

## **Senior Seminar on The Wealth and Well-Being of Nations:**

Each year, seniors in the department of economics participate in a semester-long course that is built around the ideas and influence of that year's Upton Scholar. By the time the Upton Scholar arrives in October, students will have read several of his or her books and research by other scholars that has been influenced by these writings. This advanced preparation provides students the rare opportunity to engage with a leading intellectual figure on a substantive and scholarly level.

## **Endowed Student Internship Awards:**

A portion of the Miller Upton Memorial Endowments supports exceptional students pursuing high-impact internship experiences. Students are encouraged to pursue internships with for-profit firms and non-profit research organizations dedicated to advancing the wealth and well-being of nations.

## **Charles G. Koch Student Research Colloquium and Speaker Series:**

With generous support from the Charles G. Koch Charitable Foundation, the department has initiated a research colloquium that gives students the opportunity to read and discuss seminal articles aimed at deepening their understanding of the market process. Students also develop original analysis that applies economic ideas to novel contexts. Colloquium participants receive close mentoring as they craft an article with the eventual goal of publication in a newspaper, magazine, or academic journal. The themes of the research colloquium and annual forum are supported with a monthly speaker series featuring the next generation of scholars working on questions central to our understanding of the nature and causes of wealth and well-being.

## **Annual Proceedings of The Wealth and Well-Being of Nations:**

The keynote address presented by the Upton Scholar is an important contribution to the public discourse on the nature and causes of wealth and well-being. Further, the annual forum includes presentations by noted scholars who expand upon or challenge the work of the Upton Scholar. These presentations are assembled in the *Annual Proceedings of the Wealth and Well-Being of Nations*, which serves as an important intellectual resource for students, alumni, and leaders within higher education.



THE ANNUAL  
PROCEEDINGS OF THE  
WEALTH AND WELL-  
BEING OF NATIONS

2011-2012

VOLUME IV

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To Elinor Ostrom  
*1933-2012*



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# Introduction

Emily Chamlee-Wright

As the Elbert Neese Professor of Economics, it is my privilege to introduce the fourth *Annual Proceedings of the Wealth and Well-Being of Nations*. This volume is particularly poignant as its publication marks the passing of our featured Upton Scholar, Elinor Ostrom.

Under the banner of the Miller Upton Programs, each year the Department of Economics at Beloit College features a distinguished, internationally recognized scholar who works within the classical liberal tradition. Upton Scholars are among those who have fundamentally shaped the world's understanding of the nature and causes of widespread prosperity and human development, and Elinor Ostrom certainly fits well within this company. Professor Ostrom exemplified everything the Miller Upton Programs have sought to honor: a commitment to civil discourse, a deep respect for the power of ideas to change the world, and the emancipating potential of liberal learning. It was indeed our honor to feature Elinor Ostrom, co-recipient of the 2009 Nobel Prize in Economic Sciences, as the fourth Upton Scholar.

In addition to Professor Ostrom, we featured leading scholars whose work complements hers. Our primary goal in assembling this cadre of scholars was to demonstrate that the intellectual enterprise of understanding the nature and causes of wealth and well-being is an ongoing project. The essays collected in this volume capture in written form many of the ideas exchanged, challenges posed, and questions considered during the Upton Forum and over the course of the academic year. But as the year unfolded and it became increasingly clear that Lin's health was failing, this volume took on a second and increasingly important purpose, which was to honor this great scholar and teacher. On behalf of its contributors, I therefore dedicate this volume to Lin's memory and to her work that has inspired generations of thoughtful teacher-scholars dedicated to both sides of their craft.

*A Pioneer in All Respects*

A child of the Great Depression, a first generation college student, and a pioneer for women seeking graduate training in the social sciences, Elinor Ostrom's story is a remarkable one. In an autobiographical account, Ostrom described the mental shift that was required to be the first in her family to pursue a college degree and the hard work that was necessary to finance it (Ostrom 2009). She described further her shock in learning that upon graduation, employers considered placement within a secretarial position as the only appropriate choice. In response to her initial inquiries, graduate programs in economics actively discouraged her from pursuing a PhD. The political science department at UCLA did admit her into its PhD program, but she recalled, not without heated debate about the wisdom of admitting and offering an assistantship to a woman (ibid.). The presumption was that upon graduation no reputable college or university would hire her, thereby damaging the reputation of UCLA's PhD program.

It was in the course of her graduate training that she began studying the water industry in Southern California, calling upon the work of Vincent Ostrom, Charles Tiebout, and Robert Warren (1961). Ostrom became increasingly interested in the social coordination problems associated with managing what she would later recognize as common pool resources (CPRs)—resources that are subject to appropriation by a large number of community members and, if left unmanaged, are subject to over-exploitation and degradation. This work would later form part of the foundation for her seminal book *Governing the Commons* (1990), but that would come later.

Ostrom recalled, "In 1965, Vincent was offered an attractive position as full professor at Indiana University, Bloomington. I tagged along as it was very hard for any department to hire a woman in those days. Fortunately, the Department of Political Science later needed someone to teach Introduction to American Government on Tuesdays, Thursdays, and Saturday mornings at 7:30 a.m." (Ostrom 2009). After a year of teaching freshmen-year American Government, she was offered a regular faculty appointment. For the first 15 years of her work at Indiana University, she focused on the provision of a key public good, namely police services, emphasizing again the importance of local provision and governance.

In the 1980s she returned to studying the commons through her work with a special committee created by the National Research Council, this time with a

clearer eye on the interdisciplinary nature such a program of study would require. Scholars from a wide variety of disciplines (political scientists, economists, biologists, sociologists, and so on) had studied common pool resource problems such as fisheries, forests, and water supplies around the globe, but few were aware of others doing similar work outside their own discipline. She attributes this work with helping her to recognize the ways in which the modern Academy “fragments our knowledge... Not only are we divided by discipline, but we are divided by the methods that scholars use. Economists using nationwide statistical data are critical of economists using the experimental lab to test theory. Scholars who do field research are critical of the use of any other method” (ibid. 2009).

It was to address this fragmentation of knowledge that she and Vincent Ostrom established the Workshop in Political Theory and Policy Analysis, which brings together scholars from economics, political science, and other disciplines and works collaboratively with researchers around the globe to understand how institutional rules of the game in the context of diverse ecological and political economy settings affect individual behavior and social outcomes. Through their workshop pedagogy, Elinor and Vincent Ostrom have cultivated the sense that science is a form of artisanship (V. Ostrom 1980), requiring a diversity of disciplinary perspectives and an integration of theory, experimentation, quantitative analysis and qualitative field methods (Poteete, Janssen, and Ostrom 2010). Over the years, the Ostroms and their colleagues in the Workshop in Political Theory and Policy Analysis developed a distinctive form of inquiry that is now commonly referred to as the “Bloomington School” of political economy.

### *Identifying Local Solutions to Collective Action Problems*

In grappling with the challenges surrounding the provision of public goods, such as police protection and other community services, and the management of common pool resources, such as water, fisheries, and forests, Ostrom took on central questions surrounding the nature and causes of wealth and well-being. Economists have long-studied the free-rider problem in the case of public goods and the potential threat of overexploitation in the case of common pool resources. On the one hand, market exchange is not always ideally suited to such contexts. On the other hand, government provision of public goods and natural resource management can also be fraught with political problems, such as corruption and lack of accountability.

Ostrom's research suggests, however, that many communities (in both the developed and developing worlds) have evolved varied and creative solutions to these challenges through self-governance within civil society. For example, informal norms and cultural practices, voluntary associations, and formal cooperative agreements within communities have served as effective mechanisms for managing common pool resources. This work has challenged the economics discipline to look beyond its dominant theories that focus narrowly on contexts in which individuals are entirely self-interested, and instead to focus on contexts in which individuals (self-interested though they may be) are also embedded within contexts of community that may benefit from direct cooperative behavior through well-defined rules of engagement.

Though Ostrom drew lessons of functional self-governance from local community contexts, her work does not romanticize local and indigenous solutions. Such solutions require serious attention to the incentives involved among various players, and there is no one-size-fits-all solution that is likely to work in all contexts. In fact, Ostrom was and her colleagues at the Workshop in Political Theory and Policy Analysis continue to be as interested in cases of resource management failure as success, as they are equally instructive as to the limits and possibilities that communities face. Her work has been described as "community-minded, but hard nosed" for its balanced recognition that solutions can be found within communities, but effective self-governance will not be based on community sentiment alone.

Another theme that weaves through the Bloomington School of political economic thought is the emphasis on the polycentric nature of effective self-governance. A polycentric order is one in which governance is supplied by multiple autonomous entities that can range from a local village council to a federal authority. The key elements to such a system working are that 1) each governing body possesses a sphere of autonomy that is considered legitimate and upheld by the other governing bodies and 2) the multiple governing bodies operate within a context of common overarching rules.

The successful cases of CPR management that Ostrom documented point to the central importance that local control plays in establishing rules that are effective in regulating individual behavior. Local control may be all that is needed in the context of small, relatively isolated communities. But in larger and more complex environments, such as a large metropolitan area, the self-governance that emerges at the local level may be undermined if more distant governing

bodies usurp the authority established at the local level. A polycentric model of self-governance is one in which higher levels of political authority recognize the authority vested in local-level governance and only takes on those tasks that cannot be managed at the more local level. An important feature of a polycentric model of governance is that it allows political entities to compete with one another for residents, taxpayers, or subscribers, allowing for market-like discovery to unfold in the provision of public goods (Aligica and Boettke 2009; V. Ostrom 1972; Ostrom, Tiebout, and Warren 1961).

Professor Ostrom's work made her a leading figure in the study of polycentric systems of self-governance, a line of political economic inquiry that seeks to understand the rules of the social game that are necessary for social cooperation, widespread wealth and human well-being. In the tradition of Alexis de Tocqueville, her work also instructs us on the art and science of association. In short, her work identifies solutions within civil society that replace conflict, resource degradation, and poverty with cooperation, effective resource management, and prosperity. As such, Professor Ostrom's life's work addresses questions that are at the heart of the Upton Forum on the Wealth and Well-Being of Nations.

### *The Intellectual Journey Continues*

In her keynote address offered in this volume, Ostrom discusses the tools that she and her colleagues developed to assess the likelihood of a particular social-ecological system (SES)—a common pool resource situated within a particular ecological, economic, and political environment—has for generating patterns of robust governance and sustainable development. In this piece Ostrom cautions that even though she and her colleagues have identified general principles of robust self-governance and CPR management, their research paradigm offers no panacea. Every SES requires its own multidisciplinary analysis. The analytic tools Ostrom describes do not prescribe solutions, but instead provide the research team a framework that ensures that the right questions are being asked.

The contributors to this volume extend Ostrom's work into new territory. The first three papers explore common pool resource issues in novel contexts. **Joel Mokyr** examines the ways in which “useful knowledge”—knowledge that can be applied to a wide variety of practical applications—is a common pool resource, and therefore presents all the problems associated with CPR management. The incentive problem with this particular CPR is not that it will be overused, but

that it will be under-produced. Mokyr describes how intellectual societies of the seventeenth and eighteenth centuries solved this problem by incentivizing the creation of useful knowledge even though there was usually no direct remuneration for doing so.

Like Mokyr, **Robert Garnett** also examines the commons-like properties of knowledge, but in the context of the college classroom. Garnett argues that, despite the hard work and good faith of college and university professors, the “expert-centered” model of education is a comparatively ineffective means of managing the knowledge commons. Garnett draws from Ostrom’s insights on CPR management (and the evolving dialogue on the rights and duties of instructors and students that comprises the U.S. tradition of academic freedom) to advance an alternative approach to classroom governance in which teachers and students can be understood as cooperating, not as expert and novice, but as co-occupants and co-explorers of a polycentric knowledge commons. With the right rules of the game, Garnett argues, professors and students co-create a more robust learning environment in which shared learning resources and opportunities are more effectively tapped.

Demonstrating that each year’s Upton Forum is part of a continuing conversation rather than a discrete event, **Adrian Perez** builds upon Ostrom’s work to criticize the work of the 2009 Upton Scholar Hernando de Soto. Contrary to de Soto and in keeping with Ostrom, Perez argues that narrowly defined private property rights are not always necessary to bring about economic progress, and that alternative resource management can be a viable and sometimes preferable alternative to privatization, especially in instances where effective alternative institutional arrangements are already in place.

The remaining papers explore the Bloomington School theme of polycentricity. **Jayme Lemke** deploys the concept of the polycentric order to analyze jurisdictional competition among western territories in America’s nineteenth century. Lemke argues that such territories competed with one another to leverage population growth toward statehood by offering women greater freedoms to earn wages, acquire property, and maintain control over their wealth. This case study, Lemke argues, offers an appropriate test case for evaluating the feasibility of jurisdictional competition as a means of preserving the self-governing nature of a society.

**Lynne Kiesling** asks why in this digital age the basic technology supporting the production and distribution of electric power has changed so little since the industry’s birth in the early twentieth century. She points out that one of the



fundamental advantages of polycentric orders is that they favor learning and innovation through continuous experimentation. Monocentric orders, on the other hand, tend to stifle innovation and experimentation. Kiesling argues that a monocentric regulatory paradigm—one that was ostensibly designed to make the electric power industry more efficient—has in fact created institutional barriers that have stymied technological growth in the industry.

**David Skarbek** and **Andrew Marcum** build on the theme of polycentrism as well, but in the context of informal governance that has emerged among gangs in the California penal system. Gangs are complex social systems held together by rules, sanctions, rights and obligations, but because they cannot rely on formal legal enforcement, adjudication often takes on perverse and surprising forms. Skarbek and Marcum's research underscores the point made by Ostrom that in order for self-governance institutions to generate socially beneficial outcomes, they need to be nested within a governance structure that acknowledges and upholds the legitimacy of governance that emerges at the most local level.

**Justin Ross** and **Daniel Hummel** examine polycentrism in yet one more context: the arena of public administration and finance. Ross and Hummel argue that, contrary to popular opinion, real property taxes (such as taxes on land and homes) represent a highly efficient and nimble form of public finance and that these benefits are attributable to their polycentric nature. As such, Ross and Hummel argue that reforms aimed at eliminating the property tax will ultimately undermine effective public administration.

### *With Grateful Acknowledgement*

On behalf of Jeff Adams, the Allen-Bradley Professor of Economics and the other members of the Department of Economics, I wish to acknowledge the many people who have made the Miller Upton Programs possible. First and foremost, let me say a few words about the man for whom the forum is named. R. Miller Upton was the sixth President of Beloit College, from 1954-1975. A nationally recognized leader in higher education, President Upton was known to harbor two intellectual passions. The first was a steadfast commitment to the liberal arts. He believed that the small residential liberal arts college was the ideal place to engage the "great questions," as it is here that students are expected to acquire the intellectual habits necessary for critical thinking and open civil discourse. His second passion was for the ideals of the liberal society: political freedom, the rule

of law, and the promotion of peace and prosperity through the voluntary exchange of goods, services, and ideas. He understood that transforming the ideals of liberal democracy into real institutions was at the heart of increasing the wealth and well-being of nations and peoples. We believe that the Upton Forum represents a confluence where these enduring passions meet.

I wish also to extend our thanks to everyone who played a part in making the 2011-2012 Upton Forum and associated programs a success, including the many scholars and alumni professionals who presented during the forum and over the academic year. In particular, I would like to thank Joel Mokyr who stood in for Professor Ostrom on the day she was originally scheduled to appear. With only a few days notice, Professor Mokyr was able to develop a stunning presentation that directly addressed the themes of the Upton Forum and the ideas our students had been studying all semester.

I would also like to thank Nobel Laureate Douglass North for introducing Professor Mokyr. Professor North's presence was a reminder that the lineage of visiting scholars that runs from Douglass North, to Hernando de Soto, to Israel Kirzner, to Joel Mokyr, to Elinor Ostrom is not five separate conversations, but is one ongoing conversation. A grand conversation like this doesn't just happen, however. The scholars who have participated in this conversation have been willing and eager to do so because it was Doug North who started it off. Professor North's involvement has enabled us to live up to Miller's vision for the central role a liberal arts college can play in civil society and his trust in the emancipating power of intellectual exchange.

The students in my 2011 Senior Seminar on the Wealth and Well-Being of Nations were also integral to the success of the forum. Their willingness to dive deeply into discussions of classical and contemporary works is the lifeblood of an intellectual enterprise such as this. I would like to thank four students in particular: Mashail Malik, Michael Williams, Ashley Lanham, and You Lin. In the spring of 2012, Professor Ostrom was able to join us. Following Professor Ostrom's address, Mashail, Michael, Ashley and Lin presented original research based on the ideas and influence of her work. Their professionalism and cutting edge research epitomizes the genuine discovery that takes place when students seize with both hands the opportunities a liberal education offers.

Special thanks go to Jennifer Kodl, Program Assistant to the Upton Programs and Managing Editor of this volume. Jennifer's unflappable resilience and clear-headed competence are exceeded only by the generosity of her spirit.

Finally, I would like to thank the many alumni, friends, and charitable foundations who have supported the Miller Upton Programs. When we launched this effort, our goal was to create a suite of programs that would foster the kind of intense and engaged inquiry that leads to the development of liberally educated men and women. A belief in the emancipating power of critical thinking, an unapologetic passion for ideas, and a deep respect for open inquiry in which the answers are not preordained, have been our guiding principles. If we were to honor Miller's legacy, anything less would have been unacceptable. The generosity of our contributors has allowed us to live up to the promise of those principles and has ensured that the Miller Upton Programs will serve Beloit College students and the broader community of intellectually engaged citizens for many generations to come.

This volume has personal significance for me as it represents my last official act as the Elbert Neese Professor of Economics, a professorship I have been deeply honored to hold since 2007. As I prepare to take on a leadership role at Washington College on Maryland's Eastern Shore, I find myself overwhelmed with gratitude for all that I have learned from my Beloit College colleagues, our students, and our alumni. After nineteen years of being part of this vibrant learning community, Beloit College has become, in every sense that matters, my *alma mater*. I will forever be connected to this great place of liberal learning and devoted to the people who embody Beloit's mission of engaging students' intelligence, imagination, and curiosity.

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# The Challenges of Achieving Conservation and Development

Elinor Ostrom\*

I wish to thank Beloit College for inviting me to serve as this year's Upton Scholar. In this presentation, I will examine the challenges of achieving both development and conservation. In my research, one of the puzzles that I have been struggling with is how people and their ecologies can work together. Some scholars study only ecological systems, some scholars study only people. At the Workshop in Political Theory and Policy Analysis we try to study both. This approach is essential for understanding dynamic processes that lead to, mitigate, or avoid ecological and human disasters and move toward achieving sustainability of both ecological and social systems. This research requires that we break down the disciplinary walls that prevent such discussion from happening. How we address that problem is part of what I will talk about today.

One of the primary challenges in achieving sustainability is overcoming what I call the "Panacea Trap." Panaceas are named after the Greek goddess Panacea. In her hand, she held a medicine that she told the world was the medicine that everyone should use for every ailment. We have since learned that this is a trap. The medicine might be useful for many purposes, but it is not "the" answer. In the face of multiple ecological problems, people will often say that the answer is "X." They will offer a single blueprint, such as government control, or private or community ownership. Whenever you hear things expressed in this way, be

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\* Elinor Ostrom is the co-recipient of the 2009 Nobel Prize in Economic Sciences. She is the Arthur F. Bentley Professor of Political Science and the senior research director of the Workshop in Political Theory and Policy Analysis at Indiana University, Bloomington. Professor Ostrom served as the 2011-2012 Upton Scholar as part of the Wealth and Well-Being of Nations annual forum at Beloit College.

nervous. It means that somebody is posing something as a single solution—a solution that may be useful for some settings—but it is rare that we ever find “the” universal solution. The challenge instead is to develop a social-ecological system (SES) framework to address multiple ecological problems in a variety of settings. We need to develop better theories that help us understand institutional diversity. We also need to develop databases that collect the same data in multiple places over time so we can test those theories. This work helps us to discover the principles—what I have called the design principles—that are at work in sustainable ecological and social systems (Ostrom 1990). Thus, we have an ambitious agenda ahead of us, but because we have young people involved in developing the SES framework, we believe that we have a good chance of succeeding.

Since the classic work of Garrett Hardin in 1968, it was presumed by many scholars and officials that when it came to managing common-pool resource problems, people were trapped, and unable to solve the ecological problems they faced on their own. When it came to common-pool resources, it was presumed that the only way out was to have the government come in and tell them what to do or to privatize the resource. The emphasis was placed on one of these two “solutions” rather than understanding the immense diversity of social-ecological systems that exist in the world. What we found in our research is that privatization works in some settings, government works in some settings, community solutions work in others, but each system that works fits local circumstances.

Given this institutional diversity, our work is focused on developing a multidisciplinary, multitier framework for analyzing social-ecological systems. Figure 1 illustrates how we think about a resource system (RS) such as a lake, a forest, an ocean, or an urban campus, and how it is related to a governance system (GS) of rules, the actors (A) who are interacting in it, and the resource units and services (RSU) that are formed from it. These four encompassing variables generate an “action situation” in which people attempting to solve particular problems for that social-ecological system interact with one another and generate patterns of outcomes. The SES framework facilitates the cumulative study of those interactions (I) and outcomes (O) in diverse settings.

In turn, this framework helps us build and test theories. A framework is not a theory. A framework is a language system for helping identify potentially relevant variables that we need in building and then testing our theory. If we are going to study inshore fishery systems, for example, we can develop a database based on a framework that focuses on inshore fishery systems. This database will be different



at work, and the norms operating within the community—all potentially affect an action situation. Each of these social characteristics potentially influence the ways in which people interact with the resource and with one another, and how they make decisions that lead to particular outcomes.

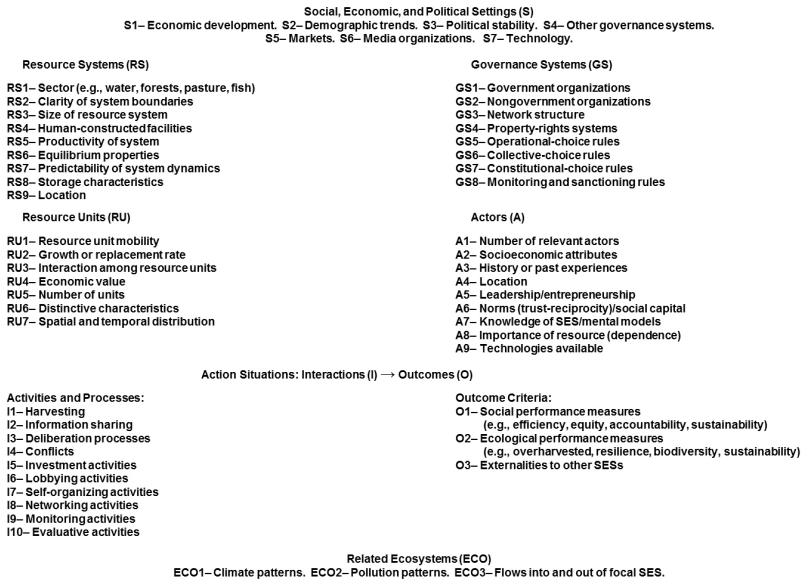


Figure 2. Second-tier variables of an SES.  
 Source: Adapted from Ostrom (2009, 421).

While this all looks very complex, we can use the framework to address three broad and critical questions. The first question has to do with what patterns of interactions and outcomes—such as overuse, conflict, collapse, or stability—are likely to result when a *particular* set of rules governs the use of a *particular* resource system in a *particular* socioeconomic and political environment? In other words, which rules generate sustainable outcomes for particular types of resources in particular social environments? What rules used in regard to grasslands and pastoral institutions, for example, generate overuse and collapse and which tend to generate adaptive use practices over time? Within the context of this very broad question, a wide variety of different rules emerge as relevant factors in generating sustainable outcomes. What we are basically interested in is identifying the kind of rules that lead to a long line of future success within these different systems.



The second type of question that we might want to address is how likely it is, in a particular setting, that people will be able to design their own systems? How likely is it that a community will be able to develop endogenous governance arrangements, use patterns, and outcomes without externally imposed rules or financing? In other words, do we need to worry about imposing institutions from the outside? Or, are well-tailored rules likely to evolve from within this type of setting? This, of course, depends on the autonomy of people living in a setting and the history and evolution of rules within different groups.

This then leads to the third type of question: How robust and sustainable is a particular configuration of rules, especially in a changing environment? In other words, what kinds of disturbances do we need to worry about in this kind of setting? Population change? Global warming? Draught? Changes in prices? In some settings, there are forest and water systems, for example, that have experienced tremendous stability for 200 years. But in the face of dramatic external changes, some of these systems are no longer robust. The question is how likely are those kinds of external or internal changes to occur? We must learn about the likely impact of such change if we are to learn how we can increase sustainability.

The next challenge then is to study social-ecological systems over time and across cases. Such studies tell us where people have developed, in some instances, very successful systems for centuries. Part of the reason that young people are very welcome in this research is that there are many case studies that have been conducted in the past that need to be replicated. Going back to those sites and studying them again is a perfect opportunity for a young scholar and has the potential to teach us a great deal about the robustness over time of rules that were identified in an earlier study.

Similarly, research that compares design principles across contexts can help us further refine our understanding of institutional diversity. Cox, Arnold, and Tomás (2010), for example, review 91 cases in which the design principles have been identified. Through this work, they find broad empirical support for the relevance of the design principles I identified in *Governing the Commons* (Ostrom 1990). But they also identified areas where further refinement was needed so as not to confuse ecological factors with social factors. They clarified, for example, that in discussing boundaries, it is important to treat the boundaries of the resource system itself and the boundaries that distinguish between legitimate users and nonusers of the resource. By separating these two different kinds of boundaries,

we can test, in the long run, whether the source of success or failure has to do with one, or the other, or both. Cox, Arnold, and Tomás (2010) also refined the design principle of congruence, or alignment of the rules with the specifics of the context. Once again, they argue that it is important to distinguish between rules that are congruent with the resource itself, and rules that help govern the distribution of benefits and costs to the people using the resource. Finally, in my previous work I have stressed the importance of monitoring. They agree that monitoring is indeed important, but again argue that it is best to treat separately the monitoring of users' activities and the monitoring of the resource system itself. With these refinements, we are able to develop better empirical tests and our understanding of why certain rules work best in particular contexts.

A central question is *why* institutional arrangements that develop in a local social-ecological context and are consistent with the design principles tend to enhance institutional robustness. One reason is the mutual investment such design principles require of participants. When you are expected to invest in costly activities, and you think that others are similarly invested, it is in your interest to make the most of that investment. Another common feature of robust design principles is that the people most knowledgeable about a system—those who know best what the effects of the rules will be—are the ones who make many of the rules. Further, robust institutions tend to be those in which resource users have developed effective mechanisms for managing the conflicts that will inevitably arise—mechanisms that are considered fair by the people governed by them. It is also important to recognize that a diversity of governance units stimulates learning and enhances performance. Institutional diversity helps to ensure that when one system fails to bring about sustainable results, resource users can search for a better approach and learn from the experiments of others. Part of this diversity is to allow for both large and small units to complement one another.

