Winning By Playing:

A Political Economy of Networks

by

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> "To use a car, roads are needed. To use roads, with traffic conditions, traffic lights are needed. Traffic lights imply rules, and the enforcement of those rules, hence traffic police and even a legal system capable of assessing guilt and innocence, fines and punishment. Automobiles imply a need for gasoline stations at spaced intervals. Travel by automobile implies a need for motels, perhaps restaurants with fast food for the anxious traveler, etc. In turn, gasoline stations need a petroleum industry to find, refine, and deliver gasoline to the motorist at his convenience…"[1]

Economic innovations do not occur in a vacuum. New ideas are evaluated based on whether they act as complements or substitutes for the existing products and services in an economy. Furthermore, products and services do not exist in an economy independently of each other. Rather, they also act as complements and substitutes for each other. Products, services, and ideas that complement each other act as "economic webs" or networks. Scholar James Burke has spent decades documenting the interdependence of ideas in innovation and the synergy that occurs when ideas reinforce each other and recombine in new ways.[2] His book The Knowledge Web, suggests that understanding the connections between ideas is crucial to navigating current social dilemmas.[3]

The presence of economic webs produces two effects on economic innovations. First, any innovation that *complements* existing economic webs will benefit from the existing network. These "network effects" have been called by economists "increasing returns; cumulative causation; deviation-amplifying mutual causal processes; virtuous

[1] Stuart A. Kauffman, "The Evolution of Economic Webs," in *The Economy as an Evolving Complex System*, ed. P. W. Anderson, Kenneth Joseph Arrow, and David Pines (Redwood City, Calif.: Addison-Wesley Pub. Co., 1988), 139.
[2] James Burke, *Circles : 50 Round Trips through History, Technology, Science, Culture* (New York: Simon & Schuster, 2000), James Burke, *Connections* (London: Macmillan, 1978), James Burke, *The Day the Universe Changed*, 1st American ed. (Boston: Little, Brown, 1985).
[3] James Burke, *The Knowledge Web : From Electronic Agents to Stonehenge and Back--and Other Journeys through Knowledge* (New York: Simon & Schuster, 1999).

and vicious circles; threshold effects; and non-convexity."[4] Second, any innovation that *substitutes* for existing economic webs will be opposed by the existing network. This is effectively a "barrier to entry" for new ideas, products, and services.

Economic innovation constantly faces these two forces. As a result, economic webs rise and fall together, both adapting to and perturbing the economic landscape.[5] When the automobile was introduced, it put out of business a whole range of products and services ranging from carriage-makers to horse-stablers, while simultaneously creating opportunities for new products and services from tires to roads to gas stations. This is Schumpeter's "creative destruction" writ large.[6] Unfortunately, because of the presence of economic webs, the economy as a whole can get stuck in a less than optimal equilibrium. "If one technology is inherently 'better' than the other (under some measure of economic welfare), but has 'bad luck' in gaining early adherents, the eventual outcome may not be of maximum possible benefit. (In fact, industry specialists claim that the actual loser in the video contest, Betamax, is technically superior to VHS.)"[7]

As Keynes realized, clearly some kind of oversight is needed, and that oversight comes from the state as the bastion of the public trust.[8] Coordinating that oversight globally is the responsibility of international institutions. Therefore, this paper has both a descriptive and a normative purpose. The analytical section will provide a description of the new "golden rule" of the globally networked economy along with some evidence that

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[4] Brian Arthur, "Self-Reinforcing Mechanisms in Economics," in *The Economy as an Evolving Complex System*, ed. P. W. Anderson, Kenneth Joseph Arrow, and David Pines (Redwood City, Calif.: Addison-Wesley Pub. Co., 1988).
[5] Kauffman, "The Evolution of Economic Webs."
[6] Joseph Alois Schumpeter, *Capitalism, Socialism, and Democracy* (New York, London,: Harper & Brothers, 1942).
[7] Arthur, "Self-Reinforcing Mechanisms in Economics," 10.
[8] John Maynard Keynes, *The General Theory of Employment, Interest, and Money*, *Great Minds Series* (Amherst, NY: Prometheus Books, 1997).

demonstrates the rule in action. Afterward, in my conclusion, I will offer some normative prescriptions for policy makers.

Finally, the presence of economic webs obviously creates winners and losers, according to its own network logic. The winners are those firms and nations who are able to create and sustain cooperative economic networks, either by complementing existing networks or by creating new ones. The losers are those fail to do so. In computational models of international political economy, "playing well with others" takes on a new urgency.[9] As Rogowski revealed, this process can only result in new class cleavages, and new demands for distributive justice.[10] My central aim, then, is to demonstrate support for the following hypothesis: *Being networked results in success, whereas "going it alone" results in failure*.

The Network Economy

Numerous scholars have attempted to analyze the network effects of the information economy.[11] While a full survey is beyond the scope of this paper, a synthesis is necessary. Kevin Kelly notes that 1) the prevalence of connections yields increasing returns via positive feedback, 2) value comes from abundance, not scarcity, 3) generosity begets wealth, 4) the primary goal is to maximize the *network*'s value, not your own

[9] Ken Kollman, J. H. Miller, and Scott E. Page, *Computational Models in Political Economy* (Cambridge, Mass.: MIT Press, 2003).
[10] Ronald Rogowski, *Commerce and Coalitions : How Trade Affects Domestic Political Alignments* (Princeton, N.J.: Princeton University Press, 1989).
[11] John Perry Barlow, "Cybernomics:Toward a Theory of Information Economy," in *Merrill Lynch Forum on Technology and Society.* (Merrill Lynch, 1998), Kevin Kelly, *New Rules for the New Economy : 10 Radical Strategies for a Connected World* (New York: Viking, 1998), Michael Rothschild, *Bionomics : Economy as Ecosystem*, 1st ed. (New York: H. Holt, 1990), Carl Shapiro and Hal R. Varian, *Information Rules : A Strategic Guide to the Network Economy* (Boston, Mass.: Harvard Business School Press, 1998).

value.[12] John Perry Barlow also notes that "insofar as goods of the mind are recombinative, wealth flows progressively from the abundance of ideas and not from their scarcity."[13] Ultimately, the reversal of traditional economic imperatives such as "value comes from scarcity" stems from network effects.