Our future work at the Workshop in Political Theory and Policy Analysis and with colleagues at multiple universities and research centers is to continue developing a common interdisciplinary language and identifying core concepts, definitions, and key terms for the multiple aspects of the SES framework. We will continue to develop a foundation for theoretical applications and future empirical studies. We have plans to study forests, water resources, and fisheries over time, including sites in the American West Coast, Kenya and Uganda in Africa, Bolivia

and Mexico in Latin America, and India and Nepal in Asia. And in each of these contexts we will be examining which propositions hold under diverse resource conditions.

I look forward to hearing more about the work being pursued by Beloit College students along these lines.

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# The Commons of Knowledge: A Historical Perspective

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**K**nowledge is a classic commons problem. As Elinor Ostrom and Charlotte Hess (2007: 41) point out, knowledge is a shared resource, but it is quite different from the main focus of Ostrom's work, which was resources that were common but depletable (such as land, clean air, and water). Knowledge is what economists would call a "classic non-rivalrous or non-subtractable good," in which adding a marginal user does not reduce the consumption of other users. As a result, there is no danger of overexploitation (Bollier 2007). The main danger is not a "tragedy of the commons" kind of problem but underproduction. Because knowledge is also characterized by high exclusion costs, meaning that it is difficult to force people to pay for knowledge once it is produced, there is a serious danger of consistent underproduction of useful knowledge, as Arrow pointed out half a century ago (Arrow 1962).<sup>2</sup> This highlights a deep and pervasive difficulty in the economic history of the Industrial Revolution. If it is granted that modern growth is characterized by being increasingly propelled by technological change, that is to say, advances in *useful knowledge*, what kind of institutions resolved the commons problem?

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<sup>1</sup> The comments of Regina Grafe, Margaret C. Jacob, Lynne Kiesling, and Sarah Maza on an earlier version were most helpful in improving and earlier draft of this essay.

<sup>2</sup> As David (2004a: 577) notes, the "appropriability problem" emphasizes that openness in science sets the stage for market failure due to free-riding problems. While this is not quite identical to the commons problems emphasized by Ostrom, the similarities are quite striking (Hess and Ostrom 2007: 4–5).

The answer should be found in Western Europe in the era just preceding the Industrial Revolution, that is to say, 1600-1750. The culture and institutions of useful knowledge changed in this era, and helped create an edifice of rapidly growing knowledge that sooner or later was brought to bear on production technology. In the eighteenth century, this movement culminated in what I have called the *Industrial Enlightenment*: a transnational movement toward the creation, dissemination, and application of experimental philosophy (as contemporaries referred to what we would call science) to the “useful arts” (see Mokyr 2002, ch. 2 and Mokyr 2009, chs. 2-4). Some of this knowledge turned out to be quite effective, but it is equally true that some of the central inventions of the Industrial Revolution required no more scientific insight than what Archimedes knew.

But generating that useful knowledge was far from a trivial matter precisely because of the appropriability issues mentioned above, and it is perhaps not surprising that of all the societies that ever existed, it was only Western Europe after 1600 that managed to create the conditions for this knowledge to accumulate at an ever rapid pace, enough to eventually affect every aspect of production. To understand how and why this happened, it helps to rely on Ostrom’s insight of the notion of a community-management of a commons resource. My argument here is quite simply that such a community emerged in post-renaissance Europe, and that it was essential in creating the useful knowledge necessary for sustained economic growth. Such an outcome may have seemed unlikely at first: Europe was enormously fragmented politically, and managing any resource by a public institution on more than a local scale seems to be beyond the power of any entity. Not only that much of the Continent was divided amongst small units, but even those that were ostensibly combined in larger political units had to cope with the virtual autonomy of many of their constituent parts.

The community in question was known in its time as the *Respublica Literaria* or the Republic of Letters (Daston 1991; Brockliss 2002; Darnton 2003). The Republic of Letters, as Ian MacLean (2008: 17) points out could be seen from different angles: a community of scholars, the content of the ideas they fostered, the means of disseminating them, as the institution that set standards of persuasion (adequacy of proof, reproducibility of experiment), attitudes to collaboration and disclosure, and so on. For my purposes here, it can be compared to the communities that set social norms and informal rules that led to a cooperative outcome that turned out to be Pareto-superior. This is not to argue that it came into being or persisted *because* it was superior. But whatever brought it about,

it turned out an institution unique in human history and, in the end, a key to understanding where the long road that led to the “European Miracle” began.

While its beginnings as a major intellectual institution can be dated to the earlier days of Erasmus of Rotterdam (MacLean 2008: 18), the Republic of Letters clearly reached full maturity in the early decades of the Enlightenment, 1680-1720 (Ultee 1987: 97).<sup>3</sup> It was above all a *virtual* community: it had no formal institutions, no annual congress, did not publish its own periodical, and yet it managed to create and enforce a substantial number of rules that amounted to the emergence of open science in Europe. The members of the community were highly educated, and with few exceptions literate both in Latin and their own language. While most of them were still quite religious (including many eminent Puritans in seventeenth century England), members were open minded, eschewed rigid dogmatism, and accepted (if sometimes reluctantly) the discipline of evidence and logic. Ancient authorities in physics, astronomy, medicine and other areas were still read and paid lip service to, but clearly this community’s most fundamental premise was it was acceptable to question the “ancients” and overturn their findings if the evidence called for it, and that they were wrong on many matters. For communications, it depended on the publication of books, newsletters, periodicals, and pamphlets, and an ever-increasing set of epistolary and personal networks (Collins 1998).<sup>4</sup> Indeed, letters were at the very heart of the *modus operandi* of the Republic of Letters (Ultee 1987). Correspondence clearinghouses or “offices of addresses” were set up, in which private communications were further disseminated.<sup>5</sup>

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<sup>3</sup> The earliest mention of the term actually goes back to 1417 (Waquet 1989: 475).

<sup>4</sup> Examples of nodal figures in these epistolary networks were Samuel Hartlib (1600-1662) and Marin Mersenne (1588-1648), both of whom maintained extensive correspondences with the major intellectuals of their age (Webster [1975] 2002: 67-77 and *passim*; Webster 1970: 8; Collins 1998: 528). Hartlib was known as an “intelligencer,” essentially a clearinghouse for new information. In the century following, periodicals increasingly supplemented epistolary networks. More than a century later, François Rozier (1734-1793), publisher of the *Observations sur la Physique, sur l’Histoire Naturelle, et sur les Arts* (widely regarded as the first independent periodical to be concerned wholly with advances in cutting-edge science) assured the American Philosophical Society that “all of Europe will be informed in less than three months” if they sent the new information first to him and that such correspondence would be “indispensable for the progress of science” (McClellan 1979: 444).

<sup>5</sup> These clearing houses had often the purpose of exchanges, where employers could find employees but in other cases they just traded information. One of the first was associated with the French physician Théophraste Renaudot (1586-1653), which was emulated in England by the irrepressible Hartlib, whose office of addresses purported to act as a “Center and Meeting-place of Advices, of Proposals, of Treaties and of all Manner of Intellectual Rarities” (Webster 1970: 44-47; Jacob 2006: 48).

To be a member of the Republic of Letters was to be connected with others. As Paul Dibon (1978: 46) has noted, “it was the strict duty of each citizen of the *Respublica Litteraria* to establish, maintain, and encourage communication, primarily by personal correspondence or contact.” In the 1660s, the first formal organizations embodying the ideals of the community were established. The British Royal Society was a bottom-up organization growing out of the “invisible academy” of Baconians, whereas the French Royal Academy was a government initiative by J-B Colbert. In between those formal organizations and the completely “virtual” epistolary networks there were the many semi-formal manifestations of literary clubs such as the *société amusante* of Berlin which met every Wednesday at the home of one of its members “with the goal of instructing and diverting themselves at the same time” (Goldgar 1995: 2). Part of it was the “public science” that could be found in coffee houses, taverns, and other informal local venues (Stewart 1992).<sup>6</sup> These institutions soon started to publish scientific periodicals, such as the *Journal des Scavants* and the *Transactions of the Royal Society*, both of which began appearing in 1665 (though neither was at first wholly dedicated to scientific and technological topics). These periodicals were a substitute to printed books and personal correspondence, and created what we call today the scientific paper (McClellan 1979: 425).<sup>7</sup> Even more powerful as a means to disseminate knowledge, technical and other, was the Encyclopedia, a form of knowledge organization and dissemination inspired by Bacon and in some ways the culmination of the European Enlightenment (Headrick 2000; Mokyr 2002: 66-69). By 1780 or so, many of the institutions of the generation and diffusion of science and technology that are still with us were in place in Western Europe. A century and a half may perhaps seem a long time for these institutions to develop, but nowhere else can we discern anything comparable. The Republic of Letters fancied itself an autonomous unit with its own rules and institutions and not subject to the norms and values of the rest of society, rising “above the petty concerns of state and church or so at least they claimed” (Goldgar 1995: 3). Pierre Bayle, the French Huguenot philosopher who lived in

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<sup>6</sup> John Houghton (1645-1705), a pharmacist and early writer in the best of the traditions of the Industrial Enlightenment, wrote in 1699 “coffee-houses improve arts, merchandize, and all other knowledge; for here an inquisitive man, that aims at good learning, may get more in an evening than he shall by books in a month” (cited by Cowan 2005: 99).

<sup>7</sup> For more details on the growth of scientific periodicals in the age of Enlightenment, see Mokyr (2005).



exile in Rotterdam and was one of the Republic's early focal points, wrote that "The Common-wealth of learning (Republic of Letters) is a State extremely free... the Empire of Truth and Reason is only acknowledged in it... everybody is both sovereign and under everybody's jurisdiction... the laws of the society have done no Prejudice to the Independency of the State of Nature as [much as to] Error and Ignorance" (Bayle 1734, Vol. II: 389, essay on *Catius*).

The Republic of Letters, then, was decidedly not a construct of modern historians. It was very much an institution of which contemporaries were fully conscious, and they realized its significance. Bayle began publishing his newsletter named *Nouvelles de la République des Lettres* from 1684, printing it in his relatively safe abode in Holland. Bayle said of his "citizens" that "we are all equal, because we are all the children of Apollo" (cited by Dibon 1978: 45). But "all" pertained to an elite that was estimated in Bayle's age to have 1,200 members, and a century later perhaps 12,000 (Brockliss 2002: 8). While the evidentiary base of these estimates can be questioned, there is no doubt that the number of people involved was small. The exact locus of the Republic is a source of some debate. It could be insisted that it existed only as a virtual entity, kept alive by letters and publications that were read by all. But some of it was clearly located in the Royal Society and the French Royal Academy, and the many Continental academies founded in the eighteenth century. Others such as Goodman (1991: 184) see the Parisian Salon as giving the Republic a source of order to the social relations and discourse of the Republic of Letters, a somewhat Francocentric point of view perhaps (Melton 2001: 211).

Unlike the other communities that form the basis of Ostrom's devastating critique of the commons "tragedy," the Republic of Letters was not a local affair and not bound by space. Its operation was based by and large on transcending distance by means of the written or printed word. In fact, it was the very opposite: it was a network of individuals connected by letters, books, pamphlets, and rare but intense personal visits. While there were differences in local institutions and styles, the common denominator of members were their social class, their commitment to what they believed was the growth and dissemination of knowledge, and their Baconian belief that this knowledge may in the end be of service to mankind as a whole. It should be added that their social class over this period was rising, and that men of letters who previously had lived their life with their solitary studies, surrounded by a few colleagues, now found themselves rising in the esteem of their society, invited to fine salons, and expected to dress

well and behave according to the manners and etiquette prescribed by the culture of the elite.<sup>8</sup> To be sure, there was an intellectual underworld of Grub Street hacks immortalized by Robert Darnton, but its impact on the economy — outside that of spiced-up literature — was probably minor.

The ethos of the Republic of Letters conformed to a great extent to Robert Merton's famous characterization of the ethos of science.<sup>9</sup> The most important "rule" of this community was that new knowledge should be placed in the public realm when it was generated. The creator would earn a property right as the rightful discoverer, but such property rights did not include the right to exclude others from using it. Instead, the originator was credited by other members of the community as the original inventor. That this system did not work perfectly goes without saying, as the many priority struggles between scientists attest.<sup>10</sup> The openness was in large part driven by an ideology regarding the moral duties of scientists in their societies. As Descartes noted, "I believed that I could not keep them [my notions concerning physics] concealed without greatly sinning against the law which obliges us to procure... the general good of mankind. For they caused me to see that it is possible to attain knowledge which is very useful in life...and thus render ourselves the master and possessor of nature" (Descartes [1641] 2005: 28). But an economist tends to suspect that beside morality and ideology, there may also have been material motives. The incentives that drove this system, as Paul David (2004b, 2008) has pointed out was through a signaling

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<sup>8</sup> In this regard, the Republic of Letters is a good example of what Deirdre McCloskey (2010) has called "Bourgeois Dignity" — the growing value that society placed on features that might be of general utility.

<sup>9</sup> Merton ([1942] 1973) notes four basic characteristics: universalism (knowledge is not specific to a single group); communism (the knowledge is shared by placing it in the public domain and thus becomes a "commons problem"); disinterestedness (researchers and philosophers search for a truth, to be policed and verified by their peers); and organized skepticism (the unwillingness of those in search of knowledge to be constrained by preconceptions).

<sup>10</sup> The earliest priority fights are found in the sixteenth century, such as that between the astronomers Tycho Brahe and Nicolaus Reimers ("Ursus") Baer. Of those, the fight between Leibniz and Newton on the invention of differential calculus is the most famous, but that between Newton and Hooke on optics and between Hooke and Huygens on the invention of the spiral-spring balance in watches are well documented. Equally nasty, if more obscure, is the fight between two Dutch scientists, Jan Swammerdam and Reinier de Graaf on the discovery of a technique to study female reproductive organs around 1665. According to an unsubstantiated account, De Graaf died as a result of the exhaustion caused by the priority dispute.

game, that had patronage jobs as their payoffs, although in some cases publishing a successful book could be remunerative. The economic organization of the Republic of Letters was through signaling. David also notes that it was difficult for outsiders to judge the quality of the members of the community, and the members of the Republic of Letters thus set up mechanisms that sent out signals about the quality of their peers. In other words, the way the system worked was for ambitious scientists to establish a reputation as a high quality person by impressing his teachers and colleagues, who would then recommend him for such patronage jobs. Reputations were transnational. As Daston puts it well, “the avowed foundation of the ...diffuse and often quarrelsome Republic of Letters... was *merit*... and many Enlightenment intellectuals came to believe that foreigners were more trustworthy judges of merit than compatriots” (1991: 379, emphasis added and slightly rearranged).

Patronage could take different forms. Much of it was handed out by the princes and kings of Europe who collected intellectuals at their courts in part just for prestige reasons, but also because their insights could help guide policies and their expertise could come in handy. Galileo was an early case: in 1610 he was appointed as court mathematician and philosopher by the Grand-duke of Florence, and as such he was free to pursue his research (as long as it did not conflict too much with religious doctrine — but that is another story). Leibniz, another intellectual superstar, was hired in 1676 by the Duke of Brunswick-Lüneburg (after 1692 Elector of Hanover), whom he served all his life. Newton was made warden and later master of the English mint in London. Many lesser lights had to struggle for such patronage jobs, but in general the higher one’s scientific reputation, the better the chances.

There were of course exceptions to this rule. Many of the scientists in this period did not seek patronage. The interesting case of Isaac Newton shows how reluctant he was to seek patronage. The work that formed the core of the *Principia* was only done at the prompting of Edmond Halley, who repeatedly visited Newton at Cambridge and urged him to complete the work; it was a difficult work that could be read only by a handful of scientists. All the same, it was enough to launch Newton’s life into a new orbit of intellectual superstar with one of the best patronage jobs in England. Yet his biography makes it rather clear that this patronage was a by-product, not the original purpose of writing the *Principia*. Some eminent members of the Republic of Letters, such as Robert Boyle, were

wealthy and had no need for patronage — and handed it out themselves.<sup>11</sup> Antonie van Leeuwenhoek, the eminent microscopist who sent his findings in letters to the Royal Society in London, was a well-to-do Delft merchant, and never seems to have sought more for his work than the satisfaction of his personal curiosity and peer recognition and respect. Not *all* science was open: Newton and Boyle, among others, were rather secretive about their alchemical work, and some notable but eccentric scientists such as the astronomer John Flamsteed and the chemist Henry Cavendish steadfastly refused to release their data until they saw fit. But these were exceptions — the pressures to conform to the new rules ensured widespread compliance.<sup>12</sup>

Reputations were international; the high mobility of European intellectuals was both a cause and a consequence of this mobility. Many of the great minds of the time, including Vesalius, Descartes, Huygens, Bayle, Maupertuis, Diderot, and many others ended up in foreign countries. The implications of the footloose nature of European intellectuals are profound, and I have explored them elsewhere (Mokyr 2006). But what matters here more than anything is the fact that their mobility underscores the disconnectedness of this community from location. This is not to say that these people were devoid of national loyalty or prejudice; the idea that “the sciences are never at war” was more ideal than reality and the tolerance that was preached related to religion, not nationality (Lipkowitz 2010).

The Republic of Letters, on the whole, was committed to Open Science, although the tension between the desirability of making all science accessible in the public realm and the need to protect the natural rights of the inventor and the obvious necessity in providing incentives remained a topic of discussion. The compromise that emerged and that has held up in rough outline to the present day is that *propositional* knowledge (the knowledge of natural phenomena and regularities) would be subject to the rules of open science, whereas *prescriptive* knowledge (technology) could in principle be protected either by secrecy or by

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<sup>11</sup> The case of Robert Hooke, a poor but highly talented scientist, who for many years was on Boyle’s payroll and part of his household, exemplifies this kind of patronage. It is perhaps no accident that Hooke was one of the scientists who strongly advocated a modified version of open science in which secrecy would be preserved because otherwise those who were “not qualified ...will share the benefit” (Eamon 1994: 348).

<sup>12</sup> As Waquet (1989: 493) notes, “The age of secret had passed; to publish became the rule and we know that Mersenne would actually resort to tricks to compel reluctant scholars to become authors. To work for the public interest became henceforth the watchword and the praise of peers had to make room for the public interest [as the main incentive for scientists].”

temporarily excluding others from using it through a patent system (Mokyr 2002). While the precise details of this division varied from place to place and over time, it was an arrangement that worked well enough to propel the West to a technological and scientific domination that lasted three centuries.

Although the Republic of Letters was dependent on beliefs and values, it had little to do with popular culture. It was confined to a small sliver of Europe's "polite society" — educated, literate, polyglot, and cosmopolitan. It was also predominantly male, although at times women did play important roles.<sup>13</sup> The "invisible college" that emerged in the late seventeenth century in full bloom was successful precisely because it was relatively small. Cooperative behavior was encouraged and defectors could be recognized and punished. This kind of equilibrium is more likely to emerge if the "game" is played over and over again, if the participants share an "ethos" of cooperation and know that others do, and if the numbers remained small enough so that opportunistic behavior could be and would be punished. As David (2008: 77) notes, "the norm of cooperative disclosure provided the basis for repeated, reciprocal information transactions that on balance would be conducive to further enhancing the members' reputation." For those reasons, "membership" in the Republic of Letters was limited and not costless. In principle, the Republic of Letters fancied itself to be egalitarian, although this was of course not the case in practice. Yet its hierarchy was ordered quite differently than the rest of society: neither ancestry nor wealth were supposed to count for much: merit, originality, achievement, and erudition were keys to one's place in the hierarchy, and were always formally contestable.

The Republic of Letters believed that useful knowledge should be placed at the disposal of those who might want to use it for technological purposes. It is not surprising that any concrete economic benefits from this ethos were many decades in the future. Technological advances that could be traced directly to scientific insights were still few and far between before 1800, although both the steam engine and chlorine bleaching were notable exceptions. Yet useful knowledge was more than just scientific discoveries. It also involved a large number of publications about engineering and production technology in a bewildering array of fields, which took the form of encyclopedias, compendia, handbooks and dictionaries of various kinds, and planned series of books that purported to cover all fields of

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<sup>13</sup> This matter is still in some dispute. For a useful summary, see Melton (2001: 209-11).

economic activity known at the time.<sup>14</sup> Engineering manuals and handbooks in a variety of useful fields were published, translated, pirated, and presumably read at a wider scale than ever before. This was even true in fields where the impact on actual production may seem small before the great advances of the late eighteenth century such as chemistry. P.J. Macquer's *Dictionnaire de Chimie* was published in 1766 and translated into English in 1771 by the chemist James Keir.<sup>15</sup> The publication of books on agriculture and farming manuals by such luminaries as Arthur Young, John Sinclair, Lord Kames, James Hutton, William Marshall and many lesser writers were indicative of the fundamental premise of open science.

Openness meant that new knowledge would be placed in the public realm and was therefore accessible to potential skeptics and critics who tried to reproduce and verify the findings. Thus, openness meant that useful knowledge became more reliable. The reason is that non-specialists contemplating using a specific piece of useful knowledge would know that the self-policing community of specialist experts had vetted it. Knowledge that might be used for practical purposes had been examined and tested by critical experts, and that if it had survived that ordeal, it would be more likely to be correct.<sup>16</sup> Such reliance on peer review could be very treacherous, of course, and a great deal of nonsense and misleading knowledge circulated in this age, nowhere more than in medicine. All the same, there was a built-in mechanism to get it right, and no matter how resistant entrenched incumbents could be, in the end erroneous and dysfunctional paradigms, from phlogiston chemistry to miasmatic medicine were eventually cast aside.

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<sup>14</sup> Early examples include Antoine Furetière's *Dictionnaire Universel des Arts et Sciences* (1690), John Harris's *Lexicon Technicum*, which appeared in 1704, and Ephraim Chambers's *Cyclopaedia*, first published in 1728, and which went through many editions. The most massive of those efforts in the eighteenth century was probably the eighty volume *Descriptions des Arts et Métiers* (1761-88) produced by the French Académie Royale des Sciences, which included 13,500 pages of text and over 1,800 plates describing virtually every handicraft practiced in France at the time (Cole and Watts 1952: 3).

<sup>15</sup> Macquer, *Dictionary of Chemistry*. Originally printed in 1771, a fifth edition had already been published by 1777, indicating the success of the work.

<sup>16</sup> Bayle ([1697/8] 1734: 389) stressed this important aspect of peer review: "every particular Man has the Right of the Sword and may exercise it without asking leave of those who govern...against Authors who are mistaken...It is true, the Reputation of being a learned man which an author has acquired is sometimes diminished thereby... but if it be done in support of the Cause of Reason and for the interest of the Truth, no Body ought to find fault with it."

A fundamental axiom of the Republic of Letters was that all knowledge was contestable and that there were no sacred cows among scholars. In that regard, the change relative to medieval Europe was still quite dramatic. In the fourteenth century, Oxford University had a rule on the books that every master who deviated from Aristotle's *Organon* would be fined 5 shillings for every case of deviation (Devlin 2000: 58). This rule was still on the books at the time Giordano Bruno visited Oxford (in 1583). But by that time, much of Europe's intellectual community was becoming gradually more heterodox.<sup>17</sup> In the sixteenth century insolently skeptical scholars such as Ramus, Paracelsus, Copernicus, and Giordano Bruno were still courageous exceptions. By the time of Galileo, Beeckman and Gassendi, the old Aristotelian orthodoxy was explicitly questioned and challenged. In 1660, the British Royal Society chose as its motto *in nullius verba* – on no one's word. As a result, much of the work of classical writers in physics, astronomy and medicine was eventually discarded. The Ptolemaic world was unceremoniously dumped in favor of the sounder heliocentric universe. New discoveries about the human body by physicians such as Andreas Vesalius and William Harvey also cast doubt on the canon of medicine such as Galen and Avicenna. But merit, quality, and distinction remained highly subjective and the Republic of Letters created the basic system of peer review that still rules the world of intellectuals. As every academic knows, this is a highly fallible and corrupt system, in which incumbents jealously defend the status quo and in which senior scholars do all they can to protect their human capital from technological obsolescence and undesirable criticism. But it worked far, far better than any alternative that could be dreamed up.

The significance of the Republic of Letters and its subset, the Republic of Science, was not only that it provided the underpinnings of the Scientific Revolution as David has argued persuasively. It serves as illustration of why cultural change in early modern Europe was both faster and moved in a different direction than it did elsewhere. The main source of Europe's success was that it combined political fragmentation with cultural unity and thus had the best of all possible worlds. If it had had one without the other, something would have

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<sup>17</sup> Petrus Ramus (1515-1572), a French philosopher and logician made a career out of slaughtering the holiest of holy cows, namely Aristotle's logic. His promotion lecture (1536) was actually entitled "Everything that Aristotle ever taught is wrong." Paracelsus (1493-1541), sometimes known as the "medical Luther," was a notoriously quarrelsome and provocative physician and chemist, who relentlessly attacked the accepted and revered medical doctrines of his time as codified by the classical authors of medicine, whose books he burned in public to show his contempt for the wisdom of the "ancients."

gone wrong. Political fragmentation in a culturally fragmented world like Africa or India would have led to cultural stagnation because no cultural entrepreneur would have been able to cover his fixed cost while catering to a “market” (or audience) of a few thousand people. But in Europe, cultural entrepreneurs from Erasmus and Luther in the early sixteenth century to Newton and Leibniz in the late seventeenth, were famous throughout the Continent.<sup>18</sup> And while most only catered to a small elite, they could access their audiences throughout the Continent and try to persuade scholars in different countries, thus not only selling books but hopefully find a wealthy and powerful patron who would underwrite their careers, protect them from possible reactionary elements, and support an appointment that would permit them to do their scientific work at an acceptable level of comfort. At the same time, the political fragmentation that was coupled to the cultural unification prevented incumbents from effectively suppressing innovators. Effective suppression required close coordination between the conservative powers, and political fragmentation meant that for all practical purposes such coordination was not forthcoming. Political and social pluralism was coupled with a well-coordinated community that “managed” the creation of new knowledge.

Why did the Republic of Letters emerge when it did? There had always been a transnational intellectual community in Europe, but it had been institutionalized in the Christian Church and Latinized culture. As the church was weakened and then divided, it left a vacuum that could be filled by scholars more interested in worldly topics. We must also allow for the growth in the technology and institutions of long distance communication. The effect of the printing press, although perhaps not as immediate as might be imagined by the observer in the twenty-first century accustomed to the meteoric emergence of mass-communications and network technologies, was quite palpable in the mid sixteenth century (Dittmar 2011). The improvement of shipping and road transportation, as well as that of the postal system, were essential for a virtual institution dependent on epistolary networks.<sup>19</sup> David (2008) argues that as aristocratic patrons found assessing the true quality

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<sup>18</sup> For a more detailed discussion of the concept of cultural entrepreneurs, see Mokyr (2012)

<sup>19</sup> The improvement of the postal system took place thanks to the organizational abilities of de Tasso family, led by Francisco de Tasso [(1459-1517), later known as Franz von Taxis] and his brothers who established regular postal services in Italy, Germany and the Habsburg lands in the early sixteenth century. Their postal system covered much of the Continent by the middle of the sixteenth century and created one of the most durable business dynasties in history.



of science increasingly difficult as knowledge (especially mathematics) became more complex, they had to depend on the judgment of expert peers to determine who was worthy of patronage. Therefore, every scientist would first and foremost want to impress other scientists and make sure they knew of his work. Yet there can be little doubt that above all that there was a growing realization that the Republic of Letters had a mission, most cogently expressed by Francis Bacon, to generate and disseminate useful knowledge that might one day contribute to material progress, that is to say, economic development.

The exact connection between the Republic of Letters and the Enlightenment has remained the matter of some controversy between scholars. As Brockliss (2002: 8) notes, today's consensus seems to regard the Republic of Letters and the Enlightenment as "distinctive entities" (though he begs to differ). For an economist, however, what mattered most about the Republic of Letters was its functioning as a virtual community that managed a common valuable resource and created the incentives for talented people to create new knowledge and overcome the Arrow dilemma. What mattered most about the Enlightenment was the *Industrial* Enlightenment, the commitment to a belief that the accumulation and dissemination of useful knowledge could and would lead to economic development and material progress. As Jacob and others have shown, the links between natural philosophy on the one hand and engineering, medicine, and agriculture on the other demonstrate the economic impact of this intellectual movement. It consisted of a small sliver of the population, but one that was key to subsequent economic growth. There was much more to the Enlightenment than that, of course, but if we accept that the element that changed Western economies in the late eighteenth and nineteenth centuries was above all technological progress, it is this aspect of the Enlightenment that is most relevant to our story. In that regard, the Republic of Letters and the Enlightenment were two sides of the same phenomenon. It continued straight through the nineteenth century into the modern age. It may well be the most significant example of successful commons management in human history.

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# Ostrom and Liberal Education: The College Classroom as Knowledge Commons

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## 1. Introduction

The reach and depth of student learning is an increasingly pressing issue in U.S. higher education (Bok 2006). In *Academically Adrift: Limited Learning on College Campuses*, Richard Arum and Josipa Roksa (2011: 36) report that nearly half of their 2300-student sample showed no significant gains in critical thinking, complex reasoning, and writing skills during the first two years of college. Their results corroborate similar findings within specific disciplines, for example in economics (Walstad and Algood 1999, Hansen, Salemi, and Siegfried 2002, Salemi and Siegfried 1999).

While casual explanations of these trends point to distracted faculty or unmotivated students, Arum and Roksa point to evolved cultural norms that shape teacher and student expectations and behaviors. In their view, learning resources are chronically untapped due to the prevalence of what higher education scholar George Kuh describes as a “disengagement compact” between teachers and students (Kuh 2003: 28).

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There seems to be a breakdown of shared responsibility for learning – on the part of faculty members who allow students to get by with far less than maximum effort, and on the part of students who are not taking full advantage of the resources institutions provide.

Physics educator Carl Wieman adds an epistemic thread to the Kuh/Arum/Roksa diagnosis, focusing on the gap between good intentions and bad results. Wieman claims that the majority of physics educators evince a “sincere desire to have their students learn physics and appreciate its usefulness and inherent intellectual beauty” (Wieman 2007). Yet limited learning persists. Why? Wieman points to the “curse of knowledge”: the fact that “when you know something, it is extremely difficult to think about it from the perspective of someone who does not know it” (ibid.). In the case of physics education, Wieman argues, “well intentioned physicists are achieving poor educational results because the ‘curse of knowledge’ makes it very difficult for them to understand how physics is best learned by a novice student, or to accurately evaluate that learning.” Hence, Wieman concludes, “it is dangerous, and often profoundly incorrect, to think about student learning based on what appears best to faculty members, as opposed to what has been verified with students” (ibid.).

In this paper, I employ Elinor Ostrom’s unique perspective on common resource governance to shed fresh light on the “limited learning” problem, building upon the historical-institutional-epistemic insights of Wieman, Kuh, Arum, Roksa, et al. Though Ostrom has never, to my knowledge, extended her analysis to teaching and learning per se, I believe the college classroom (the space of learning, broadly defined) is aptly described as a common pool resource (CPR), i.e., a knowledge commons. My motivating premise is that while many college educators subscribe to this “commons” perspective in principle, they unwittingly undermine its integrity – and students’ learning – by habitually enacting the practices and assumptions of “expert-centered” education – or by imagining that the alternative to expert-centeredness is a student-centeredness that in many instances is equally corrosive of learning.

Professor Ostrom’s work, along with an extensive body of educational literature (Campbell and Smith 1997, Finkel 2000, Tagg 2003, and many others), gives rise to an alternative view in which teachers and students can be understood as cooperating, not as expert and novice, and not as equal partners either, but as co-occupants and co-explorers of a polycentric knowledge commons – a shared space

of knowing. To reveal the distinctive insights of an Ostrom-based approach, I will draw jointly from Ostrom's work and from the rich perspective of my favorite former Beloit, Parker J. Palmer, whose spectacular book, *The Courage to Teach* (Palmer 1998), literally changed my life when I stumbled upon it twelve years ago. Lastly, I will illustrate the value of an Ostrom view of the college classroom as knowledge commons by reflecting briefly on the U.S. tradition of academic freedom as an evolving dialogue on the rights and duties of instructors and students within the shared space of inquiry. The historical-institutional complexity of this ongoing process of "getting the institutions right" suggests the salience of Ostrom's approach – indeed, it suggests the superiority of a "knowledge commons" view of the college classroom over the "marketplace of ideas" conception that has undergirded legal definitions and defenses of academic freedom since the early 20th century (U.S. Supreme Court 1919, 1967).

## 2. *The Expert-Centered Classroom*

When I think of an expert-centered learning space, I think of Captain Georg Von Trapp and his children in *The Sound of Music* (2000 [1965]). Before Maria arrives on the scene, the Captain holds his children and their ideas at arm's length. The family is organized as a monocentric platoon, governed by the Captain and his whistle. This enduring image of the Captain and his children maps closely onto Palmer's depiction of the expert-centered *classroom* (Palmer 1998), shown in Figure 1. In this model of education, teacher and students are cast as expert and amateur, respectively. The knowledge conveyed from teacher to student consists mostly of pre-digested arguments and conclusions from *other* experts. As the unidirectional arrows suggest, students are assumed to possess no knowledge worthy of sharing. The teaching process is conceived as a one-way flow of information, from teacher to student (*ibid.*).

To see what is missing from this picture, consider these statements from two educational philosophers, American John Dewey and Hungarian Laszlo Versényi:

No thought, no idea, can possibly be conveyed as an idea from one person to another. When it is told, it is, to the one to whom it was told, another given fact, not an idea. The communication may stimulate the other person to realize the question for himself and to think out a like idea, or it may smother his intellectual interest and suppress his dawning effort at thought. But what he directly gets cannot be an idea. Only by

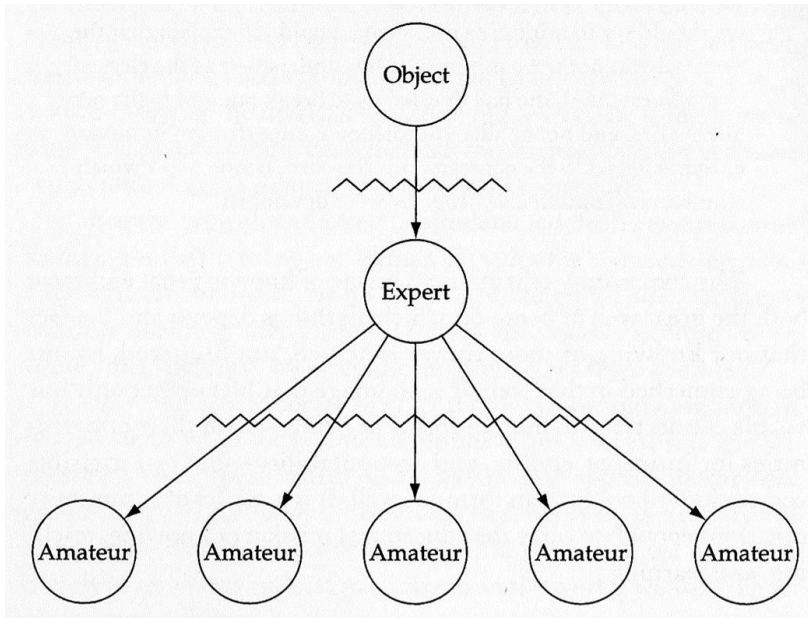


Figure 1: *The Expert-Centered Classroom* (Palmer 1998, 100)

wrestling with the conditions of the problem at first hand, seeking and finding his own way out, does he think (Dewey 1916: 159).

Real education aims at imparting knowledge rather than opinion ... [K]nowledge cannot be handed over ready-made but has to be appropriated by the knower ... [and] that appropriation is only possible through one's own search ... [T]o make a man aware of his ignorance is to start a man on the search for knowledge (Versényi 1963: 117).

Dewey's point (standing on the shoulders of Socrates, Augustine, and other giants of liberal education) is that *direct* instruction is fruitless. Like all forms of help, teaching works indirectly, by helping people (students) to help themselves (Ellerman 2005). Versényi states it plainly: knowledge is ownership. To know something is to make it your own – to incorporate it into your web of prior knowledge.

If, as I believe, Dewey, Versényi, and the larger Socratic tradition are right about the fundamental nature of knowledge and learning, then we can identify two glaring absences in the 'expert-centered' model:



- (1) Knowledge production: No knowledge is *produced* in the expert-centered classroom. Teachers are authorized to deliver knowledge, and students to receive it, but the knowledge itself originates upstream. Neither teacher nor student is regarded as a knowledge producer.
- (2) Learning community: There is no *mutual* (two-way) learning in the expert-centered classroom, neither among students nor between students and teacher. As Palmer puts it, “Teachers and students gather in the same room at the same time not to experience community but simply to keep the teacher from having to say things more than once” (Palmer 1998: 116). The expert-centered space is devoid of learning *community*.

The expert-centered vision thus suppresses the epistemic and sociological foundations of liberal education—education geared to the development of students’ intellectual autonomy.

To forestall misunderstanding, I am not proposing the elimination of all lectures, the disavowal of teachers’ subject expertise, or that classrooms become shrines to students’ pre-existing knowledge and ignorance. Nor am I advocating a “touchy feely” learning process (Colander 2004). My point is to suggest that the roots the limited learning problems we observe across disciplines and institutions today may lie partially in our tacit conceptions of knowledge, teaching, and learning themselves, and to ask: How might we recast the expert-centered picture, to recognize the communal and individual aspects of knowledge production that are essential to liberal learning?

Likewise, the “autonomy” I associate with liberal education is not about self-sufficiency but intellectual self-possession—the willingness and ability to assume responsibility for one’s own thinking. The process of becoming a self-possessed thinker is classically described by William Perry’s nine-step ladder of intellectual and ethical development, in which the highest rungs involve taking responsibility for what we think and who we are—the ability to “take responsibility for one’s own stand and negotiate—with respect—with [others]” (Perry 1970: 39-40).

The most compelling justifications for the expert-centered approach focus on its efficiency: the ratio of educational benefit to cost. However, if we take seriously the idea that “no thought, no idea, can possibly be conveyed as an idea from one person to another” and that “knowledge cannot be handed over ready-made but has to be appropriated by the knower,” then we must recognize (apropos of *Academically Adrift*, et al.) that the efficiency of top-down education may prove illusory if it does not enable students to appropriate ideas for themselves.

### 3. *The Learning-Centered Knowledge Commons*

So how *else* might we envision and enact the college classroom to address the problem of limited learning? In the case of the Von Trapps, Maria's loving and courageous interventions transformed the family into a polycentric learning community. Their transformation was in part the result of Maria's passionate pedagogy—beginning with those unforgettable picnic scenes in the Alps, where the children confess, “We don't know any songs.” The impact of Maria's teaching was then magnified and multiplied, as music itself became a living, integrative force within the family. As Maria became embedded in each of their lives, and vice versa, each of the Von Trapps (including the Captain) discovered his or her own musical voice, and music becomes their shared space of learning, trusting, playing, and ultimately escaping the Nazi occupation.

I have loved this film since I first saw it at age three, and have come to love it even more in my professorial life—as an unusually vivid account of the nature and power of liberal education. The conceptual architecture of the Von Trapp's polycentric learning community is well described by Palmer's notion of the subject-centered classroom (Palmer 1998: 103-104; see Figure 2).

Palmer describes this vision of the learning process as subject-centered because the focal point is not the teacher-expert but the living “subject”: the archetypal phenomena or enduring questions that animate each learning community. The two-way arrows linking the knowers to the known reflect Palmer's emphasis on the symbiotic relationship between the living subject and the community that seeks to know it. Learners impart their perceptions and classifications onto the subject; the subject, in turn, emits feedback to the investigators. Equally significant, Palmer classifies both teachers and students as “knowers.” He does not assume that students and teachers possess equal knowledge or authority; yet he places them in parallel positions as “knowers” vis-à-vis the subject matter.

Ostrom's CPR perspective affirms and extends Palmer's view of a polycentric learning community in several significant ways. First, Ostrom would classify teachers and students as joint appropriators of a common pool resource (Ostrom 1990, 2005). Second, she would highlight the two related yet distinct common pool resources that exist in academic learning communities: the space of inquiry and the subject itself. The former flows directly from Ostrom's understanding of competitive markets and other spaces of voluntary cooperation as common pool resources, as in her well-known claim that “[a] competitive market—the

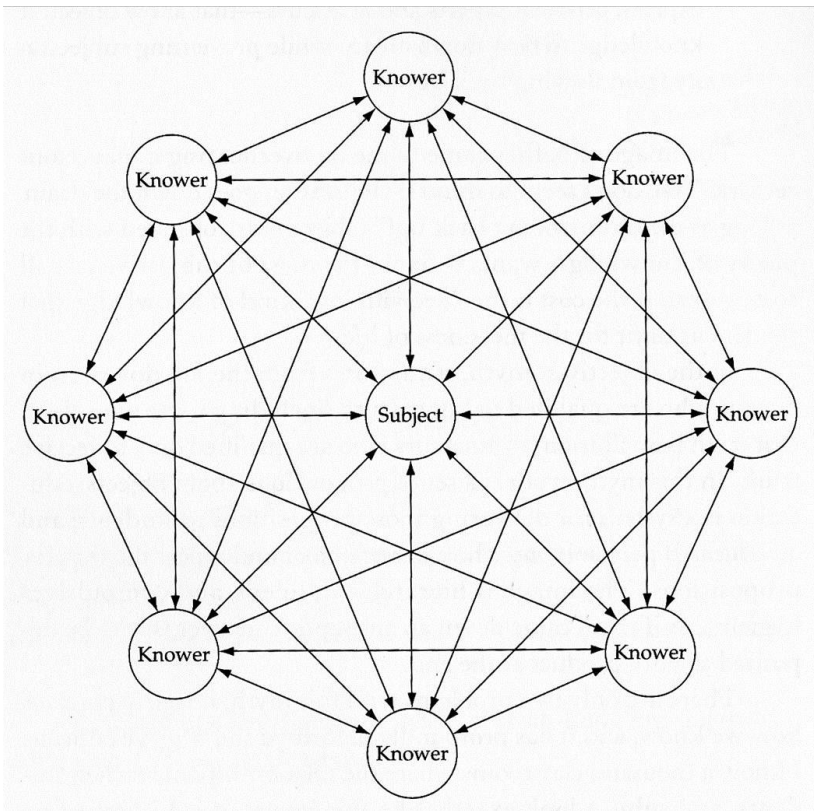


Figure 2: *The Subject-Centered Classroom* (Palmer 1998, 100)

epitome of private institutions—is itself a public good” (1990: 15). Third, Ostrom would assign to teachers two essential tasks: (a) to give students “epistemic standing” in the learning community by bringing the subject to life and introducing students to the rights and responsibilities of membership in the knowledge commons, and (b) apropos of her abiding emphasis on trust (Ostrom 2009), to establish rules and norms that reduce the affective transaction costs of participating in the public life of the learning community and thereby increase students’ willingness to risk “exposing [their] ignorance, challenging [other people’s] facts or interpretations, and [making themselves] vulnerable to the scrutiny of others” (Palmer 1990: 15). Lastly, Ostrom would remind us that in the perennial quest for better methods of CPR governance, there are “no panaceas” (Ostrom 2009). In the present context, this means she would counsel against a search for pedagogical formulas or “best practices” to which all educators should aspire.

#### *4. Comparing the Two Models*

In addition to the visible differences (monocentric vs. polycentric, expert- vs. subject-centered), the most salient contrasts between “platoon” and “commons” approaches to the college classroom are:

(1) Epistemology

Where and by whom is knowledge produced? Is knowledge produced only by professional researchers upstream from the classroom, or do classroom amateurs (including teachers) also engage in forms of intellectual production that count as knowledge?

(2) Pedagogy

What does it mean to teach? Is teaching fundamentally an act of instruction or delivery (imparting knowledge)? Or is it better described as epistemic system design—the attempt to craft or cultivate decentralized learning processes that yield (for each learner and for the class as a whole) “a kind of ‘intelligence’ that is far greater than the sum of its parts” (Lavoie 1995: 125)?

A growing body of education literature across numerous disciplines suggests that a well-governed knowledge commons generates more learning, in general, than an expert-centered classroom (Campbell and Smith 1997, Finkel 2000, Tagg 2003, Wieman and Perkins 2005, Calder 2006, Wieman 2007, Mazur 2009, Hanford 2011, de Vise 2012). The Ostrom framework lends social-scientific depth to this literature by illuminating the unique advantages and difficulties of a classroom knowledge commons. In particular, Ostrom’s approach underscores the delicate dialectic of liberty and community. As reflected in her “design principles” for “robust, long-enduring, common-pool resource institutions” (1990: 90-102), Ostrom is keenly aware that effective CPR governance requires negotiation of a sustainable balance between individual freedom and accountability, on one hand, and communal norms of reciprocity and trust, on the other. In Palmerian terms, a generative learning community must be “hospitable but charged”: hospitable in ways that inspire trust and respect (for self, others, and subject) and charged by the presence a living subject that sparks one’s desire to know, by the assignment of academic freedoms and duties to all members of the learning community, and by a steady flow of feedback from other learners (including the teacher) and from the subject matter itself.

## 5. *Academic Freedom*

Ostrom's CPR framework offers a final lesson that is deeply relevant to the college classroom, namely: the idea that common pool resource management is a complex historical process that unfolds over time and across multiple scales of social organization. As a case in point, the U.S. tradition of academic freedom represents an outstanding example of a governance system "arranged in a nested, polycentric system from small to very large" (Ostrom 2011: 371) which has emerged and evolved over the past hundred years to define, protect, and manage the common pool resources of college faculty members and students (AAUP 1915, 1940, 1967, 1987, 2007; AAC&U 2006). Indeed, though I cannot pursue the argument here, I believe an Ostrom-based concept of the college classroom as knowledge commons could provide a more robust foundation for academic freedom than the notion of the classroom as a "marketplace of ideas" (U.S. Supreme Court 1919, 1967).

The "knowledge commons" view of the college classroom was largely understood by John Dewey and others who began to articulate the rights and responsibilities of academic freedom for university teachers and students in the early 20th century. Dewey placed particular emphasis on the notion of the college, or indeed any school, as "a form of community life" (Dewey 1929: 293) —a view he contrasts to the expert-centered view of schools, e.g., arguing that the "neglect of the idea of the school as a form of social life" gives rise to educational philosophies and practices wherein "far too much of the stimulus and control proceeds from the teacher" (*ibid.*).

Ostrom's work foregrounds the complex ecology of CPR governance. With regard to academic freedom, her approach would be alert to the vulnerability of the classroom knowledge commons to imbalances in the academic property rights asserted by teachers or students, e.g., professors who construe academic freedom one-sidedly as a doctrine of professorial private property, or student rights advocates who contend that students should not be forced to learn anything that violates their religious, political, or ethical preferences. At the same time, Ostrom would urge us to take the long view when assessing these periodic imbalances. The classroom commons is continually evolving, she would remind us, in response to various pressures within and beyond the academy—all part of the "difficult, time-consuming, conflict-invoking process" of "getting the institutions right" (Ostrom 1990: 14). Our challenge as teachers and academic citizens is to

join in the ongoing renegotiation of the rules (formal and informal) that define “academic freedom,” seeking to ensure that they enable rather than disable the possibilities for liberal education.

### *6. If Learning is Knowledge Production, Teaching Can't Be Mere Distribution*

To say that the college classroom is a knowledge commons might sound like “mere pedagogy”; but really it is much more. It is an invitation to step back and reassess the way we think about and organize our colleges and universities.

The expert-centered model is part of a larger set of assumptions about knowledge in which scholarship is defined as the production of new knowledge while teaching is defined as the retail distribution of existing knowledge—an epistemically sterile process wherein no new knowledge is produced. This research/teaching hierarchy is strongly articulated to PhD students and in the job market, where a serious commitment to teaching is tantamount to settling for second best (Walstad and Allgood 2005).

In an Ostrom/Palmer model, however, learning *is* production: the production of new knowledge by students and teachers as they appropriate new ideas. The learning-centered classroom, like the commercial marketplace, is not merely a site for the retail distribution; it is a locus of individual and collaborative discovery.

If colleges and universities are to serve as catalysts for the wealth and well-being of nations (and indeed to fulfill their own stated missions), then they (we) should return the classroom knowledge commons to its proper place at the center of our academic enterprise.

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# Yet Another Path: Another Path: Expanding De Soto's Framework Using Ostrom's Insights

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## 1. Introduction

The answer to the question of why some economies prosper and grow while others persist in poverty is perhaps the holy grail of the economic sciences. Many answers have been offered up and many paths have been explored by economists and policy-makers alike without reaching a consensus on what is the key that opens the gates of development. Among the brave souls who have dedicated their lives to exploring this seemingly unsolvable puzzle, Peruvian economist Hernando De Soto certainly occupies a place of prominence in the contemporary field of development economics.<sup>1</sup> After the disillusionment with the heavily interventionist policies advocated during the past decades, De Soto's arguments favoring clear and defensible property rights and the rule of law have influenced the economic policy discourse in developing countries, especially in Latin America.

Contrary to previous "cures" of underdevelopment that focused on jump-starting aggressive capital accumulation through industrial policies such as import-substitution and strategic subsidies, De Soto's approach seeks to harness the productive forces not of large branches of industry but rather of small entrepreneurs. According to De Soto, most of the productive assets in underdeveloped

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<sup>1</sup> For a discussion of Hernando de Soto's work, see Volume II of *The Annual Proceedings of the Wealth and Well-Being of Nations*.

countries find themselves heavily underutilized or “frozen” as he describes them in his works. The reasons behind this inefficient state of affairs, according to De Soto, is not a failure in the “economic” system per se, e.g., lack of capital, low aggregate demand, low saving rates, and so on, but rather a failure of the *legal system*. Because the legal systems of most underdeveloped countries fail to successfully recognize and protect the property rights of most of the urban and rural poor, it follows that the capital and the entrepreneurial skills of most of the world’s underprivileged are wasted. The answer to the question of sustainable and equitable economic development therefore lies, according to De Soto, not in centrally planned interventions but rather in the creation of inclusive legal systems that will harness the productive potential of the common people. Following this simple yet compelling reasoning, many policy-makers throughout underdeveloped countries have devoted considerable time and energy toward formalizing property rights among marginalized groups.

Yet despite the undeniable importance of private property rights to questions of economic development, several shortcomings and omissions within De Soto’s vision of a fully formal regime of private property become apparent in the effort to implement property titling programs. Throughout his work, De Soto consistently insists that efficient institutional arrangements are *already* in place throughout the informal sector meaning that, at least in principle, the role of government lies in simply *recognizing* something that already exists. And yet, both De Soto and his followers have often endorsed top-down assignment of individual property rights in places where no such system existed before. While this in itself might not seem to present a problem, we must remember that new institutional rules are never introduced into a vacuum. In other words, the introduction of a new property rights system often necessarily results in the *displacement* of an already existing (although unrecognized) institutional system. This turn of events, however, is highly ironic given De Soto’s already mentioned insistence on the need of *recognizing* ongoing institutional arrangements. Indeed, this contradiction is a grave one since it would mean that one of the great champions for the recognition of spontaneous institutional systems might, paradoxically, be also one of its destroyers.

The root of the problem lies, I will argue, primarily in De Soto’s overly simplistic definition of property and his limited vision of what constitutes a working institutional system. Indeed, throughout his works De Soto’s advocacy for property recognition limits itself to the formalization of *individual* ownership of resources. This means that when confronted with different systems of appro-

priation, distribution, and allocation of resources, the response of policy-makers has been dismissive and sometimes destructive. We can thus appreciate that the simplicity of De Soto's theory, while being one of its strengths, is also one of its greatest weaknesses.

This paper will employ the insights of the Nobel Laureate Elinor Ostrom to formulate a constructive critique of De Soto's framework. To do so, I will first focus on the ways Ostrom's treatment of the subject of property systems serves as a much more robust and encompassing base than the one employed by De Soto and his followers. This is so because Ostrom's analysis of resource management is flexible enough to incorporate successful institutional arrangements other than the narrowly defined property rights systems that orthodox economics commonly depicts. Then, I will argue that in many instances recognizing and preserving successful alternative institutional arrangements (excluded from De Soto's framework) provides an alternative that ought to be taken seriously by De Soto and like-minded thinkers *given their own philosophical premises*.

De Soto is not alone when pointing to property rights as a major component (if not the major component) in the recipe for economic prosperity. Clearly defined and recognized property rights have been credited with significantly reducing externalities (Coase 1960, Demsetz 1967), preventing over-exploitation of resources (Alchian and Demsetz 1973), and creating the necessary incentives for economic activity (North 1981). Furthermore, the existence of private property rights enables the functioning of markets, which in turn are credited with the efficient management of scarce resources (Mises 1949, Arrow and Debreu 1954) and of solving complex problems of social coordination in the absence of complete information (Hayek 1948, 1988). Given all these benefits, it is no surprise that more and more development economists and policy-makers find themselves in agreement on the absolute necessity of property rights for developing countries (De Soto 1989, 2000, 2002; Easterly 2001, 2006; Sachs 1994; Boycko, Shleifer and Vishny 1997).

However, although the virtues of property rights are hard (if not impossible) to contest, it does not follow that *only* property rights work when solving the complex problems of economic coordination. Indeed, the works of Elinor Ostrom seem to indicate otherwise. Ostrom's genius lies in that she realized that economists had unfortunately blinded themselves into dividing all possible institutional arrangements into only two categories: the market or the state (i.e. private property or government management). In contrast, Ostrom shows that

markets and governments are but two *possible* institutional arrangements along a spectrum of alternatives. Indeed, throughout history and across the globe human communities have created and worked within countless systems of appropriation, allocation, and distribution of scarce resources that fall neither in a pure private property rights regime nor pure centralized control. In addition, these alternative institutional arrangements often have proved themselves to be as efficient (if not more) at achieving all the benefits economists thought to be reserved only to pure regimes of private property, such as externality control and prevention of over-exploitation of resources (Ostrom 1990, 2005).

## 2. *Why Property Matters*

Before constructing a critique to the orthodox property rights paradigm espoused by De Soto, we need to understand why such a paradigm matters, how it works and why so many economists embrace it. To do so we need to show the genealogy and shed light on the historical circumstances behind the birth of these ideas. What I hope to accomplish by doing this is to show that my position (and Ostrom's) far from being antagonistic to the overall *spirit* of the property rights paradigm is, quite the contrary, an extension of the paradigm itself.

To understand the intellectual roots of the orthodox property rights paradigm, we need to think back to the cataclysmic failures of central planning of the late twentieth century. Although discredited in contemporary discourse (except in the minds of a handful of radical intellectuals) the prominent intellectual paradigm for the most part of the last century was that rational planning of the economy was not only going to be more humane, and more efficient but was also a historical inevitability only fettered by the interests of the capitalist class. In that spirit many policy regimes across the globe were pursued in order to fulfill the dream of a fully rationalized society such as the Raj System in India, or more infamously, the aggressive collectivization programs in both the Soviet Union and Maoist China. Yet by the end of the twentieth century, reality hardly matched the expectations. Central planning not only proved itself to be far less dynamic, efficient and prosperous than market-based economies, but was also strongly correlated with corruption, political repression, and dictatorship.

As a result of these failures, economists began to reconsider their previous position. Instead of seeing the economy as a set of mechanistic relationships of variables that could be predictably manipulated, economists began to see economic systems as complex networks in which the optimal outcome cannot be reached

through large industrial interventions, but instead could be fostered best by fully exploiting micro-economic structures. This intellectual shift is what gave birth to our current market-oriented economic paradigm.

Yet while economists made great strides in rethinking the importance of local micro-structures underlying economic and social welfare, most of them are still bounded by the very same formalistic-mathematic approach that gave birth to the chimera of optimal social engineering, or “scientism” in the words of F.A. Hayek (1952). Even though economists recognize more and more the importance of paying attention to the delicate nuances underpinning economic relationships, their advice is still often guided by rules of thumb derived from formal “universalistic” mathematical models. This way of thinking is ultimately what lies behind “shock therapy” approaches to liberalization in which market institutions are aggressively imposed regardless of the previous institutional arrangements. Although this aggressive top-down introduction to capitalism has, arguably, been shown to work in some occasions (Sachs 1994; Boycko, Shleifer and Vishny 1997), its failures in many post-Communist countries and other regions of the globe are also undeniable. It is on this page of history that both De Soto and Elinor Ostrom appear.

The title of Hernando De Soto's book *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else* presents the central question well. According to De Soto, top-down approaches to capitalism are unlikely to yield positive results because they are unable to fully tap into already existing economic potential. Simply liberalizing key industries, opening barriers to international trade, and cutting government expenditures are not sufficient to make an economy “capitalistic.” Rather, the essential feature of a capitalistic economy, according to De Soto, is that it provides a strong, clear, and stable system of property rights, which is in turn the source of entrepreneurial activity and therefore the true motor propelling economic progress (De Soto 2000). To support his point, De Soto offers an extensive historical overview on how and why the current institutional systems *evolved* in the West and how these institutions played the key role in making the West the economic behemoth that it is today.

Yet what separates De Soto from other advocates of economic liberalism is that his position is far from advocating simply to “import” pre-made institutions into a foreign context. Indeed, De Soto's historical perspective on the emergence and evolution of property rights systems led him to conclude that successful institutional arrangements evolved by taking into account the delicate balance underlying the needs, actions and historical realities of the participants composing the

economic system. In other words, De Soto's approach to liberalization follows *the same spirit* that made economists shift away from advocating central planning in favor of markets; that De Soto takes micro-structures seriously.

Indeed, far from advocating a complete overhaul of the current system, De Soto's proposal is to skillfully work within it. The goal is thus not so much to *assign* property rights as much as it is to *recognize* property rights. De Soto is emphatic throughout its work that complex and functional systems of property rights are *already in place* throughout the informal economy (De Soto 2000, chapter XI). The step towards a functional set of "capitalist" institutions therefore lies in bringing legal recognition to these systems and thereby multiplying their efficiency. Legal recognition of ongoing property rights, according to De Soto, bring about these and other benefits (De Soto 2000: 69-86):

- Greater independence for individuals from local community arrangements to protect their assets;
- Clear, defensible ownership;
- Standardization and integration of property rules and property information in the country as a whole;
- Increased trust arising from a greater certainty of punishment for cheating in economic transactions;
- More formal and complex written statements of ownership that permit at low cost the assumption of shared risk and ownership in companies and insurance against risk;
- Greater availability of loans for new projects, since more assets could be used as collateral for the loans;
- Easier access to and more reliable information regarding such things as credit history and the worth of assets;
- Increased fungibility, standardization and transferability of statements documenting the ownership of property, which paves the way for national and international markets in which individuals and corporate enterprises can easily transport and exchange property.

Furthermore, because De Soto's vision is based on already established social relationships, it also draws from the power of social capital as defined by thinkers such as Alejandro Portes (1998) and James Coleman (1988) that emphasizes the role of stable and trustful social networks as key to unleashing the collective potential of the social network itself. Also, such a bottom-up approach is less likely to suffer from the drawbacks of "institutional stickiness" as defined by thinkers

such as Peter Boettke, Christopher Coyne and Peter Leeson (2010) referring to the difficulty of breaking away from already established institutional patterns.

### *3. Yet Another Path*

Yet while De Soto's vision of market reform constitutes an advance above and beyond the simplistic "textbook" approach to economic liberalism, De Soto is awfully silent in his works about the possibility of there being alternative institutional arrangements besides individual private property. This is not surprising given that such omission is pervasive throughout most of the economic literature, which tacitly assumes that all management of resources are either directed by market forces or government mandates. Yet with the steady rise of New Institutional Economics this omission is being remedied little by little as scholars shed light upon the diversity of human institutional arrangements. Among the works within this branch of economics, the works of Elinor Ostrom shine as the brightest examples. Against all dogma, Ostrom's works pierce through the tacitly imposed limits of the economics profession into areas previously reserved to sociology and anthropology.

What Ostrom brought us back from her journey beyond the limits of orthodox economic analysis is a fresh perspective that invites us to reconsider some of the most ingrained dogmas in economic theory. Contrary to what orthodox economics would predict, Ostrom's field work shows us that common pool resources have been successfully managed throughout history and across the globe in the absence of both pure private property and government regulation. Indeed, communities across the globe have recognized the need for social cooperation in the face of scarce resources and have consequently created ingenious systems to harvest, allocate, and consume these resources in ways that will ensure sustainability for future generations.

The key to understanding such disparity between theory and reality is that economists limit their analysis to only a small subset of social arrangements. At the core of most, if not all economic models lies the presupposition that human actors are "trapped" in a set of institutions. Individuals, it is assumed, can maximize within the constraints of the given set of institutions, but they cannot change the institutions themselves. The reason why economists have been blind to such a possibility is that they have, for the most part, neglected the possibility of meaningful trust relationships among economic actors that would allow them to change the rules of the game from the bottom up. Indeed, by simplifying human

beings to the *homo economicus*, economists created relatively simple and usefully predictive models, but they also limited themselves to a narrow understanding of the human condition. In contrast, Ostrom's emphasis on the communicative and social aspects of the human behavior opens our eyes to the possibility of efficient institutional arrangements other than private property or government regulation to emerge.

Indeed, through examples ranging from small, traditional fishermen communities in Turkey to large and modern water basins along the Californian coast, Ostrom shows us how economic actors have been capable of crafting efficient institutional arrangements with little to no outside interference. The key to a successful and stable common pool resource management system lies, according to Ostrom, in what she calls eight "design principles" (Ostrom 1990: 90):

1. Clearly defined boundaries (effective exclusion of external un-entitled parties);
2. Rules regarding the appropriation and provision of common resources that are adapted to local conditions;
3. Collective-choice arrangements that allow most resource appropriators to participate in the decision-making process;
4. Effective monitoring by monitors who are part of or accountable to the appropriators;
5. A scale of graduated sanctions for resource appropriators who violate community rules;
6. Mechanisms of conflict resolution that are cheap and easy to access;
7. Self-determination of the community recognized by higher-level authorities;
8. In the case of larger common-pool resources, organization in the form of multiple layers of nested enterprises, with small local common pool resources at the base level.

Furthermore, once we put emphasis on the communicative and intrinsically social aspects of human interaction we should be led to conclude that there are no clear cut systematic limits that separate a set of institutions or "rights" from one another. Indeed, a "right" arises from a social agreement, which in turn, is underpinned by the particular communal interpretation on the proper relationship between actors and between actors and objects. As such, we should not identify the presence or absence of private property as an "on-or-off" switch as many economists and political philosophers do, but as an end of a graduated *spectrum* of pos-



sible institutional frameworks. In accordance with this vision, Ostrom identifies property, as a *cumulative bundle* of “use” rights that are *not* presupposed by each other, meaning that they are not “all-or-nothing” kinds of rights, as is often tacitly assumed by proponents of market institutions (Ostrom 1990). This vision offers many degrees of freedom regarding possible efficient institutional arrangements that can encompass both orthodox as well as alternative institutional frameworks when dealing with economic problems.

We must, however, be careful not to romanticize Ostrom's views on alternative institutional arrangements. In the same way that markets and governments can bring sub-optimal results under certain circumstances, alternative institutional arrangements can also fail to provide efficient outcomes. Indeed, throughout her works Ostrom never shies away from the possibility that indigenous institutional systems might fail to uphold the eight design principles and consequently fail at bringing sustainable and efficient resource management (Ostrom 2005). Furthermore, local and indigenous systems, even when they are effective at managing common pool resources in an economic sense, might fail at providing fair and just treatment to its participants if they rely on hierarchical, discriminatory or unequal results that could be seen as objectionable from a philosophical point of view through a universalistic theory of justice (e.g.: Rawls 1971, Nozick 1974).

Ostrom's point, however, is not that *all* alternative institutional systems work but rather that they can work under the proper circumstances. What we are left with is therefore not a simple rule of thumb but with the contrary: an imperative to examine, weigh, and judge every case with care and with awareness of particular circumstances. We now can see how Ostrom's vision fits within the general spirit of the other thinkers discussed here, in that their conclusions converge toward *taking micro-structures seriously*.

#### 4. *At A Crossroad*

As I argue above, De Soto's vision of a formal regime of property rights is robust because it draws upon the power of *already existing* institutional arrangements at the microeconomic level. By simply formalizing something that is already established De Soto's theory exploits the social capital and local knowledge already present in pre-existing institutional arrangements. Furthermore, recognizing ongoing institutional arrangements avoids the costs associated with changing from one set of institutions to another. At its core, we can see how De Soto's theory is in alignment with the insights offered by Ostrom and her work on common pool resource management.

Yet while the core premises of De Soto's theory are sound, their applications have been less so. The reason De Soto's theory works is not because it brings about a superior set of institutions, but rather because it recognizes the ones that are already in place. In practice, however, this key insight has often been substituted by the simplistic rule of thumb "assign individual property rights." This rule of thumb by itself presents no problem when the preexisting institutional arrangements were indeed based on individual private property. But private ownership of land and resources does not hold everywhere. Indeed, alongside private property arrangements there is a myriad of alternative institutional arrangements that have emerged in order to regulate the appropriation, distribution, and consumption of resources and many of these are still practiced today. While the central idea behind De Soto's theory, i.e., "recognize what already exists," suggests the need to recognize these alternative institutional arrangements, the crude rule of thumb "assign individual property rights" points us in the wrong direction. Herein lies the contradiction in De Soto's system.

What must be done is clear. If the theory espoused by De Soto is to be free from internal inconsistencies it must explicitly recognize the possibility of legally recognizing alternative institutional arrangements *other* than narrowly defined individual private property. By employing Ostrom's insights on the nature of successful alternative institutional arrangements, we can expand the limits of De Soto's vision of a bottom-up approach to formalization to include institutional arrangements other than narrowly understood private property or government management. As such, De Soto and his followers should therefore skillfully use Ostrom's work to recognize and protect not only informal private property arrangements, but potentially any institutional arrangement that proves itself to bring efficient and sustainable outcomes.

Although the idea of legally recognizing a wide diversity of institutional arrangements might seem at first revolutionary or even utopic, we must realize that similar legal provisions are already in place in many regions of the world. Latin American governments, for instance, have a long history of giving indigenous communities relative autonomy in matters such as water supply management, land management and provisions of community justice. The irony lies, however, in that movements promoting such communal autonomy have often been politically associated with "the Left," while movements advocating property rights have been associated with "the Right." Thus the two approaches have been seen as

incompatible paradigms, even though the analysis presented here show that they can be reconciled in both practical and philosophical terms.

Expanding De Soto's boundaries also implies a change in the way we need to think about institutional arrangements. Instead of rushing into giving simple "universal" answers to economic problems, economists should be more careful in taking into account the unique features and problems every particular micro-economic system presents.

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# Polycentrism, Self-Governance, and the Case of Married Women's Rights Reform

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## *1. Introducing the Relationship Between Polycentrism, Self-Governance, and Married Women's Rights*

A self governing political system is one in which individuals create and enforce the rules that govern their own communities. Questions about the creation, functioning, and maintenance of these systems are foundational to the study of constitutional political economy (Buchanan and Tullock 1962, Hayek 1973). One of the most enduring of these programs is the research of Elinor Ostrom, Vincent Ostrom, and their colleagues in the Workshop in Political Theory and Policy Analysis at Indiana University Bloomington.

The collective oeuvre of Elinor and Vincent Ostrom considers self governance in two lights. First is the question of the practical realization of self-governance. This is exemplified particularly by the work for which Elinor Ostrom has become most famous, the study of how individuals have designed arrangements for the management of common pool resources on their own authority without the need for a central coordinator (E. Ostrom 1990). The second sense in which

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self-governance is discussed, and the focus of this paper, is the study of self governance as an ideal political structure to be sought after and worked towards because of the benefits that will result from government serving as an instrument of the people rather than vice versa. In *The Meanings and Vulnerabilities of Democracies*, Vincent Ostrom articulates the paradox that

human beings are required to have potential recourse to instruments of evil to advance their joint or common good... The threat of chaos and the creation of order from chaos, in turn, pose a threat of tyranny (V. Ostrom 1997: 121).

Taking as given that some sort of governing institutions are desirable for activities such as the production of public goods but that the strength of these same institutions poses great danger, the critical question becomes whether or not the governing power can be sufficiently harnessed.

The polycentric order is proposed as a social structure equivalent to the task of sufficiently harnessing governing power. A polycentric system is a network of multiple autonomous governing units that interact within a system of shared rules. The self-governing properties of a polycentric order are many. The most active and important political units in a polycentric order are communities and the voices of their individual members. The growth of governance structures from the bottom up guarantees that large political entities only emerge with the sanction of the lower levels, all the way down to individual residents. Finally, and perhaps most importantly of all, the existence of multiple autonomous units that are directly connected to individual persons opens the opportunity for jurisdictional competition. Political bodies in competition with each other are motivated to satisfy citizen preferences and disciplined when they do not, resulting in a government more responsive to the will of the people it was designed to serve (Aligica and Boettke 2009; V. Ostrom 1972; Ostrom, Tiebout, and Warren 1961).

The history of the many at least partially sovereign states nested within the United States provides rich fodder for evaluating the relationship between a polycentric order and the effective functioning of a self governing society. The particular example I will explore here is that of gains in married women's rights during the nineteenth century. The evolution in this particular legal institution was dramatic. The American republic came in to being with married women formally established as a lesser class who sacrificed both their legal and economic independence upon marriage. Married women could not own property, retain their own

wages, sign contracts without permission, or in general participate in any other activity requiring legal recognition. However, this state of affairs did not persist for long. By the end of the nineteenth century, nearly every state had passed legislation establishing married women's property rights as fully equivalent to those their husbands had always enjoyed. Does women's success in getting what they wanted from their political leaders have anything to do with the Ostroms' insights about the ability of polycentric orders to sustain self governance?

I argue that there is indeed a strong and causal relationship between the presence of a polycentric legal order in nineteenth century America and the advances in women's rights that occurred during that time. In the second section of this paper, I will discuss the nature of polycentric orders in greater detail. Particular emphasis will be placed on the question of why polycentric orders should be expected to support self-governing behavior. In the third section I will introduce evidence from the passage of the married women's property acts that supports the theoretical proposition that polycentrism allows the residents of a jurisdiction to retain true governing power instead of leaving it to the discretion of legislators and other political leaders. The essay concludes with some final thoughts on what United States history can teach us about polycentricity and self-governance as general propositions.

## *2 Jurisdictional Competition in a Polycentric Order as Self-Governance*

### *2.1 Self-governance and jurisdictional competition:*

Communities of individuals may find it advantageous to cooperate with each other for the production of public goods and services, such as law, that no one individual would find it profitable or possible to produce alone. The ability to reap these gains is, however, limited by the temptation for individuals to free ride and enjoy the benefits of public goods without contributing to their production. Social contract theory posits that in order to get around this unfortunate inevitability, individuals will choose to select a third party to enforce the terms of the contract (Buchanan and Tullock 1962; Hobbes [1651] 2008). For example, if the members of a community agree to compensate a judge to serve as a full time arbiter of disputes, they can solve the free rider problem by turning the power to tax or evict any who should choose to renege over to a neutral third party.

An entity granted the power to enforce all social contracts for cooperative provision is generally known as a government. So long as this entity sticks to the

enforcement duties it is authorized to perform, the society can be considered a self-governing society in which authority and ultimate control over political activity remains in the control of individuals rather than government officials. Unfortunately, the ability of individuals to govern themselves can be difficult to retain after ceding even a portion of enforcement power to a political apparatus. The agreement with the third party enforcer is after all a contract as well, similarly subject to potential default.

So, *quis custodiet ipsos custodes?* Or in a more modern tongue, who will watch the watchman? The problem becomes one of finding a solution that is mechanistic in nature, or self-enforcing (Leeson 2011). The hypothetical ideal is to find a structure that rations the exercise of coercive behavior in the same way that the price system rations the consumption of market resources (Hayek 1945). This is the only way to avoid the never ending pursuit of finding a watchman to guard the watchman who's guarding the watchman and so on ad nauseam.

Competition between governing bodies can provide this type of self-enforcement by serving as a market-like mechanism through which individuals can discipline political leaders (see Leeson 2011; Tiebout 1956; and Weingast 1995 for variants on this assertion). Governance structures that require states to provide their citizens with some consumer satisfaction can help individuals retain some degree of control over what they have created. In other words, jurisdictional competition “may produce substantial benefits by inducing self-regulating tendencies with pressure for the more efficient solution in the operation of the whole system” (Ostrom, Tiebout, and Warren 1961: 838).

The simplest and most common variant of jurisdictional competition is federalism. Federalism broadly understood is little more than the division of governing power across multiple states, often with the attached implication that competition is supposed to lead to good results- the much storied laboratory of the states.<sup>2</sup> Yet despite federalism's long history, there is still no scholarly consensus over why competing jurisdictions work or even exactly what they do.

Most of the ink and effort to date has taken the form of proposing different sets of conditions under which multiple competing governance units should be expected to be more or less efficient than the centralized provision of public goods and services. Tiebout (1956) added a set of standard neoclassical assumptions

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<sup>2</sup> See James A. Gardner, *The “States-as-Laboratories” Metaphor in State Constitutional Law*, 30 Val. U. L. Rev. 475 (1996) for a history of Justice Louis Brandeis's now-famous metaphor.



to the relationship between citizens and politicians to demonstrate that under a set of idealized conditions,<sup>3</sup> governing units could be disciplined through the process of citizen mobility to efficiently provide public goods. If the politicians in one state behave sub-optimally, a system of multiple states in competition allows citizens to simply choose another state to be recipient of their tax dollars. The ultimate result is the efficient provision of goods and services.

Tiebout's assertion that competition between political units could be efficient has been expanded upon by many scholars since. Albert O. Hirschman hypothesized that individual mobility between jurisdictions was a way for citizens to exercise a type of market choice over government agents (Hirschman 1970). Geoffrey Brennan and James Buchanan proposed the empirical existence of an inverse relationship between the number of government jurisdictions and the extent to which taxpayers are fiscally exploited (Brennan and Buchanan 1980). Frey (2005) offers up the theory of "functional, overlapping, competing jurisdictions" as a normative proposal for how to best organize government in order to take advantage of efficiency when possible while still ensuring that a core set of government services are provided to all residents of the overall geographic regions. More recently, Leeson (2011) builds on Buchanan (1965) to propose a system of clubs that would serve as a true market in governance.

As such the most distinctive contribution of the Ostroms and their colleagues is not necessarily their role in early studies on jurisdictional competition. They were not the first or the only to advance the idea. Rather the importance of the Ostroms' work in this field comes from the particular set of conditions they suggest as most conducive to effective governance, those of the polycentric order (Ostrom, Tiebout, and Warren 1961).

## *2.2. Polycentrism as the fertile ground:*

All variants of jurisdictional competition theory recognize two distinct and equally necessary prerequisites to the functioning of jurisdictional competition. First, individuals must have the motive and means to be able to choose to patronize a variety of different jurisdictions. If jurisdiction A does not satisfy, the members of a society must have the option to move on to jurisdiction B. Albert

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<sup>3</sup> Conditions for efficiency include a citizenry with complete knowledge of the choice set, a sufficiently large number of jurisdictions to choose between, costless mobility between those jurisdictions, no externalities from public goods provision, and that there is an optimum population within each jurisdiction.

Hirschman popularly labeled this phenomena as “exit”, one of the two mechanisms by which politicians can be disciplined by the citizenry, the other being “voice” (Hirschman 1970). Complete knowledge is not required as long as there is some systematic accuracy in individuals’ assessments as to whether they prefer to live in jurisdiction A or B. In the context of law as a public good, this can be thought of as market demand for better laws (O’Hara and Ribstein 2009).

The second prerequisite for jurisdictional competition stems from the fact that polycentric orders are built by and comprised of individuals rather than conglomerates. As such it is not obvious that a jurisdiction necessarily prefers more residents to fewer in the way that a firm in the marketplace prefers more customers. The structure of the governing institutions must be such that the individuals with political decision making power will be personally affected by people either entering or exiting the jurisdiction. O’Hara and Ribstein (2009) label these individuals the suppliers of law who are seeking to better serve the market demand of current and potential residents of the jurisdiction.

Where theories of jurisdictional competition differ is in the details of the structure and functioning of these markets- or quasi-markets- in governance.<sup>4</sup> Every theory of jurisdictional competition has its own perspective and context. For the Ostroms and their colleagues, polycentrism is the institutional context that is proposed as the most likely to guarantee the effective functioning of jurisdictional competition. The concept of polycentrism is first introduced in a collaboration between Vincent Ostrom, Tiebout, and Warren (1961). This initial article focuses on illuminating the ordered reality under the anarchic appearance of many different and occasionally conflicting governing units working to provide public goods in the same metropolitan region. The aim was to contradict the common belief that multiple governing units are necessarily inefficient because of the inevitable duplication of efforts and overlap of jurisdiction. Instead the trio argued that multiple autonomous jurisdictions can successfully resolve conflict between groups working to provide the same public goods or services while increasing the satisfaction of resident consumers.

Polycentric orders have now been a recurring theme in the work of Vincent and Elinor Ostrom for over fifty years (see for example E. Ostrom 1972, 1990; E. Ostrom and McGinnis 2012; V. Ostrom 1972, 1991, 1997). Polycentrism liter-

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<sup>4</sup> See Boettke, Coyne, and Leeson 2011 for a critique of conflating the functioning of political and market systems.

ally means 'more than one center'. However, the Ostroms have imbued the term with additional layers of meaning that make it both more specified and less concrete. In the vernacular of the Ostroms and their colleagues, a polycentric order is

one where many elements are capable of making mutual adjustments for ordering their relationships with one another within a general system of rules where each element acts with independence of other elements (V. Ostrom 1972: 6).

Translated into language more directly related to political economy, a polycentric order can be defined as a governance system that involves multiple autonomous decision makers spontaneously interacting within a shared system of rules.<sup>5</sup>

There is a good deal to unpack in this definition. It is a good start to note that polycentric orders are individually unique, complex phenomena that cannot be identified by counting up the units of government and classifying the number as either equal to or greater than one. It is true that if an order is going to be considered polycentric, political authority must be dispersed across many organizations rather than held en masse in one central location. However the presence of multiple jurisdictions is not a sufficient condition. A polycentric order requires more. Returning to Vincent Ostrom's definition, the relevant decision makers in each jurisdiction must be "capable of mutual adjustments" and "ordering their relationships," and all "within a general system of rules" (V. Ostrom 1972: 6).

In order for a governing jurisdiction to be able to take action to adjust its role in the legal-social-political order, there must be both means to act and incentive to take action. The means to act requires that each jurisdiction vested with the authority to govern must retain some degree of autonomy. If the decisions of the political leaders in a particular jurisdiction are overly constrained or subject to overturn by other jurisdictions, then the ability of those political leaders to take any action at all is severely impaired. The incentive for jurisdictions to act comes through the process of interjurisdictional competition, to be discussed in greater detail shortly. A polycentric order also requires that all the participants operate within a shared general system of rules, which serve the function of defining the terms of engagement for interaction between jurisdictions.

Perhaps above all, a polycentric order is characterized by the recognition that decisions are made by the individuals participating in the system. Jurisdictions

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<sup>5</sup> For the sake of simplicity, all future uses of the term "polycentrism" in this paper will refer to the latter definition, as adopted by the Ostroms and their intellectual kin.

themselves do not make decisions, nor do they come in to being through a mandate dictated from on high. As such the proposition that individuals imbue governing entities with authority rather than the other way around becomes a state of reality rather than a normative proposal, at least in the context of a peaceful society. The only alternative to voluntary individual decision making is a coerced dictatorial society. From this perspective, polycentrism in many societies is not one of many alternative systems, it is simply a fact.

Polycentric orders that are comprised of many autonomous and overlapping jurisdictions will be distinct from monopolistic – or monocentric – governance systems in many important ways. A crucial difference that I would like to focus on here is the question of self-governance, or the extent to which these two different systems hold political actors accountable to those who granted them the authority to govern in the first place.

### *3. Polycentricity and Advancements in Married Women's Property Rights*

In the United States, laws regarding marriage have traditionally been the exclusive purview of state level courts and legislatures. With some minor variation by state, the precedents of these courts and the statutes of the legislatures formed a set of legal rules that allocated a majority of a nineteenth century woman's legal rights to her husband upon marriage. Married women had no right to own property, retain wages, sign contracts, or stand in court (Salmon 1986, Warbasse 1987, Zaher 2002). In *Blackstone's Commentaries on the Laws of England*, the definitive source on pre-revolutionary Anglo-American law, the married woman is described as: "...incorporated and consolidated into that of the husband: under whose wing, protection, and cover, she performs everything..." (Blackstone 1765: 430).

Around 1840 states began the slow, piecemeal process of changing these rights. No state's history is the same. Many states failed to abolish restrictions on married women's property rights in one fell swoop, but rather amended them one piece at a time through multiple legislative acts. Others acted fully and decisively. In some states, the process took decades while others include rights for married women in their initial constitutions. Despite this great diversity, laws regarding ownership of property were contingent upon neither marital status nor sex by the early twentieth century. Restrictions on married women's legal rights were no longer a relevant part of American life.

In this section, I present evidence that this evolution in family law not only occurred within a polycentric order, but that the polycentric nature of the institutional environment contributed directly to the advancements in married women's rights.

### *3.1 The relevance of the case:*

In order for the case of reforms in married women's property rights to be able to say anything about jurisdictional competition in polycentrism, it must be true that married women's property laws were a public good produced within a polycentric order. So can the nineteenth century American landscape be in any way described as polycentric in the sense defined by the Ostroms, the sense that is relevant to a conversation about self-governance?

We know that the United States has always been federalist, but federalism and polycentrism are not synonymous. The term federalism often refers to a hierarchical process of decentralization that is determined optimal and put into place by a central body (Wagner 2005). A federalist system as such can have multiple loci of power and can even imbue these loci with sovereignty to an extent, though it is important to remember that what can be given can also be taken away. However, it is possible for a system to be considered federalist while still missing a key component of a self-governing order- namely, establishment by the people through a process of bottom up development.

In a truly polycentric order, the appropriate scale of government provision is not centrally coordinated but emerges through individual action as people choose either to operate independently or contract for joint production (V. Ostrom 1972). Though it might be questionable how well this statement applies to the modern United States, the nineteenth century was a wide open landscape where a significant portion of today's units of government had not yet been formed or even imagined. Boundaries of states and even the number of states that would be admitted to the union were still undecided. Many political leaders, particularly along the frontier, did not know if they would maintain control or wind up annexed or gerrymandered out of relevance.

However, despite the flexibility of the landscape, the formal entry of new jurisdictions was by act of Congress only and as such not completely unrestricted. Fortunately the existence of a monocentric federal government does not prohibit specific public goods or services from being provided within a polycentric order. Polycentrism and monocentrism are not dichotomous concepts, and they are capable of co-existing simultaneously over the same geographic space. It is

perfectly possible for some aspects of law to be provided by a system that is largely monocentric while others are provided within a polycentric order. Further, even if power is only partially dispersed among competing autonomous jurisdictions, self governance can still be partially successful. Political leaders may still be somewhat constrained even if a legal order is only somewhat polycentric.

The case for the relevance of married women's property reform is further bolstered by the fact that particular facets of American law are still today and have always been polycentric in the sense of autonomous, competitive, and constrained by local interests (O'Hara and Ribstein 2009). Incorporation law is a classic example of this often cited in the literature. Most states in the eighteenth and early nineteenth centuries granted businesses the right to incorporate only through special charters granted individually by the legislature. Butler (1985) argues that competition over the fees and taxes associated with incorporation led state legislatures to switch to general charter systems that made the incorporation process simple and more attractive to businesses. These changes would not have taken place if each state was not completely autonomous in their choice of incorporation practice (Butler 1985, Easterbrook and Fischel 1991: 212-227, O'Hara and Ribstein 2009).

Although less thoroughly discussed, laws relating to marriage and family would seem to fit these criteria as well and for the same reasons.<sup>6</sup> Until very recently in history there has been no discussion of infringing upon state sovereignty regarding marriage law. Consequently tales of moving across state boundaries in search of preferable laws abound- individuals have moved in search of a lower marriage age, laxer definitions of consanguinity, less costly divorce, and the list goes on (Hartog 2002; Jones 1987).

My argument is that in the nineteenth century, laws regarding married women's property were subject to the same type of search behavior on the part of residents. Further, this search behavior combined with the Ostroms' insight that orders with more polycentric characteristics will be closer to truly self-governing societies explains why some states enacted married women's rights reform earlier or with greater strength than other states.

When circumstances emerge such that political leaders benefit from individuals entering their jurisdiction, and conversely incur costs when individuals exit or

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<sup>6</sup> O'Hara and Ribstein (2009) argue this as well in the context of the contemporary debate about same sex marriage.

fail to enter, those political leaders become motivated to capture population. This in turn leads them to engage in the type of behavior that current and potential citizens will find desirable. This type of jurisdictional competition cannot function in the absence of polycentrism, because without some degree of polycentrism there are not multiple autonomous actors capable of engaging in competition.

The Tiebout model, which lays out a theoretical argument for a similar breed of jurisdictional competition, is in many ways too restrictive to be a reflection of reality (Easterbrook 1983, Epple and Zelenitz 1981). Individuals do not have perfect information about the behavior of political agents. They are not able to move costlessly between jurisdictions. Even if they did, the full political profits of this movement do not accrue neatly to a single politician (or even to a small homogenous group), creating further room for distortion in the feedback loop between individual choice behavior and political action.

However, the effects of Tiebout competition are, under the right conditions, observable in the real world. Even in the absence of the ideal conditions required for efficiency in the provision of public goods, there can still exist pressures that will encourage more efficient behavior at the margin. In this regard one can view the historical advancements in married women's property rights as a set of conditions encouraging—if not requiring—political leaders to act according to the will of the people.

### *3.2. The market for law along the moving frontier:*

Within the historical movement of advancements in married women's property rights, there is one particular area of reform that I would like to focus on in this case study—the Western frontier. The West is the area of the country that saw the greatest fluctuations in jurisdictional boundaries during the post-1840 era of married women's rights reform. States were not only unformed, but territorial boundaries were still evolving. Creation and re-creation of state and territorial constitutions was a frequent occurrence. Consequently the West developed within a robust system of legal competition over potential residents, resulting in many beneficial outcomes for married women. This section will explore the two components necessary for jurisdictional competition in a polycentric order: residents moving between jurisdictions in search of a better life, and politicians who stand to personally gain by satisfying the demands of those residents.

Most frontier migrants pre-1860 made the journey as part of a wagon train, largely because there were no alternatives. Wagon trains traveled many possible

routes, each of which traversed a different section of the largely unsettled Western territory. Before making the journey from locales further east, these migrants had an important decision to make: which trail would they choose to follow? Were they on their way to California or Idaho, Missouri or Colorado? Popularly available trail guidebooks such as “The Emigrants Guide to Oregon and California” and “Journal of Travels Over the Rocky Mountains” helped people select their trail of choice (Schlissel 1982 [2004]: 119).

There is evidence that the people making these decisions had knowledge of how the governing regimes behaved, and that they based their choice of future residency at least in part on this knowledge. Further, women were active participants in this process. Though married women did make the journey with their families, more women than might be expected were young and single when they chose to brave the wagon train. Newspapers carried advertisements such as “WANTED--Situations by two respectable women to go West. Best references given.”<sup>7</sup> As such a number of the women traveling west were particularly likely to care about laws that defined the allocation of property within marriage, because the decision as to whether or not to marry was still ahead of them.

Though cognizance of why one is exiting a legal jurisdiction and entering a preferred set of rules is by no means requisite for the mechanism to function, there is evidence that settlers consciously compared different legal orders. For example, in 1879 a reader writes in to the *Weekly Inter Ocean* of Chicago to ask whether it's true that women in the Dakota's can own property that is not subject to their husband's control.<sup>8</sup> Newspapers across the country frequently carried stories regarding the development of married women's property legislation in major jurisdictions like Missouri, New York, and the U.K.<sup>9</sup> Liberality of divorce law is even explicitly advertised to lawyers along the east coast as a reason for them to move their practice and take advantage of the business available to them in the more permissive Western states (Jones 1987).

Choice behavior on the behalf of residents would however mean little in the absence of political suppliers of law individually benefiting from competition for

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<sup>7</sup> *Boston Investigator*, (Boston, MA) Wednesday, June 18, 1873; pg. 6; Issue 8; col D.

<sup>8</sup> *The Weekly Inter Ocean*, (Chicago, IL) June 05, 1879

<sup>9</sup> *Boston Investigator*, (Boston, MA) May 05, 1837; Issue 7; col D; *The Daily Inter Ocean*, (Chicago, IL) December 25, 1886; *The News and Observer*, (Raleigh, NC) March 02, 1892; Issue 44; col D; *The Atchison Daily Globe*, (Atchison, KS) December 29, 1892; Issue 4,704; *Daily Evening Bulletin*, (San Francisco, CA) February 28, 1883.



residents. Both sides of the competitive process — politicians to compete and residents to judge — are necessary for jurisdictional competition to have been a factor in these legal reforms. The political competition to provide better law along the Western frontier came from territorial legislators and political leaders who stood to gain a significant degree of power and influence by attracting sufficient population to turn their territory into a state.

The benefits to legislators of attracting population are well documented historically. The procedures for transforming a territory into a state were first laid out in the Northwest Ordinance. These same terms were then more or less duplicated for every region that made the transition from settlement to territory to state during the nineteenth century<sup>10</sup> (Willoughby 1905). One of the key pre-requisites to the application for statehood was a particular level of population that had to be met. Initially this level was set at 60,000, but beginning in 1850 the territories were required to meet the higher mark of having a population sufficient to merit a seat in the House of Representatives (Owens 1987).<sup>11</sup>

Further, and key to the claim that political leaders in the territories cared about population, there were strong gains to be enjoyed by territorial politicians who succeeded in transforming the geographic region of their employ into a state. First it should be noted that territorial political leaders were a small group with close connections to Washington. Upon initial formation, a territorial government consisted entirely of a governor, secretary, and three judges, all of whom would be appointed by the federal government. A legislature of one representative per 500 residents would be added when the population of the territory reached 5,000, to be supplanted by a legislature of that initial legislature's design once the population reached 12,500 (Willoughby 1905).

Many political scientists have made a strong case for why local political leaders would have preferred to transition out of the territorial appointment system and in to a more autonomous state-based structure. First off, territorial leadership

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<sup>10</sup> The exception to this rule is California, which skipped the territorial stage entirely.

<sup>11</sup> This increase in the population requirement continued to grow with the population of the country as a whole, as follows: in 1850, a population of 99,000 inhabitants was required; in 1880, a population of 150,000 inhabitants was required; in 1890, a population of 170,000 inhabitants was required (Owens 1987). Owens also writes about Congress invoking a clause in the Northwest Ordinance about admitting regions in the general interest of the union in order to either admit territories early or delay admission. This complicates the link between population and gain to territorial politicians, but does not destroy the connection — Congress was only willing to flex the requirement so far.

was appointed by the United States government, leaving office holders with very little stability in their position. It was to be expected that a new President would appoint new territorial governors. Second, being granted statehood gave territorial leaders the right to participate in the state constitutional process. Third, at least three of these local politicians would also have the opportunity to move up to Washington as a delegation to Congress (Owens 1987, Downes 1931).

The upshot is that there was a clear vested interest which would benefit from attracting an increased population. This in turn increased the sensitivity of territorial law-makers to the demands of potential immigrants. Territorial governments wanted new settlers to pick their region as their future home and were willing to alter constitutions and legal practices in order to make this so.

The great scarcity of women along the western frontier gave legislators particular reason to focus on attracting women in order to grow their populations.<sup>12</sup> The first to travel to a new territory were always predominantly male migrants working in solitary manual occupations like mining and trapping. Only after the initial homesteading would farmers, ranchers, and their families follow, introducing a female population to the territory. This is illustrated particularly starkly in the Mountain and Pacific territories. In 1850, the residents of these regions were 73.7% men. This number grew but slowly, reaching 68.2% in 1860 and 62.5% in 1870 (Kleinberg 1999: 51).

These strikingly low proportions of females on the frontier provided additional incentive for law-makers to focus on reforming those areas of law that would be of particular interest to women. And the question of population growth goes beyond satisfying a congressional requirement. Charles Ingersoll, a representative from Pennsylvania during the 1840's conflict with Canada over ownership of the Oregon territory, is reported to have said, "We wanted no Alexander to put us in possession of our modern Asia. All we wanted was women and children."<sup>13</sup> Population growth was key to the protection of America's interest in expanding geographically, and there is no population growth where there are no women to be found.

Newspaper archives provide rich historical evidence on the competition between territorial political leaders for female residents. One of these political agents

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<sup>12</sup> Braun and Kvasnicka (2010) similarly find that the collective action problem inherent in women's suffrage is overcome when states need to attract women to the Western frontier in order to correct the gender imbalance. The ratio of females to males in a state is a robust predictor of voting rights, with states with a proportionally smaller female population granting suffrage earlier.

<sup>13</sup> *Fayetteville Observer*, (Fayetteville, NC) Tuesday, January 13, 1846; Issue 1493; col E

was William Gilpin, whose life and livelihood depended upon progress and settlement in the American west. He spent his life traveling the frontiers as part of different United States government missions. All before 1848 he had lived or served in Missouri, Florida, Oregon, and other areas of the region that would be acquired by the U.S. at the conclusion of the Mexican-American War. Gilpin's life was dedicated to encouraging westward expansions through writings such as the dramatically descriptive *Mission of the North American People*, a treatise on the virtues and supremacy of the North American continent (Gilpin 1873).

Gilpin also happened to be the first governor of the Territory of Colorado. During his tenure, Colorado became the first Western territory to enact full married women's property rights. Gilpin's intentions of attracting population to the territory, and women in particular, can be clearly seen in an editorial he wrote in 1861 upon arriving to the territory:

It would be a great blessing to both Colorado and Nevada if an emigration of females to those Territories could be obtained. Many thousands of poor girls... destitute of employment in the Atlantic States, would be gladly welcomed in these remote regions, and might establish themselves for life in domestic happiness and comfort.<sup>14</sup>

Gilpin's editorial was circulated around the country in newspapers as far east as Massachusetts, so this message certainly made it to those "poor girls" Gilpin was hoping to entice to Colorado.

J.M. Ashley, governor of the Territory of Montana, goes even further in his salesmanship in an address to the Montana Immigrant Association, an organization dedicated to encouraging migrants to choose the territory of Montana as their homestead:

In many of the Eastern States and especially in all the great cities there are thousands of honest, industrious men and women without homes and without employment, struggling for a precarious subsistence. Here in Montana there is remunerative labor for all, with free homes, and health and a bright future. **Montana is especially desirable for women who are dependent upon their own labor for support...** thousands can find good homes and immediate employment... (Ashley 1870: 4; emphasis added).

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<sup>14</sup> *The Barre Gazette* (Barre, Massachusetts) December 13, 1861; Volume: 28; Issue: 21; Page: 1

Ashley's singling out of working women is of particular interest. Working women during this time would have been disproportionately single. To work outside the home while married was still rare (Kleinberg 1999). This group of women would have been the group with the most to gain from the married women's property reforms, as they not only owned separate property but also had not yet ceded any of their earnings to a husband. If there was a way for a politician to appeal to the single working girl of the nineteenth century, reforming laws regarding property rights after marriage would certainly have been a good choice.

The messages of these governors are echoed by dozens upon dozens of un-attributed calls in newspapers for all —particularly women—to head West in search of a better life, often with one particular region highlighted as the promised land.<sup>15</sup> A South Carolina paper in 1843 reprinted a story published in an Iowa newspaper where the editor "...begs and prays five thousand good-looking industrious and sweet-tempered young women to emigrate..."<sup>16</sup> A Milwaukee paper wondered in 1846 why more women hadn't ventured to the mineral region of the state, where a working woman "can easily earn one hundred dollars there per annum, besides her board."<sup>17</sup> An unnamed resident of Utah pleaded to a New York paper in 1856, "For humanity's sake... do, Mr. Editor, earnestly recommend the emigration from Down East of a few thousands of virtuous and industrious young ladies..."<sup>18</sup> And taking advantage of some of the most common parlance of all, the Cleveland Herald in 1883 proclaimed, "GO WEST, young girl! In Texas they are paying servant girls \$20 a month."<sup>19</sup>

In these and like actions we can see the self-governing capacity of polycentric orders that the Ostroms have so successfully drawn our attention towards. Autonomous political actors reacted to the potential gains from statehood by appealing to the women and men of regions further east— particularly the women—to come and join them along the Western frontier. This type of jurisdictional competition, possible only within a polycentric governance framework, opened the door for a type of social change that may not have otherwise occurred.

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<sup>15</sup> A partial survey of nineteenth century newspaper articles on women uncovered over 100.

<sup>16</sup> *The Southern Patriot*; Date: 03-10-1843; Volume: XLIX; Issue: 736; Page: [2]; Location: Charleston, South Carolina.

<sup>17</sup> *Daily Sentinel and Gazette*, (Milwaukee, WI) Saturday, March, 14, 1846; Issue 24; col A.

<sup>18</sup> *The Weekly Herald*, (New York, NY) Saturday, March 29, 1856; pg. 99; Issue 13; col B.

<sup>19</sup> *The Cleveland Herald*, (Cleveland, OH) Friday, November 02, 1883; pg. 4; Issue 300; col C.

#### *4. Concluding Remarks*

The history of the nineteenth century United States offers great opportunity for the study of polycentric orders. Real world instances of relatively stable and economically developed systems that both allow autonomous sub-units and permit jurisdictional entry and exit of these units are rare. This much cannot even be said of state level activity in the United States today, though certainly polycentrism is alive and well at the municipal level. Rarer still is the observance of autonomous and competing jurisdictions in the context of a shared set of general rules and norms, provided in part in the case of the United States by the legal ancestry of the common law that has shaped so much of state legislation and judicial action.

The stakes of this expedition into economic history are high. Polycentrism and its mechanisms of function, such as jurisdictional competition, may be one of very few ways to actualize a self-governing society. In the words of Vincent Ostrom,

If the whole system of human affairs is capable of being organized on principles of polycentricity rather than monocentricity, we could have human societies that no longer depend upon a unity of power to achieve coherence (V. Ostrom 1991:224).

This does not mean the subversion of cooperative effort. It does not mean no government, or even no coercion. What is offered forth in this statement is the idea that there may be a system capable of permitting the formation of governing bodies that could not ever fully embody the description of a government as a monopolist in violence even if they tried.

The consequence is that a truly self-governing system becomes possible. If the Ostroms are correct, polycentric systems enable the actions of individuals to effectively prevent power from becoming concentrated among political actors, instead keeping that power dispersed. The potential of this research agenda to answer one of the great unsettled questions in constitutional political economy justifies investment in scholarship that uses historical evidence to press the theory of polycentric orders to a finer level of understanding.

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# Regulation's Effect on Experimentation in Retail Electricity Markets

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## *1. Introduction*

Almost since its inception over a century ago, the electricity industry in the United States has been subject to economic regulation designed within a specific social-technological context in the early twentieth century. Such regulation facilitated widespread electrification and high service reliability in the twentieth century (contributing significantly to economic growth), and it has done so via investment in generation, transmission, and distribution infrastructure based on a specific set of electro-mechanical technologies:

- Centralized large-scale electricity generation;
- A transmission and distribution grid that employs alternating current to enable the long-distance transportation of electricity from the central generator;
- Electro-mechanical controls, switches, and consumption (watt-hour) meters; and
- Static capacitors and insulators to act as buffers in a network that requires real-time balance between supply and demand because of the cost of the next best alternative, which is storage.

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Indeed, the regulatory institutions that still predominate in electricity date from the Progressive era of the early twentieth century; they were also designed based on the then-prevalent electricity generation and distribution technologies and their associated cost structures.

Over the ensuing century, though, technology outside of this industry has changed dramatically, particularly digital communication technology. Yet the electric power industry, the backbone of our modern, technology-rich lives, is the most technologically backward industry in the country, an analog, mechanical relic of the early twentieth century. Few of these exogenous digital innovations that could create more value or reduce costs have been adopted in the regulated electricity industry. Imagine, for example, a home energy management system accessible through an Internet-ready television that enables a consumer to receive price signals as the retail price of electricity varies in real time; that system can automate responses of digitally-enabled appliances and devices in the home (HVAC, refrigerator, laundry, lighting, electric vehicle charging, solar panel generation) to price changes without mechanical interference, and without requiring the consumer to perform the mechanical responses manually. Some consumers may also benefit from having a retail electric service provider bundle that system and the associated electricity contract with a home security service or a home entertainment service (or both). These and other unforeseeable potential value propositions arise due to the promise of digital communication technology and its application to electricity use in the home.

Similarly, regulatory institutions have not adapted to these exogenous technological changes, resulting in regulated investments and service offerings that perpetuate this analog equilibrium. Regulatory institutions have not changed significantly from the forms set in place in the early twentieth century. Technological change is both inevitable and ubiquitous, yet economic regulation typically does not anticipate it, plan for it, or adapt to it when it does happen. Forces such as inertia, culture, and concentrated interests in maintaining the status quo perpetuate these institutions, even in the face of technological change that impacts the effects or the relevance of the long-standing regulatory institutions.

The historical regulatory institutions in the electricity industry have stifled endogenous innovation in certain directions and promoted it in others. Regulators allow regulated firms cost recovery (plus their regulated rate of return) on certain investments – supply-oriented innovations related to physical generators and wires, “iron in the ground”, as well as reliability-related investments, such

as digital innovations in control room operations. In those areas regulators have been more willing to allow new technologies, and have felt that they would be better able to do *ex post* prudence reviews of those investments than in other areas, such as customer-facing end-use devices to automate settings changes in response to price changes or to changes in system status.

These dramatic and exciting technological changes could be on the verge of creating a paradigm shift in this industry, and firms, regulators, and policymakers are now grappling with the challenges associated with this industry's evolution from a mechanical public utility to a modern technology and infrastructure industry. Historically vertically integrated and regulated, the electric power industry in the U.S. was engineered for centralized physical and economic control, for operational, economic efficiency, and equity reasons. Reliability and system balance have always been the paramount policy objective, and from an economic perspective, the principal illuminating regulation has been the concept of "the public interest" used to control the exercise of market power. Digital smart grid technologies, including in-home digital devices and energy management systems, enable this system to achieve reliability and system balance through decentralized coordination across these distributed, heterogeneous agents, rather than the centralized control for which the physical infrastructure and the regulatory institutions were designed.

In this paper I provide a critique of traditional electricity regulation and its effect on technological change based on concepts and frameworks from the literature on institutional design and robust political economy. Applying insights primarily from Ostrom, and Pennington, I propose broadening the framework in which we analyze economic regulation in natural monopoly situations to analyze such regulation as a set of possible governance institutions. In particular, both Ostrom (2005) and Pennington (2011) stress the importance of experimentation and trial-and-error processes for the development of robust institutions that enable individuals to thrive in complex social systems. Grounded in the pervasiveness of the knowledge problem, arguments in favor of experimentation hold that knowledge about how an institution will function can only emerge through the process of trial and error.

Here I argue that traditional electricity regulation, based on static neoclassical natural monopoly theory, misunderstands the nature of competition and consequently undermines experimentation and its ability to create knowledge, and ultimately, value through innovation and technological change. Regulation disables experimentation in two arenas: it rigidifies the process of institutional experimentation and it stifles the process of market experimentation. The formality of the procedures for institutional change make regulatory institutions inflexible and slow to change. Further, the incentives they create in both the regulator and the regulated industry create a bias toward maintaining the status quo. Regulation also stifles market experimentation through the effects of legal entry barriers in retail markets, and the specific legal definitions of product characteristics and market boundaries that are required in order to implement cost-based economic regulation. In analyzing the effects of stifled market experimentation my analysis draws on the entrepreneurial theory of both Schumpeter and Kirzner.

This experimentation-based critique of regulation suggests that enabling some institutional flexibility and adaptation rules for institutions would reduce the problem of maladaptive institutions in the presence of pervasive technological change. Furthermore, retail competition and the reduction of entry barriers into retail electricity markets would enable market experimentation that can create value from innovation and technological change for a wide range of electricity consumers.

## *2. Theoretical Framework: Institutional Analysis and Experimentation*

One hallmark of new institutional economics, including Ostrom and her colleagues known as the Bloomington School, is the fundamental premise that social systems are complex. Achieving decentralized coordination of individual actions and plans in complex human systems requires institutions, the rules structuring the situations in which agents interact. Ostrom gives a broad definition of institutions:

Institutions are the prescriptions that humans use to organize all forms of repetitive and structured interactions including those within families, neighborhoods, markets, firms, sports leagues, churches, private associations, and governments at all scales. Individuals interacting within rule-structured situations face choices regarding the actions and strategies they take, leading to consequences for themselves and for others (Ostrom 2005: 3).

This definition encompasses both formal and informal rules in a variety of contexts, addressing a range of different challenges that arise in social interaction. Such rules include property rights and use rights; they govern contracts, and they shape the extent to which agents organize transactions through firms or through market processes.

Institutions or rules enable agents to form expectations, which is crucial for any form of non-simultaneous, inter-temporal exchange. We form expectations of the potential benefits and costs of our actions, of the behavior of others, of the ability to get a benefit in the future if we incur a cost now, and so on. Therefore institutions help us create focal points that facilitate our attempts to coordinate individual actions and plans.

Another complicating factor in institutional design relevant to this analysis is designing institutions in the face of pervasive change. In addition to his earlier pioneering work in new institutional economics, North (2005) adds a fundamental insight that is directly relevant to analyzing regulatory institutions – human action and individual decision-making necessarily take place in a non-ergodic world: “the world we live in is non-ergodic—a world of continuous novel change ...” (ibid.: 16).<sup>2</sup> Innovation continually produces unanticipated changes in the underlying environment.<sup>3</sup>

This insight about the non-ergodic nature of social-technological change leads to several implications. One methodological implication is the even-further reduced relevance of static neoclassical models for enabling us to understand dynamic processes involving economic growth, technological change, and institutional change. Another implication directly relevant to this work is that institutions, such as regulatory institutions, are created within a particular social-technological context, but that context is going to evolve in novel directions that have never before been encountered or even imagined. Unless institutions can adapt and co-evolve with their social-technological context, we run the risk of institutions becoming maladaptive.

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<sup>2</sup> The *Oxford English Dictionary* defines a stochastic process as ergodic if it has “the property that the probability of any state can be estimated from a single sufficiently extensive realization, independently of initial conditions; statistically stationary.” Thus a non-ergodic process is one for which the probability of any state cannot be estimated independently of its initial conditions; it is also not stationary.

<sup>3</sup> For a discussion of Douglass North’s work, see Volume I of *The Annual Proceedings of the Wealth and Well-Being of Nations*.

One of the fundamental insights of Ostrom, the Bloomington School, and robust political economy is that “political action and institution building could be seen as a continuous series of experiments based on ideas articulated as institutional design principles” (Aligica and Boettke 2011: 52). Experimentation is a core concept embedded in the institutional design principles articulated and analyzed in Ostrom (1990) and (2005), among other works.

Ostrom’s work combines with Pennington (2011) to create a framework for evaluating the robustness of electricity regulation as a governance institution. Why is this idea of robust political economy so important? Robustness is, like resilience, a performance criterion by which we can evaluate a set of institutions to see how well they perform in real-world situations across time and space. Robust social institutions take into account the cognitive, psychological, and strategic realities of being human and trying to live together in civil society, rather than being based on some mythical, hypothetical individuals who are either entirely Cartesian-rational, entirely Hobbesian-rapacious, or possessing full foresight. Pennington (2011: 2-3) takes on all of these traits of real humans, and much of his argument is grounded in the reality of the knowledge problem; he articulates the primary criterion used here to evaluate regulation’s robustness as a governance institution:

Human beings are limited in their cognitive capacities and as a consequence even the most intelligent and far-sighted people are relatively ignorant of the society in which they are situated (Hayek 1948a, Simon 1957). Given the imperfections of human knowledge, the consequences of any particular action, either for the actors concerned or for the wider society, will at any given time remain uncertain. Robust institutions should therefore allow people to adapt to circumstances and conditions of which they are not directly aware, and under conditions of ‘bounded rationality’ must enable them to learn from mistakes and to improve the quality of their decisions over time.

Taking into account the knowledge problem, what are institutional traits that enable heterogeneous self-interested individuals, for whom self-interest usually takes many different forms, to live together and hopefully to thrive in civil society?<sup>4</sup>

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<sup>4</sup> For more thorough background on robust political economy, see Boettke and Leeson (2004), Leeson and Subrick (2006), and Boettke et. al. (2005).

Pennington answers that question by arguing that institutions reflecting classical liberal ideas and principles are best situated to enable thriving civil society. He synthesizes Scottish Enlightenment political economy, Austrian economics, public choice economics, and new institutional economics (including both Ostrom and North) into a classical liberal framework that qualifies as robust political economy. He melds the complexity and emergent order approaches of the Scottish Enlightenment and of the knowledge-problem-focused Austrian economics with the ideas of adaptation and evolution in those traditions as well as in new institutional economics. He blends the polycentric and locally-driven approach to institutional design from new institutional economics with the “model men as if they are knaves” to constrain selfish minorities that we see in David Hume, James Madison, and modern public choice economics. He further combines all of the above with the idea that processes that enable emergent, decentralized, polycentric institutions will do a better job of enabling people to thrive in civil society (i.e., be robust) precisely because they allow for trial and error, for experimental evolution, and that the combination of community processes of consent with real options for both voice and exit are a crucial component of creating this robustness. As such, Pennington’s synthesis provides a foundation for an experimentation-based critique of electricity regulation in the presence of pervasive technological change.

Why is experimentation so fundamental and so important? In dynamic, complex social systems, change is ubiquitous and pervasive; individuals within these systems change their behavior in response to changes in their own perceptions of preferences and opportunity costs, in response to changes in the actions of others, and changes in the rules that structure these interactions and shape their incentives and behavior. Because social systems are complex, the outcomes of these interactions are non-deterministic, so designing rules *ex ante* that will enable perfect plan coordination and avoid processes like rent dissipation (i.e., expenditures in pursuit of political favor seeking) or contract renegotiation is difficult, if not impossible. Indeed, North (2005) contends that the non-ergodic nature of dynamic, complex social systems means that designed rules are almost always out of date, because they are designed to address issues and incentives at a particular time and context. The constantly-changing world changes that context, and at the margin changes the relative importance of different issues and the relative weight of incentives in shaping behavior.

The experimentation process enables social learning in these complex social systems in which both economic outcomes and how specific institutions will

function are unknown.<sup>5</sup> Only by experimenting with different institutions, or by testing institutions in economic experiments that capture the salient features of the real-world environment, can we learn the effects of rules on behavior, resource allocation, and other social phenomena (such as social cohesion). The rules embedded in different institutions change the interactions of agents in complex social systems, thereby changing outcomes, often in unpredictable and non-deterministic ways.

In this analysis I distinguish between two areas of experimentation: institutional experimentation and market experimentation. The work of the Bloomington School emphasizes the latter, as described above, but their insights apply equally to the market experimentation that is the focus of the entrepreneurial literature building on the work of both Schumpeter and Kirzner. By market experimentation I mean the ability of agents to create new products, services, production processes, or business models that can lead to changes in market boundaries and definitions as they engage in their activities in interaction with consumers. Personal communication technology is the most obvious recent example of such experimentation, in which Schumpeterian entrepreneurs invent new products and services that did not exist previously (Apple's iPad and the proliferation of cloud computing), and Kirznerian entrepreneurs and their alertness to profit opportunities take those disruptive changes, commercialize them, and enable equilibration toward new outcomes in these evolving, changing markets.

Schumpeter (1934: 75, 136-7) models the entrepreneur as an individual who creates new combinations. These new combinations can include new inventions, and combining new inventions with existing products, services, or business processes in original ways. Thus dynamic competition often takes the form of product differentiation and bundling to compete for the market; rivalry occurs among differentiated products, and by so doing, innovators and entrepreneurs change market definitions and boundaries by creating new products and services, and new bundles of products and services. Dynamic competition does not take the form of price competition between or among sellers of an already-existing or administratively-defined product (Schumpeter 1942: 79-87).

From this analysis, Schumpeter's (1942: 84) most famous argument and metaphor derive naturally. Competition in dynamic, free enterprise societies is a

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<sup>5</sup> For a critique of electricity regulation emphasizing its truncation of social learning, see Kiesling (2010).



process of change and creative destruction, with new combinations making previous ones obsolete. Thus the nature of growth-generating competition is dynamic, not static; feature-driven, not just price- and cost-driven.

The entrepreneurial activity of Schumpeter's bold, disruptive innovator finds its complement in the entrepreneurial activity that Kirzner's work has emphasized. Kirzner explores the role of individual entrepreneurial decisions in the competitive market process.<sup>6</sup> While neoclassical economic theory's focus on equilibrium and constrained optimization given known and unchanging variables leaves little opportunity to analyze the process of creating that equilibrium, Kirzner goes beyond the equilibrium framework to analyze the role of entrepreneurial decisions in the equilibration process.

Kirzner's (2009: 147) "entrepreneur as equilibrator" uses differential alertness to profit, at least in expectation, from an existing opportunity to create net value. Differential alertness means awareness of and openness to an opportunity that has yet to be widely noticed. The simplest example of entrepreneurial activity grounded in alertness is price arbitrage – alertness to the existence of price differentials, taking action to resolve them, and profiting from doing so. This action creates value while also driving the market toward equilibrium by capitalizing on price differentials. Even this simple form of entrepreneurial activity illustrates the dynamic nature of market competition, in contrast to the static, equilibrium, price-focused model of competition on which the natural monopoly theory of regulation and the institutions built upon it are based. This entrepreneur is not a disruptive creator *a la* Schumpeter, but takes actions that set equilibrium in motion. Although static equilibrium is never reached, the entrepreneur as equilibrator adapts to underlying changing conditions to drive the equilibration process. Thus entrepreneurial alertness plays a coordinating role.

Thus this experimentation-based political economy critique of traditional public utility regulation presented here is twofold. Regulation rigidifies the process of institutional experimentation by relying on extensive formal legal procedures that are slow and costly to change, by creating entrenched interests who act to maintain the status quo, and by coupling economic with political incentives to induce regulators to make cautious decisions. Regulation also stifles market experimentation by erecting entry barriers, by specifying product and product

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<sup>6</sup> For a discussion of Israel Kirzner's work, see Volume III of *The Annual Proceedings of the Wealth and Well-Being of Nations*.

quality definitions, by minimizing feedback channels for consumer preferences by imposing average-cost pricing, and by creating incentives for regulated firms to propose backward-looking, cautious investments.

### *3. History and Electricity's Political Economy*<sup>7</sup>

The electricity industry is the last remaining industry in the U.S. to be regulated fully as a public utility. In this industry the regulated firm has typically been a vertically-integrated, private, investor-owned utility. The traditional structure and regulatory environment in the electricity industry are due primarily to scale economies over the range of demand (subadditivity of cost if the firm is a multi-product firm). These economies of scale, in combination with its technology-driven vertical integration, led to the industry's treatment as a natural monopoly by the early twentieth century.

The electric industry's technical development as a natural monopoly originates in large cities in the U.S. in the late nineteenth century. Chicago's history illustrates the politics, economics, and finance of the industry; between 1887 and 1893, twenty-four power companies were established in Chicago (Platt 1991). With overlapping franchises granted by the city council, competition was high, rivalry was vigorous, and investment in generation plants and distribution wires was largely duplicative, leading to retail price volatility and high debt levels in the industry. Samuel Insull resolved this problem in 1898 by purchasing all twenty-four power stations, thereby establishing a monopoly (which became Commonwealth Edison). The creation of a monopoly led fairly directly to regulations on monopoly profits, and while some pushed for competitive pricing, Insull advocated profits above the competitive level to enable the regulated monopoly to invest in infrastructure so it could serve all customers on demand (Hirsh 1999: 14). Insull and others in his position in other cities had also incurred substantial debt to acquire these assets, and saw state-level regulation as a way to reduce debt costs along with the barriers to potential entry from competitors.

Under regulation, utilities receive exclusive franchises for specific geographic service territories and are subject to a set of rules. The two most important of these rules are the obligation to serve in their exclusive service territory and their entitlement to charge prices that are based on recovering costs plus a return on the assets they have purchased that the regulators approved. The obligation to

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<sup>7</sup> For a more extensive discussion and analysis, see Kiesling (2008).

serve includes all present and future customers in the service territory receiving electric power at a reasonable price, with regulators determining reasonableness based on cost recovery and their determination of a reasonable rate of return. This obligation to serve continues to be a fundamental characteristic of the monopoly franchise and eliminates possible competition for utilities, including competition from new technologies for distributed generation or from retail energy service providers. Basing the rates that customers pay on cost recovery is one of the consequences of the obligation to serve (in combination with rate-of-return regulation). This focus on cost recovery in rates often provides an obstacle to the evolution of market-based retail electric pricing, because instead of considering the value created for customers it emphasizes only the cost of providing customers with a particular type and quality of a regulation-specified product.

The 1940s to 1960s saw substantial investment in generation, transmission, and distribution assets to meet the policy of national electrification; the regulated rate of return that utilities earned induced those investments. By the late 1960s, though, investment slowed and so did the operating efficiency of new generation, which hit a plateau of approximately 33 percent in the early 1960s (Hirsh 1999, Figure 3.1: 57), which has improved slightly but persists to this day. By this time, though, the industry had largely achieved the shared state and federal social policy objective of national electrification that was one of the hallmarks of the Progressive era.

This early history of the industry, its technology, and its regulation demonstrates how the incentives facing both the regulator and the regulated solidified during this era. Both parties had their interests aligned in support of cost-based regulatory institutions that provided a regulated rate of return in compensation for widespread investment in the generation, transmission, and distribution technologies and centralized network of the electro-mechanical era. These incentives became deeply entrenched, as did the focus of both parties on investment in established technologies.

Thus the history of the U.S. electricity industry has been a century of symbiosis between the regulator and the regulated. Over this time technology and economic activity have changed the underlying physical and economic fundamentals of the industry, making traditional natural monopoly regulation increasingly obsolete. Due to technological change, the only part of the historically vertically integrated value chain that has any remaining claim to “natural monopoly” status is the wires network (and even that claim will erode over time as distributed

generation technologies become more economical). The industry's "natural monopoly" characteristics have eroded, as have those of the retail/marketing/end-use customer interface part of the value chain. Thus the traditional regulatory institutions have outstayed their welcome, particularly in view of the forward-looking image of a digital twenty-first century.

#### *4. Regulation and Technological Change: Smart Grid Policy*

Cost-based regulation in electricity has resulted in investments concentrated in established, large-scale, supply-side technologies for the past century. Meanwhile, the past 30 years have seen unprecedented innovation in digital communication technology that has transformed almost every aspect of daily life, except for how individuals purchase and use electricity and associated products and services.

In electricity, technology evolution has taken the form of smart grid technologies in all parts of the electricity value chain – generation, transmission, distribution, and retail service. Technologically, a smart grid is a digital communication overlay that is integrated into the existing electric power network, which creates embedded, sensing, digital communication capabilities. Digital smart grid technologies include

- Digital switching networks for autonomous physical flow management;
- Remote sensing and monitoring in wires and in transformers;
- Fault detection and devices for automated fault repair; and
- Intelligent end-use devices in homes, stores, office buildings, garages, and factories.

These smart grid technologies enable a variety of capabilities in the electric power network, such as

- Distribution system automation by the wires company, leading to better service reliability;
- Distributed resource interconnection, including small-scale renewable generation;
- The ability of an individual to be either a producer or consumer of electricity, or both
- Demand response to dynamic pricing;
- The ability of an agent to program end-use devices to respond autonomously to price signals; and
- Using price signals and distributed autonomous responses to them to enable transactive coordination of the system (many of the previous functionalities contribute to this coordination).

The integration of these technologies into the electric power network will embed distributed intelligence in the systems comprising the electric grid network. The potential ways that smart grid capabilities can create value are significant, and they transcend the traditional utility-provided “plain vanilla” electricity generation and delivery value proposition. By enabling better, and more decentralized, coordination of electricity supply and demand, smart grid functionalities contribute to the optimization of resource use in the entire electricity system. One example of this optimization is how dynamic pricing induces consumers to shift consumption away from expensive peak hours, which leads to a reduced need for expensive infrastructure investment that is built to meet peaks and then sits idle for substantial portions of the year. Avoiding that investment saves costs and saves resources.

For example, a home can have a home area network (HAN) that connects its appliances, its heating and cooling, its water heater, its laundry, its entertainment (stereo, television, digital video recorder, game console), and its lighting into one communication network, accessible either through a computer screen or Internet-ready television in the home or through a web-based portal that can be accessed via a computer or a mobile device. Through this communication interface, the customer's electricity retailer can communicate real-time information about the quantity of electricity consumed, the price the consumer is paying, and even the type of generation resources being used to generate the power being consumed. The retailer can also communicate price signals to the customer, and the customer can program the different devices in the HAN to change their settings in response to price changes – if the price increases from 9 cents to 12 cents per kilowatt-hour, reduce the temperature in the water heater by 5 degrees, and increase the thermostat air conditioner setting by 5 degrees. Thus the retail provider essentially communicates directly with the consumer's devices, which the consumer has used to automate responses to price changes. Moreover, the consumer can have remote web access to the HAN, and can change settings, monitor energy consumption, and analyze data on the home's electricity consumption.

Furthermore, if the home has distributed generation equipment installed, such as solar photovoltaic rooftop panels, the customer can program the network to reduce electricity use once the home's consumption reaches the generation capacity of the solar resource, thereby reducing the use of energy overall and reducing the use of fossil-fuel-generated power, if the marginal generation resource at that time is coal or natural gas. (Of course, with retail choice, the customer could

choose a 100% renewable energy contract if s/he desires, which would alleviate the green/grey mix consideration). Some of the value of smart grid technology is grounded explicitly in product differentiation to increase welfare by satisfying heterogeneous, subjective consumer preferences, such as preferences over the fuel used to generate electricity. These digital communication technologies enable new value creation, reduction in environmental impact, and decentralized coordination in the electricity industry precisely because they make more of the network, and more of the participants in the network, transactive.

Bundling of retail electricity service with other services also has the potential to create value for consumers by making it easy and convenient for them to save money on their electricity bill in combination with other home services they consume, such as home security or home entertainment; however, existing regulation erects an entry barrier against such bundling. For example, in vertically-integrated, regulated states in the U.S. a company like ADT home security, AT&T, or Comcast cannot enter the retail electricity market and offer a bundled service.

A hallmark of digital smart grid technologies is how they enable and reduce the cost of two-way communication. In electricity as in other industries, digital communication technology makes it possible and easy to have two-way communication, and to use that communication capability to automate individual actions. As we have seen throughout society over the past two decades, the proliferation of communication technology has made engaging in transactions easier and cheaper. The implications of this potential for the electric power network are profound; rather than simply a physical transportation network for the flow of current, a smart grid is a rich transactional environment, a market platform, and a network connecting producers and consumers who contract and negotiate their mutual exchange of value (product, service) for value (payment). A smart grid is a transactive grid.

Over the past five years, policymakers, regulators, and regulated firms have become increasingly interested in how to implement smart grid investments. From a regulatory perspective much of the emphasis has been on requiring those interested in encouraging smart grid investments to make strong business cases in support of them; these cases have been challenging because so much of the regulatory perspective emphasizes cost recovery and the ability of investments in new technology to reduce costs. Regulated firms similarly focus on that argument, due to the symbiotic alignment of the interests of the regulator and the regulated. Thus much of the debate about smart grid investments has been

whether the cost savings associated with wires-related technologies (distribution automation, intelligent transformers and substations, and so on) is sufficient to warrant the investment, with little attention paid to the potential value creation at the residential customer interface. This customer-facing value proposition is getting more attention now, however, due to the Department of Energy-funded smart grid pilot projects at many utilities around the country arising from the ARRA stimulus funding in 2009. These pilot projects are occurring in states that cover the range of regulatory regimes, from full vertical integration and traditional regulation in states like Minnesota and Florida, to restructured states with limited retail competition like Maryland and Ohio, to fully deregulated Texas.

In this market, intelligent end-use technologies create the potential for ubiquitous, timely information in a market that has heretofore been opaque to consumers, who know little about their electricity consumption and only know it *ex post*. Historically, this opacity and the technological difficulty of communicating timely consumption information to consumers has reinforced the dominant economies of scale/subadditivity of costs argument for vertical integration, legal entry barriers, and regulated retail prices. In that context, regulation “stands in for” competitive market forces, and serves to protect consumers from the exercise of market power to raise prices.

However, the exogenous evolution of technology has created a potentially competitive retail electricity market, although in most states vertical integration and retail regulation persist. With more transparent and timely consumption information in the hands of consumers, many more buyers will have the ability to acquire and access timely information about their individual electricity consumption patterns, and the ability to program their demand functions into transactive devices that can respond autonomously to price signals. In other words, the technology now exists to enable consumers to use competitive alternatives to protect themselves from the exercise of market power. Thus one of the traditional functions of regulation is becoming obsolete due to technological change.

Yet the retail regulatory institutions in the U.S., except for Texas (Kiesling and Kleit 2009), generally have retained retail market entry barriers. The range is from 14 states with nominal retail competition, where the incumbent utility holds the rights to provide the default retail service contract (e.g., Ohio, District of Columbia, New Jersey, New York, Maryland, Illinois), to outright refusal to consider modifying the retail regulatory institutions to allow competitive retail entry. Without such institutional change, though, retail consumers are much less

likely to have a larger choice set and the ensuing likely increase in total welfare that arises from the experimentation and social learning of both producers and consumers participating in market processes.

In markets with low entry and exit barriers, entrepreneurship drives new product creation, product differentiation, and the experimentation in the market that reveals whether or not consumers value such innovations. In regulated markets like electricity, however, this experimentation occurs in a more top-down, procurement-oriented manner. Innovations do not succeed or fail based on their ability to attract end-use customers, but rather on their ability to persuade the regulated utility that the product is valuable to the firm.

In this bureaucratic market environment, the form that market experimentation takes is the large-scale, multi-year pilot project. The regulated utility (after approval from the state public utility commission) publishes a request for proposals from smart grid technology vendors to sell devices and systems that provide a range of services specified in the RFP. The regulated utility is thus the vendor's primary customer. In many of the smart grid pilot projects that are currently in progress, the regulated utility is buying in-home energy management devices on behalf of retail residential customers (Smart Grid Information Clearinghouse).

The stated goal of these pilot projects is primarily to install digital technologies that increase performance and reliability of the basic provision of basic electricity service; for that reason, the projects emphasize technologies in the distribution wires network (distribution automation) and the digital meter at each home. The digital meter is the edge of the wires network, from the regulated utility's perspective. A secondary goal is to provide some customers with in-home energy management technology, to experiment with its features and to explore how customers actually use technology to control and manage their own energy use; a longer-run consequence of this experimentation may be heightened awareness and activity of consumers with respect to their electricity consumption, now that digital technology exists that can enable them to reduce consumption and save money by automating their actions.

Thus the technology choices are being made at the firm level, not at the consumer level, even for in-home energy management devices. This path to market for in-home technology changes the nature of the market experimentation — on one hand, the larger-volume purchases by regulated utilities may attract vendors and investors and increase rivalry and experimentation, but on the other hand, the margin at which the technology rivalry occurs is not at the end-user as



decision-maker, but instead at the regulated utility. The objective functions of the utility and their heterogeneous residential customers differ substantially, and the use of this more bureaucratic experimentation path reduces the role of the different preferences and knowledge of those heterogeneous consumers. In that sense, the in-home technology choice being in the hands of the regulated utility stifles market experimentation with respect to the preferences of the heterogeneous consumers, although it increases experimentation with respect to the features that the regulated utility thinks that its customers want.

This analysis of the technological and political history of electricity regulation shows the origins and persistence of a cost-based institutional design based on the static neoclassical natural monopoly model and prevailing Progressive mores. In the ensuing decades as electrification proceeds, regulatory institutions and the affected parties become entrenched and have interests aligned in the persistence of the status quo. The emphasis on investment in established electro-mechanical technologies leads to slowing innovation. Yet exogenous technological and economic dynamism are unavoidable and pervasive; they reduce the institutional fit of traditional regulation, but entrenchment leads to institutional persistence. Dynamically, regulatory institutions become less of a fit and more maladaptive as this process of economic dynamism and technological change continues.

### *5. Regulation and Experimentation*

Thus the electricity industry is a regulated industry that has generated little internal digital innovation, and is only slowly incorporating exogenous digital innovation. This industry has also seen little institutional innovation to adapt to and enable the value-creating potential of digital technology. The framework of economic and social institutions in which individuals make choices shapes our choice set in the face of such pervasive and inevitable change. How do institutions enable us to benefit from our choices? With such pervasive technological change, can regulatory institutions hamper our ability to benefit from such new value creation?

Research in institutional analysis and robust political economy suggests that the process of value creation from exchange and markets necessarily involves experimentation. Regulation stifles, rigidifies, and changes the form and path of experimentation, both market experimentation and institutional experimentation. It does so in an environment in which exogenous economic and technological dynamism has transformed the underlying cost structure of most parts of the vertical

supply chain, as well as transforming the nature and the magnitude of consumer demand and how they are able to exercise choice. The economic and technological changes of the past 30 years, and the fact that the economy is a continually evolving complex system, means both that portions of the electricity supply chain are no longer natural monopolies and that the regulatory institutions that treat them as such are maladaptive and prevent the evolution of the type of rivalrous competition that creates new value and provides consumers with more opportunities and better means of “consumer protection” than mandating a fixed, averaged, regulated price for a predetermined, commodity product.

### *5.1 Regulation rigidifies institutional experimentation:*

In the context of a dynamic social system with pervasive technological change, institutional experimentation is a process that enables formal rules to adapt to changes in the system that arise from technological change, changes in the underlying (physical, economic, social) environment, changes in the behavior and interaction of agents, and changes in outcomes. Formal rules are typically backward-looking in the sense that they usually arise out of a response to particular issues and outcomes that have arisen in the past.

In electricity, economic regulation arose out of the combination of the economies of scale of large-scale centralized generation and transmission of electricity and the Progressive era mores regarding large firms. The changes that economic and technological dynamism have wrought in society mean that the underlying environment in which this industry is situated has changed dramatically over the past century, yet the regulatory institutions of the early twentieth century persist, largely with little modification. There has been little institutional experimentation that would enable more technological change and innovation to emerge within the industry or be adopted when it occurs exogenously. Existing formal regulatory institutions are rigid and slow to adapt to technological change in ways that would improve the well-being of consumers while creating profit opportunities for producers.

Why do these regulatory institutions persist, stifling innovation that can empower consumers to make their own value-creating decisions? Three main drivers rigidify institutional experimentation: slow and inflexible procedures for changing formal rules, the incentives of entrenched interests to maintain the status quo, and the incentives of regulators to make cautious and conservative decisions.

Regulation's formal institutions are extensive, and the formal processes for changing them contribute to the rigidity and inertia in institutional change. These formal institutions change only very slowly, through either legislative changes or through administrative proposals that involve public hearings, public comment periods, and regulatory staff responses to public comments and hearings proceedings. Public hearings and comments arise from the application of the Administrative Procedure Act at both the federal and state level. Enacted into federal law in 1946, the Administrative Procedure Act outlines the steps that regulatory agencies must take to provide, solicit, and incorporate public information and reaction to proposed regulatory changes. It also establishes a process for judicial review of federal regulatory changes. Every state has adopted procedures for promulgating state regulations that reflect the principles laid out in the Administrative Procedure Act. While these legal procedures have the salutary effect of promoting administrative transparency and public awareness, they do also make the process of institutional change slower and more inflexible.

These formal regulatory rules, based on century-old administrative law foundations, also create an institutional environment that facilitates the formation of entrenched interests in maintaining the status quo. Regulators who believe that their traditional regulatory actions are in the public interest will oppose efforts to change the regulatory mission or to change the scope of their influence. The regulated firms, similarly, may prefer a business model in which they make traditional investments in electro-mechanical technologies, receive cost reimbursement plus a reasonable rate of return on those investments, and do not face any potential competition in any part of their vertically-integrated supply chain due to regulatory entry barriers. Thus the incentives of the regulator and the regulated often align to reinforce the regulatory status quo and rigidify the process of institutional change in reaction to exogenous economic and technological changes.

One reason for the persistence of obsolete aspects of regulatory institutions must be rent seeking and the ability of special interests to perpetuate arrangements beneficial to them (Stigler 1971, Stigler 1972, Tullock 1993). Over the near-century of this symbiotic evolution, actors in the regulatory system have adapted to the incentives inherent in that system and learned how to maximize profits within its context. People respond to incentives, and utility executives are people. So are regulators. The public choice model illuminating the persistence of obsolete regulatory institutions also has to include the incentives of regulators, well-meaning civil servants who choose to work in the public interest, and who

believe that regulatory control and management of utilities is the most effective means to do so. Several counter-examples exist of utility executives and regulators who are forward-looking dynamists and are taking the small steps that they can within their constraints to promote institutional change. Others want the old system to persist, and the old system is persisting. Those interests reinforce the inertial trajectory of the system.

Not surprisingly, then, the third driver arises – regulator risk aversion and caution. In such an engineering-centric and technical industry, regulators who are often lawyers may not possess the technical knowledge and expertise to evaluate investment proposals involving new technologies that differ substantially from the traditional electro-mechanical “iron in the ground” that had met regulatory approval for more than a century. Similarly, regulators face high error costs in the public and political spheres if they approve new technology investments that either end up being more costly than anticipated (resulting in unpopular rate increases) or that do not contribute to reliability and product quality (resulting in a blackout rate that is no lower than before). For that reason, regulators are likely to reject new technology investment proposals, or at a minimum subject them to much more extensive analytical justification, which would require the regulated firm to provide a more thorough business case for the new technology investment. In such a scenario, both the regulator and the regulated often choose the low-effort route of retaining investments in old technologies beyond the point when they should have switched.

One challenge in analyzing these three drivers is disentangling the beneficial effects of slow institutional change from the detrimental effects. Consider the physical reality of electric power service; electric shocks can be fatal, the network must maintain physical balance of flows in real time, and at the transmission level these flows are not entirely predictable due to the physics of Kirchoff’s Law. When combined with the cost of constructing and maintaining the wires network infrastructure, the large expenses (pecuniary and nonpecuniary) associated with the provision of electricity and any failures to do so mean that some level of conservatism and caution is justified. When, though, does that caution and institutional inertia stifle either institutional change or economic change that would be generally beneficial? With respect particularly to rules regarding retail competition, institutional inertia and caution create more costs by forestalling evolution and change than benefits by providing a stable institutional environment.

If institutions are endogenously embedded in their social and technological contexts, then a logical question is what the process of institutional change looks like. If these three elements of a system co-evolve, what form does that process take? How does each element of the system affect the others? Clearly there will be direct and indirect effects – for example, technological change may produce institutional change directly, but it may also produce social change that itself produces institutional change. Both direct and indirect effects shape, induce, or stifle institutional change.

This discussion raises again the tension that lies at the foundation of this entire analysis. Institutions have to be flexible and able to adapt to unknown and changing conditions if they are to be effective in structuring behavior in changing environments. But they also have to provide transparency and some degree of consistency if they are to serve that objective and to create meaningful focal points for the coordination of behavior among heterogeneous agents with diffuse, private knowledge. This is the fundamental tension of institutional change – to be effective institutions have to be adaptive, but not so flexible that the incentive structure is as constantly in flux as the social-technological environment is. Well-designed institutions lend structure to the economic environment, but still retain a capacity for beneficial change.

By establishing preconditions for markets to function and creating an institutional environment in which they thrive, robust regulation would adapt to change because markets are complex adaptive systems that achieve ordered outcomes through decentralized coordination. By allowing markets to function, regulation will also benefit consumers by delivering differentiated products and services at different price points; note also that competition-facilitating regulation also enables entrepreneurial producers to profit from meeting the needs of consumers (who have diverse preferences and diffuse private knowledge). Market processes are positive-sum interactions in ways that traditional regulation cannot anticipate or duplicate.

### *5.2 Regulation stifles market experimentation:*

Traditional electricity regulation also stifles, rigidifies, and changes the path of market experimentation, which can both introduce and commercialize exogenous technological innovations and enable endogenous technological change within the electricity industry. It does so by erecting entry barriers and by specifying product definitions and characteristics (in the process of circumventing the inevitable information asymmetry between regulator and regulated).

To better enable both regulatory cost recovery by the regulated monopolist and the monitoring and regulation of product quality, regulatory institutions necessarily stipulate product dimensions and characteristics. Specifying the voltage, frequency, methods of delivery, permissible outage rates, and other product characteristics enables regulators to stipulate what operational actions and investments will qualify as a prudent business decision on the part of the regulated firm, and which therefore are eligible for cost recovery (plus a reasonable rate of return). This regulatory product definition also plays a crucial role in enabling regulators to overcome information asymmetry that prevents them from observing fully the costs that the firm incurs; one way that a regulated firm can shirk in the regulatory compact is to claim a certain level of costs but to under-provide quality, so quality regulations and monitoring are a crucial feature of regulatory institutions.

By stipulating product characteristics and quality, regulatory institutions thereby solidify market definition and market boundaries. This effect, in combination with the legal entry barrier eliminates what, following Schumpeter, I characterize as true competition in the form of rivalry due to innovation that creates product differentiation, new modes of organization, and product bundling that changes market definitions and boundaries. Similarly, following Kirzner, true competition enables entrepreneurs to attempt to benefit from their alertness to profit opportunities, including opportunities to commercialize new inventions and new product and service bundles in ways that move the evolving market toward a new equilibrium. The entry barriers that undergird the regulated monopolist's cost recovery prevent producer and consumer experimentation by imposing product and market uniformity.

In fact these issues of rigid product and market definitions and entry barriers form the crux of this dynamic institutional critique of natural monopoly regulation. By establishing product definitions, market boundaries, and entry barriers, regulation isolates the regulated monopolist, and the regulated industry as a whole, from the complex market ecosystem in which it actually operates. A lack of market experimentation means less or no value creation through creative destruction (product differentiation, bundling, changing market boundaries, rivalry among differentiated bundles). Entry barriers contribute to this lack of experimentation because new entrants are the ones most likely to risk their resources in these actions of the Schumpeterian disruptive entrepreneur. Entry barriers and formal market and product definitions undermine the processes for entrepreneurial discovery of new knowledge to lead to new value creation. New

entrants are the ones most likely to be alert to new profit opportunities, and since entry barriers reduce the returns to that alertness in this industry, these Kirznerian equilibrating entrepreneurs look elsewhere. The static regulatory model embodies a misunderstanding of the nature of competition; by focusing on cost recovery and targeting the lowest possible price, regulation undermines the processes of rivalry and experimentation with new products, new services, new bundles, and new profit opportunities that are the defining characteristics of competition. Reduced value creation and lower economic growth are the logical consequences of such a lack of market experimentation.

While regulators have allowed some changes in the products and prices offered by the regulated monopolist over the past century, these changes are often small tweaks that are still grounded in cost recovery, not discrete product differentiation or bundling. Moreover, what institutional changes have occurred in regulation have been slow, reactive, and as lagged responses to exogenous technological change. The Energy Policy Act of 1992's liberalization of wholesale power market transactions — as a consequence of the combined-cycle gas turbine's transformation of the economies of scale in electricity generation — is the most notable example in this industry.

## *6. Conclusion*

Using the tools and frameworks of institutional analysis and robust political economy suggests that the existing regulatory institutions in electricity both rigidify the process of institutional experimentation and stifle market experimentation. Regulatory institutions based on neoclassical natural monopoly theory and premised on unrealistic static assumptions are ill-suited to enable the electricity industry to serve customers and maximize value creation in this constantly changing world, with pervasive technological change. In the case of consumer-facing smart grid digital technologies, this experimentation-based critique indicates that regulatory institutions should adapt to allow retail market competition, which would reduce the entry barriers that prevent Schumpeterian and Kirznerian entrepreneurial activity from creating new value propositions for residential customers.

Technological changes in digital communications technologies over the past two decades (coming from outside the industry) have accelerated the obsolescence of the traditional regulatory model. Technology also affects whether decentralized coordination of individual actions and plans and the resulting emergent order are possible; the dramatic transformation of digital technology in the past few decades

has decreased transaction costs and increased the extent of feasible decentralized coordination in this industry. Institutions, which structure and shape the contexts in which such processes occur, provide a means for creating this coordination.

Regulatory institutions affect whether or not this coordination can occur, and the extent to which this coordination includes innovation in products, services, and markets arising from technological change. In general, to "... enhance effective problem-solving ... Instead of central direction, what is needed are policies that enhance the accuracy and reliability of information, that provide low-cost conflict resolution, and that develop the authority to govern resources at multiple levels" (Ostrom 2005: 240). The coordination framework suggests the following alternative criteria by which to evaluate regulatory institutions and market designs:

- Adaptability to unknown and changing conditions, including technological change;
- Enabling coordination of distributed, individual plans and actions;
- Enabling agents to self-organize; and
- Reducing the transaction costs that prevent private parties from engaging in mutually beneficial exchange (Kiesling 2008).

Regulatory institutions that meet these criteria will do a better job of enabling new value creation to come from unanticipated areas and sources, including those involving technological change. Regulation that enables both its own evolution and adaptation to change and market experimentation through competition serves consumers by decreasing entry barriers and transaction costs that obstruct the process of innovation in services and technologies.

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# Polycentrism and Prison Gangs

David B. Skarbek and Andrew Marcum<sup>\*1</sup>

## *1. Introduction*

Contemporary research on diverse institutional arrangements for governing public goods on multiple scales builds on classical economic theory while developing new theory to explain social phenomena that do not fit the dichotomous world of “market” and “state,” “private” and “public” (E. Ostrom 2010: 641). Prior to this development, the prevailing view saw the market as the optimal institution for the production and exchange of private goods, and government as necessary to impose rules and force payment of taxes for contribution to public goods. This research argued that without a hierarchical government, self-seeking individuals fail to cooperate and generate efficient levels of public goods. A single city governmental unit, as one example, was recommended to lessen the “chaotic” organization of metropolitan governance, reduce governmental conflict, increase efficiency, and best serve the public. Goods could be defined as either purely private or public. From this dichotomy, humans were viewed primarily as consumers or voters incapable of devising complex systems of self-governance.

The development of a framework consistent with game theory and extensive empirical research slowly transformed this view. Theoretical, empirical, and experimental research on how “citizens, local public entrepreneurs, and public

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officials engage in diverse ways of providing, producing, and managing public service industries and common property regimes at multiple scales” generated substantial knowledge about interactions unexplained by the two earlier forms of optimal organization (*ibid.*: 643).

Central to this advancement, Vincent Ostrom, Charles Tiebout, and Robert Warren in their seminal work (1961) introduced the concept of polycentricity. Polycentric orders are those in which decision-making power is dispersed across multiple organizations. Government units exercise autonomy in their realm of authority, and individuals and organizations holding power are constrained by self-established rules. Their research attempted to understand if diverse public and private agencies that produce public goods in metropolitan areas were chaotic or productive. This important piece, along with the empirical research it fostered, defied conventional wisdom that viewed polycentric systems of governance as inefficient, and studies of polycentrism questioned if substantial economies of scale existed for centralized government in the provision of public goods.

With empirical case studies initially on water industry performance in Southern California and later in police services for urban neighborhoods throughout the United States, the Ostroms showed that “small to medium sized cities are more effective than large cities in monitoring performance of their citizens and relative costs; citizens who are dissatisfied with service can ‘vote with their feet’ and move to jurisdictions that come closer to their preferred mix and costs of public services; and local communities can contract with larger producers and change contracts if not satisfied with the services provided, while neighborhoods inside a large city have no voice” (E. Ostrom 2010: 643-644).<sup>1</sup> These empirical studies and others carried out across the globe rejected the theory underlying greater centralization, and showed that complex institutional arrangements are not necessarily chaotic, and can in fact lead to more effective governance.

The diversity of field settings enabled the Ostroms, along with colleagues and students at the Workshop in Political Theory and Policy Analysis at Indiana University, to develop an Institutional Analysis and Development (IAD) framework that builds on the foundations of polycentrism. This framework is a “systematic method for organizing analysis” (Polski and E. Ostrom 1998: 5) that uses a “general set of variables” for institutional investigation in diverse settings such as

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<sup>1</sup> Aligica and Boettke (2009) provide an excellent overview of the intellectual history and advances in institutional analysis and development that the Ostroms promoted.

“human interactions within markets, private firms, families, community organizations, legislatures, and government agencies” (E. Ostrom 2010: 646). The IAD framework displaces formal government as the source of omnipotent knowledge and total authority, and has demonstrated individuals’ capacity to “organize and govern themselves to obtain continuing joint benefits when all face temptations to free ride, shirk, or otherwise act opportunistically” (E. Ostrom 1990: 29). Scholars have begun to unravel “the diversity of puzzles and problems facing humans” and the “complex motivational structures” that lead to the “diverse private-for-profit, governmental, and community institutional arrangements that operate at multiple scales to generate productive and innovative, as well as destructive and perverse outcomes” (E. Ostrom 2010: 641; North 1990, 2005). This research shows the individual’s “capacity to overcome dilemmas and create effective governance” (E. Ostrom 2010: 650).

Elinor Ostrom in her groundbreaking work *Governing the Commons: The Evolution of Institutions for Collective Action* (1990) identifies the core underlying lessons that characterize long sustained governance regimes. These design principles synthesize core factors that influence the probability of an institution’s survival (ibid.: 90):

1. *User boundaries*: Clear and locally understood boundaries between legitimate users and nonusers.
2. *Congruence with Local Conditions and between Appropriation and Provision Rules*: Rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and provision rules.
3. *Collective Choice Arrangements*: Individuals affected by operational rules participate in modifying those rules.
4. *Monitoring Users*: Members monitor rule compliance of other members, not an external authority.
5. *Graduated Sanctions*: Sanctions and punishment for rule violations begin with minor sanctions but become harsher if a user commits a serious offense or repeatedly violates rules.
6. *Conflict Resolution Mechanisms*: Low cost local arenas exist for resolving conflicts.
7. *Minimal Recognition of Rights*: Rights of local users to make their own rules are recognized by formal government.
8. *Nested Enterprises*: Governance activities are organized in multiple layers.

These design principles have been used to analyze the success or failure of over 100 institutions in diverse settings (E. Ostrom 2010: 653; Cox et al. 2009). More than two-thirds confirmed that robust systems are characterized by many of the principles.<sup>2</sup>

Using the IAD framework, this paper examines the polycentric system of governance that has emerged among gangs in California to fill the void created by inoperative, centralized government. Formal government's inability or unwillingness to define and enforce property rights, resolve disputes, and limit negative externalities among drug dealers creates long-term demand for governance that is supplied by prison gangs. This context furthers our understanding of how robust self-governance institutions emerge without congruent institutions, minimal recognition of rights by government, and formal conflict resolution mechanisms. Below, we argue that innovative entrepreneurs can overcome institutional design failures, although the absence of key features can be the source of conflict with disastrous and somewhat surprising consequences.

## *2. Literature Review*

Centralized government and polycentric orders can provide governance institutions that secure property rights, resolve disputes, and limit negative externalities (Hooghe and Marks 2003). Experiments reveal that self-governance is achievable (E. Ostrom et al. 1992), and private provision of governance existed historically (Grief 2006; Stringham 2007). Examining illicit organizations provides benefits for understanding governance institutions, since prison gangs and drug dealers cannot rely on the state to ensure contribution to public goods.

Organized crime has two primary forms. It either provides goods to voluntary consumers or seeks to gain benefits from coordinating coercion, thievery, and physical violence. Criminal groups frequently create and provide governance to enable exchange in the absence of formal government. Past works by Bandiera (2003) and Gambetta (1993) show Sicilian Mafiosi provided governance by protecting land and enforcing contracts. Similar institutions existed in Japan, (Hill 2006; Milhaupt and West 2000), post-Soviet Russia (Varese 2005), and northern Italy (Varese 2006). Membership in organized crime increases in response to vio-

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<sup>2</sup> The authors of the studies "that found the design principles inadequate tended to interpret them very rigidly and felt that successful systems were characterized by more flexibility" (E. Ostrom 2010: 653).

lence rather than precipitating it, which suggests that people join gangs for safety when formal government neglects in providing it (Sobel and Osoba 2009).

Consistent with the Ostroms' research, this article suggests that private organizations can provide local public goods. We argue that in the absence of formal government that addresses the needs and wants of local communities, private polycentric systems of governance emerge to fill the void. These institutions provide governance by settling disputes, securing property rights, and limiting negative externalities. In spite of incongruence among rules at multiple levels, and the lack of minimal recognition of rights by government and formal community conflict resolution mechanisms, innovative entrepreneurs can overcome these deficiencies and generate private organizations to meet demands for governance.

### *3. Application of IAD Framework to Prison Gangs*

Long-enduring, robust self-governance institutions typically fulfill the eight principles described above. Although these criteria were initially used in the context of common pool resource environments, the IAD framework can be utilized for understanding governance institutions more generally. Below, we adopt this framework within the context of prison gangs, with specific emphasis on how incongruent rules, lack of formal conflict resolution mechanisms, and minimal recognition of rights by the state is overcome by innovative entrepreneurs. Although long-term self-governance regimes are possible without meeting all principles, their absence creates an incomplete governance system and can cause conflict.

#### *3.1 Clearly defined boundaries:*

Contributors to a public good take the risk that the benefits they produce will be reaped by others who do not contribute. Thus, defining boundaries of local public goods, specifying those authorized to use them, and closing it to outsiders is the first step in organizing collective action (E. Ostrom 1990: 91). Since incarceration makes monitoring free riding difficult, prison gangs depend on defining boundaries in a number of ways. First, they recruit high quality members. In the Mexican Mafia, a current member must sponsor a recruit and is liable for the recruit's behavior. Recruits must also receive unanimous approval from other gang members, assault or kill gang enemies, and promise lifetime membership before gaining membership. These practices prove dedication and ensure improved membership quality, while also limiting free riding.

Boundaries that specify those authorized to use the public good are defined in a variety of ways. In Los Angeles, gangs use the number 13 to signal affiliation with the Mexican Mafia, because M is the thirteenth letter of the alphabet. Street gangs, like MS-13, actually add “13” to their names to identify membership with the Mexican Mafia—ensuring the organization’s access to the local public goods and governance system provided by the prison gang. Gang members also tattoo the number prominently on their bodies, necks, and faces. These tattoos reveal membership in the organization and allow for easy recognition of who can and cannot access the governance system (*United States v. Barajas et al 2008: 5*). To free ride on the local public goods generated by the prison gangs’ governance services requires taking action that members of the organizations easily observe. These practices ensure that members and associates of prison gangs have clearly defined boundaries that limit free riding by those unauthorized to use the public good.

### *3.2 Congruence between appropriation and provision rules and local social conditions:*

Appropriation and provision rules, especially those dictated by formal government, are congruent with local social conditions (E. Ostrom 2010: 653). The rules governing a local self-governance institution align with the national, state, and city laws. Typically, “adding well-tailored appropriation and provision rules helps to account for the perseverance” of a governance institution (E. Ostrom 1990: 90). Given that organized crime administers a system of governance that facilitates *illicit* and *illegal* market exchanges, it seems obvious that criminal organizations lack congruence with national, state, and city laws. Differences in rules generate potential sources of conflict and violence. Although incongruent institutions could lead to institutional failure in other settings, embedded governance institutions that are inconsistent with the *de jure* legal system persist in illegal markets. This interaction of incongruent formal government and local self-governance institutions generates complex, and sometimes conflicting outcomes.

Incompatible rules with self-governing institutions at the local level, and formalized institutions at the city, state, and federal levels, can generate significant conflict between government officials and members of self-governance institutions. It is “one thing for governmental agencies to participate within polycentric societal processes on the same terms as other participants,” but another thing altogether when these agencies ignore local institutions and instead participate as an external authority dictating how individuals and groups of people must behave (Wagner 2005:179). Incongruence between various levels of institutions perpetu-



ates one of “the greatest evils inflicted upon humanity” when the “work of those who are so confident of their effort to do good that they do not hesitate to use the instruments of evil available to them on behalf of their righteous cause” (V. Ostrom 1980: 312).

### *3.3 Collective-choice arrangements:*

In a well-functioning system of self-governance, most individuals affected by an institution’s operational rules can modify them (E. Ostrom 1990: 93). This criterion allows members of an institution to adjust their rules to local circumstances. Individuals, who interact directly, modify the rules to better fit specific characteristics of an institution’s setting (ibid.: 93). It is important to note that two types of governance rules can constrain and coordinate a group’s operations in these collective-choice arrangements. Explicit rules are written, detailed constraints. For example, the Mexican Mafia and Nuestra Familia prison gangs coordinate their organizations’ productive activity, limit external costs, and mitigate rent-seeking through explicit rules. Typically stated in the gang’s constitution, explicit rules create common knowledge about what members can expect of other members’ behavior and reduce conflict by coordinating enforcement of rules (Leeson and Skarbek 2010; Skarbek 2010). Explicit rules define the most important behaviors, whereas less important rules remain implicit. Since it is costly to codify all aspects of an organization’s expectations, all groups rely on implicit constraints to promote particular behaviors. Unwritten rules provide a broad behavioral standard that ensures gangs can adapt to unforeseen situations within local contexts. Implicit rules, especially among decentralized organizations like prison gangs, ensure some flexibility in behavior that allows local actors to make decisions and adjust to changing circumstances.

Prison gangs also have mechanisms to voice dissatisfaction and influence rule changes from within. The Mexican Mafia, for example, requires a unanimous vote to have another member killed and an implicit rule of appealing to influential members to replace ineffective leaders. Similarly, the Nuestra Familia has an explicit protocol for filing grievances and for investigating complaints against predatory superiors. These mechanisms allow members to modify operational rules directly. Members of prison gangs have multiple collective choice arrangements that enable them to modify and change rules at the institutional level, which allows members to adjust their rules to fit the specific characteristics of the institution’s setting and helps ensure compliance.

### *3.4 Monitoring:*

For a system of self-governance to function well, individuals who use a local public good monitor its use (E. Ostrom 2010: 653). Members of self-governance institutions create their own internal enforcement to deter potential rule breakers and assure compliance (E. Ostrom 1990: 95). Street and prison gangs have an incentive to monitor who claims affiliation with their organization in order to internalize the benefits of membership, prevent low quality individuals from weakening the group's reputation, and to limit free-riding. Gangs also unintentionally monitor reputation by attacking people who claim an affiliation with a rival organization. Although not designed, this unintended monitoring system limits the strategies available to avoid paying prison gang taxes and to free ride on the governance system. Prison gangs also monitor internal rule breaking through constitutional systems with checks and balances. The Nuestra Familia prison gang uses a constitution that includes mechanisms for monitoring rule compliance within a hierarchical system of governance. This system enables the lowest ranking gang members, who have specific and local knowledge, to monitor and report the actions of higher-ranking officials. The monitoring structure prevents internal predation, since members have an incentive to communicate information about abuses from their superiors.

### *3.5 Graduated sanctions:*

Within well-functioning self-governance institutions, individual members who violate operational rules are likely to be assessed graduated sanctions by other members of the organization (E. Ostrom 1990: 94). Among robust institutions, members of the organization undertake punishments and sanctions, not external authorities (ibid.: 94-95). Drug dealers and prison gangs cannot rely on external authorities like the police, courts, or private arbitrators to provide punishment for rule infractions, so sanctions must come from within the organization.

Prison gangs utilize graduated sanctions against rule breakers that include fines, assaults, stabbings, and death. Although these sanctions escalate sharply from financial penalties to death, members assess punishment rather than an external authority. Punishments increase in severity based on past offenses and the nature of the rule infraction. In instances where a fine may be insufficient to remind the rule-breaker of the importance of compliance, harsher punishment is imposed. Actions that inflict serious harm on other members or undermine the group's well being leads to more serious punishment. The use of extreme vio-

lence ensures compliance to rules that generate high external costs, such as rules forbidding informing law enforcement or acting cowardly. Although prison gang sanctions are at times violent, both the monitoring of rules and punishment of infractions fall under the authority of gang members.

### *3.6 Conflict resolution mechanisms:*

Within a functioning system of self-governance, members of the institution have rapid access to low-cost local arenas to resolve conflict (ibid., 100). If individuals are going to follow rules over a long period of time, there must be mechanisms for discussing and resolving disputes (ibid.: 100). Although conflict resolution mechanisms do not guarantee that members will be able to maintain enduring institutions; it is “difficult to imagine how any complex system of rules could be maintained over time without such mechanisms” (ibid.: 101). Members have constitutional provisions that allow them to voice dissatisfaction. However, the inability to use third-party arbitration and other more formal conflict resolution mechanisms can generate intergroup-conflict.

In the absence of formal institutions like courts and contract law, drug dealers often resort to violence to resolve disputes. Violence reduces the demand for drugs since customers feel threatened by it. Violence increases operating costs, as it draws attention from law enforcement and as dealers employ additional members to purchase firearms to protect territory (Levitt and Venkatesh 2000). Since prison gang revenues decline during drug territory wars, gangs provide governance that ensures the relatively peaceful adjudication of disputes.

The Mexican Mafia, as one example, “actually strives to minimize inter-gang violence so each gang would be more efficient in its drug-selling activities” (*United States v Fernandez et al. 2004:9, in Skarbek 2011: 711*). Before the Mexican Mafia negotiated conflict resolution, Hispanic gangs engaged in greater amounts of violence. Although prison gangs provide an organization structure that helps ensure resolution of conflict among diverse groups, criminal organizations lack access to formal conflict resolution mechanisms like courts to help mitigate violence.

The illicit nature of the trade prevents gangs from using formal community conflict resolution mechanisms. Without the continuing jurisdiction of the court or access to contract law, individuals involved in illicit markets, like the drug trade, lack the formal conflict resolution mechanisms that are frequently essential to sustained self-governance institutions. Absence of formal conflict resolution mechanisms actually creates the demand for governance that prison gangs pro-

vide. Unable to settle business and territory disputes in court or through private arbitration, drug dealers are given the choice between extortion by prison gangs to enjoy the benefits of conflict resolution or violence for non-compliance. If formal government provided local arenas for conflict resolution or legally enabled private third-party arbitration to negotiate settlements between gangs, it seems unlikely that the levels of violence so commonly associated with these groups would exist, or that prisoners would have the power to extort criminals from behind bars. By failing to provide formal mechanisms for resolving disputes when demand clearly exists, the state perpetuates the prison gang's system of extortion and violence.

### *3.7 Minimal recognition of rights to organize:*

Within functioning systems of self-governance, the rights of individuals to devise their own institutions are undeterred by external authorities (E. Ostrom 1990: 101). If external government officials presume that only they have the authority to make rules, it is difficult to sustain self-governance (ibid.: 101). Given the illicit nature of criminal organizations, external authorities regularly challenge the right of individuals to devise their own institutions. Unexpectedly, it is this challenge, rather than because of it, that prison gangs administer their system of governance. Despite the absence of rights to organize, innovative entrepreneurs can adapt their behavior to formal institutions.

The Mexican Mafia, as one example, wields power in large part due to their ability to utilize formal institutions to the organization's advantage. The gang uses its geographic concentration in Men's Central Jail, proximity to the Central Arraignment Courthouse of Los Angeles, and racial segregation in California prisons to control influence over Hispanic gangs. The large concentration of gang members in Men's Central Jail gives the Mexican Mafia the power to extort street gangs. Since the Mexican Mafia's members and associates are frequently on trial, the jail's proximity to the Central Arraignment Courthouse of Los Angeles enables members to have their enemies or fellow gang members transferred to their location. The use of formal institutions provides greater extortion power, and enables the Mexican Mafia to generate greater control and influence on the narcotics trade in Los Angeles. Prison gangs also understand that correctional facilities segregate dormitories and that all newly arrested inmates of their ethnic group will be housed in the same place, which yet again helps provide a legitimate threat of violence for the gang's extortion. The Mexican Mafia's use of formal institutions like the Men's Central Jail, proximity to the Central Arraignment Courthouse of

Los Angeles, and formal segregation all point to the ability of innovative entrepreneurs to overcome formal institutions.

Without minimal recognition of the right to organize by formal government, criminal groups lack the legitimacy associated with legal enterprises. Whereas individuals operating legal businesses are able to protect property rights and enforce agreements through formal government and contract law, prison gangs must, at times, rely on violence to control contraband markets and to prevent entrance of new inmate groups who attempt to capture gains from the illicit market. Rather than preventing the long-term sustainability of the self-governance institution, however, a lack of minimal recognition of rights by formal government actually empowers the criminal group and increases the likelihood of violence.

### *3.8 Nested enterprises:*

Within a polycentric system of self-governance, appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises (ibid.: 101). Establishing rules at one level without rules at others will create an incomplete system that may not endure over the long run. Criminal organizations must provide much of the governance they demand themselves. In spite of this nesting, the incongruence of rules at the national, state, city, and community levels ensures an incomplete governance system.

## *4. Conclusion*

Prior to the 1950's, inmates relied on decentralized norms for self-governance. Norms became ineffective at providing governance because of major demographic shifts in prison populations, which created demand for a governance system to address the needs of inmates and substantial profit opportunities for groups that had a credible threat of violence and could deter opportunistic behavior. Since formal government was either unable or unwilling to meet these demands, private organizations emerged to capture gains from illicit market exchange. Given the nature of this trade and the potential for profits, it should come as no surprise that private organizations fill the void created by inoperative, centralized government. What probably remains less clear, however, is that prison gangs operate within a larger polycentric governance system of organized crime.

Polycentric provision of local public goods consists of "many centers of decision-making, which are independent of each other" (V. Ostrom et al. 1961: 831).

By removing high ranking government officials as the final source of knowledge and authority, polycentric orders permit local actors to better utilize dispersed, localized knowledge of time and place that is essential to sound economic decision making. Although prison gangs enjoy some monopsony power, if situated within the larger context of criminal organizations, it becomes evident that these groups operate within multiple centers of decision-making that are relatively autonomous. In Los Angeles, for instance, there are at least 21,000 gang members who belong to over 400 Hispanic gangs (Los Angeles Police Department 2006). These street gangs operate autonomously within their neighborhood-based enterprises, competing for territory and revenue with rival gang organizations. Gangs are geographically dispersed to such an extent that it is impossible for one to control the entire drug market. The geographic dispersion and large number of groups creates competition among criminal organizations. Competition for governance ensures that the number of governmental decision making authorities increases and that the jurisdictional size of each governmental unit is smaller. Dispersion of power and competition is apparent beyond the municipal level as well. The *Nuestra Familia* in Northern California, for instance, was founded in the mid-1960's to counter the Mexican Mafia's abuse. The organization emerged as an alternative and a competitor to the Mexican Mafia (Skarbek 2011). Competition is limited to some degree by restrictions placed on membership like race, location, and region. However, these limitations have ensured the emergence of overlapping jurisdictions in the larger criminal underworld. Rather than one prison or street gang controlling large geographic areas, organizations are limited to decentralized systems of governance that contain multiple centers of power.

Minimal recognition of rights by formal government, formal community conflict resolution mechanisms, and congruent institutions at multiple levels are all elements identified in Elinor Ostrom's research as practices that lead to long-lasting institutions. Although these principles are apparent in most robust institutions, prison gangs have demonstrated their effectiveness in the face of both violent intergroup hostilities and active suppression by government to creatively overcome these design failures. The absence of these three principles, while likely unique to the illicit trade's context, show how robust self-governance institutions that fulfill most design principles can emerge. Innovative entrepreneurs can utilize their lack of minimal recognition of rights, formal conflict resolution mechanisms, and congruent systems, to their advantage, generating power and ensuring the survival of their organization.

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# Property Taxes and Polycentricity

Justin M. Ross and Daniel Hummel<sup>\*1</sup>

*There are no taxes capable of financing our current system of local governments that can be locally levied and administered, except the property tax.*

—G. W. Fisher (1996: 210)

*[The property tax] resembles a structure designed by a mad architect, erected on a shaky foundation by an incompetent builder, and made worse by the well-intentioned repair work of hordes of amateur tinkers.*

—F. C. Stocker (1991: 1)

## 1. Introduction

**E**linor and Vincent Ostrom have dedicated their professional careers to understanding polycentric forms of public administration. A polycentric public administration system is one that is highly decentralized, with many independent and overlapping jurisdictional boundaries. The purpose of this paper is to consider what form of public finance can allow for such a system to exist with the principles the Ostroms have laid out in what has become known as the “Bloomington School” of institutional analysis.

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Early on in their careers, the Ostroms argued for polycentric forms of public administration, particularly in metropolitan areas where many of their intellectual rivals believed a single centralized authority should exist. Ostrom et al. (1961) lay out the considerations that should determine the optimal design of public administration:

1. The size of the governmental unit required to undertake the provision of a good or service;
2. The citizens directly affected by provision;
3. The political community for whom the nature and provision of the public good is being determined.

While these criteria did not outright exclude a single universal general purpose administrator of all public services in a metropolitan area, it was also clear that such a form seemed unlikely. It was far more likely that the implied optimal design would have polycentric nodes of administration, in which administrative districts would be defined by a narrower set of functions, and that these districts could have non-congruent borders with other service districts. For example, within a metropolitan area there may be multiple school districts, as well as multiple police districts, and there does not need to be any correlation between the administrative boundaries of the police districts with those of the schools. Furthermore, service provision levels need not be the same across these units, as the preferences of the communities may differ for each type of service. Given the nature of these criteria, it is not surprising that many people view the Bloomington School of Political Economy, albeit incorrectly, as one that explicitly advocates for small, decentralized, and overlapping governmental units.

“Who” should determine such a polycentric system? The general Bloomington view has been that it should result from the democratic involvement of the population, and this has been an important reoccurring theme in their analysis of institutions. In the context of public administration, the notion of democratic involvement is more than having elected representation or voters who make an appearance on election days. Their view of democracy is one of local participation and contribution, making it much closer in spirit to Alexis de Tocqueville’s observation of Americans finding ways to encourage voluntary collaboration and shared experience within communities.

From a public finance perspective, the Ostrom-polycentric system represents a number of challenges. Any governmental unit must have a procedure for extracting economic resources so that its operations are adequately financed. This

fact was not lost on America's founders, who devoted a considerable portion of the U.S. constitution to creating independent access to economic resources that would allow for a Federalist system of government. For overlapping governments to maintain a shared sovereignty, they must be able to independently and adequately access the same economic system. If autonomy of individual units within a system of multiple overlapping governmental units is desirable, then a means of permitting simultaneous financial independence of very similar areas in a relatively small community is necessary. These requirements are further complicated by the fact that mobility of citizens between government units serves as a constraint on such economic extraction.

America's answer to the financing of polycentric public administration has been the real property tax—a tax levied against land and its capital improvements, so as to distinguish it from taxes on “personal” (e.g., cars or boats) or “intangible” (e.g., stocks or bonds) property—which has characteristics that are unique among taxes. These unique characteristics are discussed with an eye toward explaining how the real property tax allows for multiple, decentralized, and overlapping polycentric nodes of public administration to have financial independence necessary for fiscal autonomy. Furthermore, we discuss the way the property tax incentivizes the kind of democratic action that the Ostroms have associated with polycentricity.

The next section briefly describes the administration of the property tax, which is often misunderstood but important to understanding the incentives of taxpayers and public officials.

## *2. Property Taxes and Polycentrism*

Before proceeding to why the property tax has emerged as America's answer to the public financing of polycentricity, it is perhaps helpful to identify why most other taxes are not up to the task. From a legal perspective, the United States constitution has much to say regarding taxing powers, in part for the purpose of trying to maintain state and federal government sovereignty. Under Article 1, Section 2, Clause 3 of the Constitution, all federal direct taxes (including the property tax) must be apportioned among the states on the basis of population. The Federal government tended to rely upon import and export tariffs, and in 1913 was able to levy income taxes without apportionment with the passage of the 16th Amendment. States and their underlying “creatures” retained greater abilities to levy direct taxes.

The only non-property tax instruments whose revenue potential is adequate enough to allow for fiscal independence are those on sales and income. State governments have largely focused on these revenue sources, and increasingly delegated the property tax as the primary financing mechanism to the local levels. While local areas often can and do levy sales and income taxes, these sources are not good candidates because they represent taxes upon mobile bases.<sup>1</sup> The smaller the district wishing to raise its individual rate, the more easily transactions move outside its jurisdiction. Furthermore, governments would inevitably find the size of their tax base to be jointly determined by all of the overlapping governments, such that the increasing of the rate by a school district might shrink the base and lower the revenue available to all other administrative districts with a shared domain.

### *2.1 The Administration of Property Taxes: Expenditures, Levies, and Rates*

The property tax overcomes these problems in part because of its unique administration. This section describes how the nature of administration directly links the property tax revenue to the level of expenditures, and does so in a manner that provides a remarkably stable source of revenues. The property tax is formally an ad-valorem tax, meaning the liability on an individual property is determined as a percentage of its value. This leads to the common mistake, even among public finance scholars, of assuming that the property tax has the same relationship between rates and revenues as is seen in other forms of taxation. For other taxes, public officials determine the rate, either as a dollar per unit or as a percentage, and then tax revenue is derived from the observed volume in the taxable base.

Administering taxes upon real property works quite differently, in that the process begins with the amount of revenue to be raised. More precisely, the government body determines its expenditure level ( $E$ ) for the fiscal year using the local democratic norms, and then it subtracts revenue ( $R$ ) from all other sources to result in the property tax levy ( $L$ ):

$$L = E - R$$

The levy ( $L$ ) is the aggregate amount of revenue to be raised from property taxation. The above identity begets an important relationship that will be touched upon throughout the remainder of this paper: *The community choice of property tax level is tantamount to a simultaneous choice of expenditure level on services.* If other taxes were the sole source of revenue, then annual expenditures would rise

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<sup>1</sup> See Hall and Ross (2010) for a recent review of local government tax instrument choice.

and fall in accordance with the volatility of the base to maintain balanced budgets. The choice of service level is far less predictable when that community chooses a fixed rate, even if it does so frequently. Whatever democratic process is employed to choose service provision is simultaneously, and with equal frequency, applied to the choice of property tax burden.

The next stage of the budgeting process is to convert the levy to a millage rate (i.e. property tax rate) to determine the tax burden faced by an individual household. The millage rate ( $\tau$ ) is determined by dividing the aggregate levy by the aggregate level of total taxable property values ( $P$ ):

$$\tau = \frac{L}{P}$$

For concreteness, consider an area with three parcels demanding a \$1K property tax levy for services, and assume that the three parcels have taxable property values of \$20K, \$30K, and \$50K. The millage rate in this case is:

$$\tau = \frac{1\text{K}}{20\text{K} + 30\text{K} + 50\text{K} = 100\text{K}} = 0.01$$

This millage rate results in the following distribution of tax burdens by parcel:

Property Owner	Millage Rate	Tax Bill
\$20,000	0.01	\$200
\$30,000	0.01	\$300
\$50,000	0.01	\$500

One of the consequences of this process is that the millage rate is a “residual” rather than a determinant of the revenue raising process, and the value of the underlying property is also not a formal determinant.<sup>2</sup> If the taxable value of property were to raise by a uniform 100% across all parcels, the millage rate would be cut in half and the distribution of the property tax burden would be unchanged:

$$\tau = \frac{1\text{K}}{40\text{K} + 60\text{K} + 100\text{K} = 200\text{K}} = 0.005$$

<sup>2</sup> For a more in-depth discussion of “the residual view” and its determinants, see Ross and Yan (Forthcoming).

This millage rate results in the following distribution of tax burdens by parcel:

Property Owner	Millage Rate	Tax Bill
\$40,000	0.005	\$200
\$60,000	0.005	\$300
\$100,000	0.005	\$500

Part of the reason for this form of administration is due to the fact that the tax is based upon a stock of an asset, rather than a flow of commercial exchanges. The physical quantity of land in the base will remain unchanged, and the capital investment will be a durable good composed of previous household investments. Furthermore, the frequency at which each of these parcels is traded can be quite low, with some not selling for decades. As such, the property tax requires an assessment process to determine the distribution of value across the base. During the property assessment process an agent of the government takes inventory of the structures and features of the property in its territory for the purpose of determining its taxable value.<sup>3</sup> One could see where the potential for manipulation would arise if the property tax rate were fixed in the same manner as other taxes, as revenue could rise or fall at the whims of an administrative official.

By making the base independent of the revenue raised, however, it demotes the role of property assessment to only playing an equity role, in which each property pays in proportion to its share of the base. This is not to say that politics do not occur in property assessment, as there is evidence indicating that property assessors do respond to pressures from their constituents (see Ross, 2011, 2012a), but only that this process is only important to revenue extraction in terms of the political consequences of inequitable tax burdens. The necessity of the property assessment process is evident, but so is the subjectivity of the process.

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<sup>3</sup> Property assessments usually determine the taxable value of a property through some gauge of the “fair market value,” which is based upon a willingness-to-pay of hypothetical prospective buyers in normal circumstances. Basing the assessment on the “replacement cost” of the property unit was popular at one time, and that standard still exists in some areas of the United States. Interestingly, Adam Smith found property taxes based on a valuation to be “...an attention so unsuitable to the nature of government, that it is not likely to be of long continuance...” that would ultimately “... occasion much more trouble and vexation than it can possibly bring in relief to the contributors” (Smith 1776: 899).

Unlike most public officials, the assessor would literally visit taxpayers to determine their individual liability. This could create a considerable incentive to under-assess property, especially if the property assessor had been elected by that constituency. Passing a levy and then determining the millage rate by residual made the total property tax revenue collected independent from the property assessment process. No matter how error prone the assessor, or systematically biased towards lowering the assessed values of the constituency, the revenue raised would be the same. The assessment process would then only serve an equity role, so that changes in the distribution of the assessed values could be reflected in the distribution of individual liabilities. This process also makes municipal debt a relatively safe financial investment for lenders, who can be confident that the government is fully capable of repayment no matter what happens in the business cycle, and thereby lowering the cost of capital for investments in public services.

The levy setting process might be more problematic if voters could escape the jurisdiction without paying their property taxes. However, the property tax is levied *in rem*, or against the property rather than the person. As Mikesell (1998: 189) aptly observed, “[property tax] administration can proceed without much danger that the parcel will disappear or flee the jurisdiction.” Because the property itself is immobile, delinquent or non-compliant taxpayers are only capable of minimal revenue impact upon the taxing jurisdiction. Unpaid property taxes, as well as penalties, interest, and compliance costs can be accrued and attached as the first lien against a property. Any exchange of the property requires that the tax lien be paid, and the government retains the authority to seize and auction the property through a tax sale. It is no mystery then, that governments routinely collect 99-100 percent of the property tax revenues they levy, even if the taxpayer disappears or refuses to sell the property to a compliant taxpayer (Ross 2012b).

In summary, the administrative characteristics of the property tax create a number of important points of consideration for polycentric local government districts. First, property taxes are jointly determined with expenditures, so that there is no meaningful separation of the two figures during the budgeting process. Secondly, virtually all property tax revenue levied is collected, making it an adequate source of revenue for financing services. Third, it is levied against immovable property, which circumvents the mobility problem small districts experience when they raise taxes. Next we discuss how property taxes are conducive to overlapping governments, and why these features encourage a democratic process.

## 2.2 Property Taxes and Polycentric Nodes of Public Administration:

The property tax's unique administrative characteristics allow for independent access by multiple overlapping governments, and does so in a way that maintains fiscal autonomy in terms of both revenue adequacy and administration. Furthermore, the administrative process is one that allows for relatively flexible jurisdictional boundaries by permitting changes in association of parcels across different public service districts within an area.

A \$100	B \$50	C \$200
D \$150	E \$200	F \$100

*Figure 1: Polyville by Property Parcel and their Taxable Value*

To illustrate how property taxes work in a polycentric system, consider the fictional metropolitan area of Polyville in Figure 1. This hypothetical account is employed for illustrative simplicity of identifying property-service affiliations, but the simplicity of administration is not meaningfully exaggerated. Figure 1 demonstrates an area composed of six property parcels, identified by a letter (A-F) and a taxable value. Let's consider a case where Polyville is served by two school districts, three waste districts, two fire districts, and three library districts.<sup>4</sup> Table 1 lists each of these districts and the property parcels which are within their jurisdiction, their public expenditures, property tax base, and the resulting implied millage rate. Once again, when each district determines its expenditure level, it is jointly determining the property tax rate because it must take the base as a given, creating an inseparable link between service level and tax burden.

As can be seen in Table 1, no two districts have exactly the same set of parcels in their domain. A household selecting a parcel is, in fact, simultaneously choos-

<sup>4</sup> A monocentric alternative would have a single general purpose government covering all parcels and providing all services.



ing their most preferred bundle of public services and taxes within Polyville. To the extent that any particular district deviates from their preferences, they must hope to convince the administrative district to change its allocation by whatever means is consistent with the local democratic process.

*Table 1: Polyville's Arrangement of Public Services*

<b>Public Service</b>	<b>Parcels</b>	<b>Expenditure (\$)</b>	<b>Tax Base (\$)</b>	<b>Millage†</b>
School District 1	A+B+C	20	(100+50+200)=350	0.0571
School District 2	D+E+F	10	(150+200+100)=450	0.0222
Waste District 1	A+D	5	(100+150)=250	0.0200
Waste District 2	B+E	5	(200+50)=250	0.0200
Waste District 3	C+F	5	(200+100)=300	0.0167
Fire District 1	A+B+D+E	40	(100+50+150+200)=500	0.0800
Fire District 2	C+F	20	(200+100)=300	0.0667
Library 1	B+D+E+F	60	(50+150+200+100)=500	0.1200
Library 2	A	10	100	0.1000
Library 3	C	10	200	0.0500

† Expenditure divided by Tax Base

Table 2 cross-tabulates the information from Table 1 as it would be recorded in a government database, abridged only by ignoring information specific to the parcel (e.g. address, owner's name, and so on.). For each parcel, a public service provider is identified for each type of service, and in doing so it reveals that no two parcels have exactly the same set of providers. Since each property represents a unique bundle of public services, the effective millage rate to the parcel owner is calculated by summing the millage rates for each service provided in Table 1. The individual tax bill is calculated by applying the owner's effective millage rate against their individual property value. The tax collector then remits this tax payment back to the service provider in proportion to the service millage rate's share of the total effective millage rate. For example, parcel A has school district 1, waste district 1, fire district 1, and library district 2, and from Table 1 this implies an effective millage rate of  $(0.0571 + 0.0200 + 0.0800 + 0.1000 =) 0.2571$ . The resulting  $(100 \times 0.2571 =) \$25.71$  tax bill is then split into four separate payments of  $(\$25.71 \times \frac{0.0571}{0.2571} =) \$5.71$  to school district 1,  $(\$25.71 \times \frac{0.0200}{0.2571} =) \$2.00$  to waste district 1,  $(\$25.71 \times \frac{0.0800}{0.2571} =) \$8.00$  to fire district 1, and  $(\$25.71 \times \frac{0.1000}{0.2571} =) \$10.00$  to library district 2.

This allows the political community for each service to differ for both logistical considerations in adequate service delivery, and for differences in preferences for the level of provision, all the while allowing for fiscal sovereignty. Since the base is independent and irrelevant to the amount of revenue, and the parcel cannot leave the tax jurisdiction, changes in chosen property tax revenue demands by one district do not directly influence the revenue raised in any other overlapping jurisdiction. If the parcel owners of Library District 2, for example, determined to double the expenditure level, it would raise their own property tax rate by an additional 0.10 mills with the entire burden falling on parcel A, and there would be no accompanying revenue effect on any of the overlapping jurisdiction. By contrast, if a library sales tax rate was added to transactions over parcel A, much like local and state income taxes are currently employed, there would be an accompanying shift as some transactions moved off of parcel A altogether, reducing the taxable revenue for all public service districts that administer to parcel A.

Now consider a more dynamic setting where parcels are capable of changing their affiliations. In principle, the ability of individual units to change public service affiliations is perhaps the most important mechanism in polycentric public administration, arguably more important than actually having multiple nodes. A system in which each parcel voluntarily opts into a universal provider of all services may be a better representative of a polycentric system than one that engages in mandatory (and static) decentralization. Suppose the owner of Parcel B conceives that Library District 3 would be a better fit for his preferences than District 1.

*Table 2: Polyville's Service and Tax Bill by Parcel*

Parcel	Value (\$)	School	Waste	Fire	Library	Millage†	Tax Bill (\$)††
A	100	1	1	1	2	0.2571	25.71
B	50	1	2	1	1	0.2771	13.86
C	200	1	3	2	3	0.1905	38.10
D	150	2	1	1	1	0.2422	36.33
E	200	2	2	1	1	0.2422	48.44
F	100	2	3	2	1	0.2256	22.56

† - Sum of millage rates by public service found in Table 1. †† - Millage rate times Parcel Value.

Divorcing his affiliation would reduce the tax base in Library District 3 to \$450 and increase it to \$250 in library District 1, which *ceteris paribus* reduces the millage rate and tax burden for District 1 while increasing it in District 3. These effects may be mitigated somewhat by competing effects in the administration of services. In considering the acceptance of parcel B into the current library district, the current owner of parcel C would weigh the reduced tax burden against any perceived needed increases in expenditures to accommodate the higher demand, as well as any quality erosion such as greater congestion at the library. Likewise, the higher tax burdens to parcel owners D-E-F may be offset by lower expenditure demands and congestion. Further, the ability of parcel B (or any other contiguous parcel) to change affiliations can incentivize more aggressive competition for tax base that somewhat resembles a marketplace, in which library districts compete via product copying and/or differentiation.

This narrative should illustrate that, although the tax base cannot escape a jurisdiction, there remains mobility of association for at least the properties along the boundaries of its administrative zone. Association choice is not the only form of mobility that is important, as the next section will demonstrate that mobility effects remain an important component of the overall democratic nature of the tax.

### *2.3 Taxation In Rem Does Not Reduce the Importance of Mobility: Capitalization in the Housing Market:*

The previous section described the administration of the property tax, and paid particular attention to the dynamics of public service affiliation. At the same time, the public services and the property values were held constant, and the incentives for competition in tax base came strictly from mobility of parcel owners to change their affiliated services. This section adds another layer to this set of incentives by considering the relationship between property values, public services, and taxes. An equilibrium outcome of a neoclassical model of consumer choice would be characterized by each property yielding the same level of utility across all consumers with the same endowment and preferences. Consider a case in which the stock of services are fixed across all parcels in a neighborhood, but the property tax payments differ. The present value of household expenditures for residence at the property will be the sum of the payment for the property ( $v$ ) and the expected future property tax payments ( $(t \cdot v)/i$ ), where  $i$  is the interest rate. The only reason for households to prefer one property over another in this case is due to differences in the tax payments and the quality of the public services ( $g$ ) as

they enter into a dollarized household utility function,  $U(g)$ . A simple expression of this would be to consider the purchase price of the property as representing the benefits of the service less the tax payments that accompany it:

$$v = U(g) - \frac{tv}{i}$$

If the quality of the service rises in excess of its tax payments, the property appreciates in price  $v$  so that household utility remains equal across all properties. If quality remains constant while the tax payments increase, then property values likewise decline. Hedonic estimation of this form is well understood and so commonly accepted in economics that it is frequently employed to estimate the inferred benefits of locational attributes that are not directly traded in a marketplace setting (see for example, see Brasington and Hite 2005; Chay and Greenstone 2005; Bayer et al. 2009; Nahman 2011; Leguizamon and Ross 2012).

From an ex-post perspective, capitalization would seem to undermine many concerns for inequalities arising from poorly administered public services because owners are compensated with less expensive property. For the notion of polycentricity, however, this capitalization of net benefits creates an additional set of political economy incentives because it incentivizes property owners to view public services as assets that contribute to their property wealth. Suppose a new curriculum is adopted in school district 1, but not in school district 2. If this curriculum revision turns out to be a desirable one, then property values in school district 1 will rise while those in school district 2 will depreciate until the difference between them is equal to the benefit of the curriculum revision. Even if parcel owners in school district 2 do not directly value the service (e.g. if they had no school age children), they nevertheless would suffer some loss of wealth by living in a district which has neglected a similarly favorable revision.

In section 2.2, the significance of mobility was limited to the prospect of a parcel switching public service associations, which of course is limited to the borders of each district. Capitalization returns mobility to an important consideration of the policy process because it only requires that there be demand for property in Polyville, which can come from current or potential new residents moving into the area. Competition for these migrants by creating an appealing community mix of services contributes to increasingly valuable property for the entrenched owners. Therefore, even if locals find no innate motivation to contrib-

ute to the democratic process and monitoring their local public administration, capitalization gives them a significant financial interest.

The role of housing values in encouraging local participatory democracy has been extensively reviewed in Fischel (2001), and it has long served as the motivation for the view among economists that there may be positive externalities from homeownership (see for example, Hoff and Sen 2005). The capitalization of property taxes should also make it an especially appealing revenue instrument to those who subscribe to the view that voters have a tendency to indulge in “irrational” policies that they would not prefer if they shared in the cost. For example, Caplan (2007) points to the minimum wage as an example of such a policy, which he argues would be less likely to receive widespread support if an individual vote were costly, by which it is meant that the vote is decisive and that the law would be binding to the voter’s employment prospects. By contrast, rent control seems to enjoy similarly high levels of voter sympathy, but seems to only persist in large cities with high rentership rates, possibly due to homeowners who recognize the negative effects the price control has on the housing stock (Fischel 2001).

The capitalization of public services and property taxes should also be an appealing characteristic to those in public administration who favor the bottom-up, inductive, public administration process. This vision of public administration values increasing citizen participation. Advocates of this view theorize that the result of this form of governance is an increase in competent and neutral administration, which is in line with the utility function of a government’s citizens (Weimer 2005). The problem with increasing citizen participation is determining how to effectively ascertain and utilize it in a manner that allows for a feedback mechanism, and there have been many proposals along these lines (see for example Fung 2003, 2006; Ebdon and Franklin 2006). We suggest that the solicitation of this information is tantamount to estimating what the impact of a project will be on housing prices, about which most property owners will care a great deal.

### *3. Conclusion*

In this essay, we argue that property taxation has historically been the only revenue instrument for the public financing of a polycentric system of metropolitan government. In fact, we know of no other revenue instrument that mimics its characteristics sufficiently well enough to provide for an autonomous and sovereign local system. Over the last few decades, many states have undertaken significant reforms for the purposes of restraining local government access to the

property tax, and the cost of these services will likely be accompanied by diminished local sovereignty.<sup>5</sup> For instance, in 2009 Indiana imposed property tax caps to limit the possible tax burden, and in exchange moved the operating budgets of all school districts into the general fund of the state. Likewise, in North Dakota there is a proposed constitutional amendment (Measure 2), which would eliminate property taxes as a source of local government revenue and replace it with state tax revenue. How plausible is it that Indiana school districts or North Dakota local governments will retain local autonomy over public service provision when the financing is provided by the state? Our expectation is that, over time, there will be an increasing emphasis on consolidation towards single general purpose governments that provide favorable economies of scale. Proponents of polycentricity should probably be opponents of reforms that detract from the property tax, and we echo the sentiments expressed by Mikesell (1997: 106):

*[The property tax] is a tax which, because its base is visible, easily attached, and taxable at a leisurely pace, can be effectively administered at the local level. Hence, the idea of local governmental independence and the property tax are intimately linked. Other broad and productive options are beyond the possibility of local operation, save as supplements to a tax levied and administered by a higher (state) government. Thus if it is desired to have governmental services provided by a government that is close to the people, then the property tax is the only meaningful option. Those who value local government ought, by the same token, to love the property tax and to work to make it productive.*

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<sup>5</sup> This has been largely driven by school finance reform (see Fischel 2001). States have public education as a constitutional responsibility, and some have interpreted the local financing and provision of education as an unconstitutional source of financial inequity.

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