A crucial metaphor for understanding network effects is the fax machine. A single fax machine has no value. A second fax machine doubles the value of both machines. Each new fax machine in the network increases the value of the others exponentially, or to generalize, each new node in a network increases the value of all of the nodes exponentially. Moreover, the individual nodes have *no value outside of the network*. It is the network that acts as the creator and carrier of value.

The need for a "value network" leads directly to Kelly's dictum to "feed the web first."[14] Furthermore, because fostering networks for mutual benefit is an economic imperative, the network economy is ultimately a gift-economy, not a transaction economy.[15] In addition, feeding the network creates a "commons," or shared value-pool, which the members draw upon. Unlike depletable commons, however (such as environmental resources), economic webs benefit from increased use, producing what Dan Bricklin calls "the cornucopia of the commons."[16] Ultimately, the demand for new ways to create and sustain networks has ushered in a host of new tools to enable sharing, collaboration, and cooperation.[17]

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[12] Kelly, *New Rules for the New Economy : 10 Radical Strategies for a Connected World*.
[13] Barlow, "Cybernomics:Toward a Theory of Information Economy."
[14] Kelly, *New Rules for the New Economy : 10 Radical Strategies for a Connected World*.
[15] Eric S. Raymond, *The Cathedral and the Bazaar : Musings on Linux and Open Source by an Accidental Revolutionary*, Rev. ed. (Beijing ; Cambridge, Mass.: O'Reilly, 2001).
[16] Dan Bricklin, "The Cornucopia of the Commons," in *Peer-to-Peer : Harnessing the Benefits of a Disruptive Technology*, ed. Andrew Oram (Beijing ; Cambridge Mass.: O'Reilly, 2001).
[17] For examples see: Dan Gillmor, *We the Media : Grassroots Journalism by the People, for the People*, 1st ed. (Beijing ; Sebastopol, CA: O'Reilly, 2004), Bo Leuf and Ward Cunningham, *The Wiki Way : Quick*

Economic webs are nothing new, but in the network economy, economic webs become increasingly crucial because much of the global economy requires the presence of standards: standards for communication, standards for accounting, standards for property, etc. The need for global standards, driven by globalization, creates conflict at the international level.[18] Firms, individuals, and nation-states need networks in order to prosper. The nature of economic webs in the network economy places new demands on international political economy and policy makers to understand the emergent dynamics of the global economy.

Cases: Hegemons vs. Networks

Kindelberger's famous phrase "for the world economy to be stabilized, there has to be a stabilizer, one stabilizer" is a typical example of the belief that ordered systems require orderers.[19] His assertion laid the groundwork for Stephen Krasner's theory of hegemonic stability, which also suggests that international public goods, like free trade, have to be provided by a dominant hegemon.[20] Mattli's study of regional integration reaches much the same conclusion, noting that economic integration succeeds only when

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Collaboration on the Web (Boston: Addison-Wesley, 2001), Andrew Oram, *Peer-to-Peer : Harnessing the Benefits of a Disruptive Technology*, 1st ed. (Beijing ; Cambridge Mass.: O'Reilly, 2001), Howard Rheingold, *Smart Mobs: The Next Social Revolution* (Cambridge, MA: Perseus Publishing, 2002), Steve Weber, *The Success of Open Source* (Cambridge, MA: Harvard University Press, 2004).

[18] Thomas L. Freidman, "Doscapital," in *Global Issues 02/03*, ed. Robert Jackson (Dushkin/McGraw-Hill, 1999), Ignacio Ramonet, "Let Them Eat Big Macs," in *Global Issues 02/03*, ed. Robert Jackson (Dushkin/McGraw-Hill, 1999), Dani Rodrik, *Has Globalization Gone Too Far?* (Washington, D.C.: Institute for International Economics, 1997).

[19] Charles Poor Kindleberger, *The World in Depression, 1929-1939*, *History of the World Economy in the Twentieth Century, V. 4* (London,: Allen Lane, 1973), 105.

[20] Stephen D. Krasner, "State Power and the Structure of International Trade," *World Politics: A Quarterly Journal of International Relations* 28, no. 3 (1976).

a wealthy "paymaster" can provide financial incentives to potential defectors.[21] In fact, John Arquilla and David Ronfeldt at RAND have suggested in their theory of "noopolitik" that "it may take some exercise of hegemonic power to foster the development of a global noosphere…. A benevolent hegemon may be needed so that NGOs, individual activists, and others, have the space to build the networked fabric of global civil society."[22] Certainly some theorists would not be surprised to find one hegemonic system declining and another rising.[23] Numerous scholars of international politics, however, have articulated the possibilities for coordinated cooperation even in the absence of a hegemon.[24] Furthermore, outside of political science, scholars of complexity theory, network analysis, and swarms and other self-organizing systems have also proven this contention false.[25] Nonetheless, the debate over economic networks versus economic hegemons is central to the problem of providing public goods, such as standards.

In the economic sphere, Microsoft operates according to a "hegemonic" principle, seeking to impose standards by dominance and centralized control. When, Microsoft's

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[21] Walter Mattli, *The Logic of Regional Integration : Europe and Beyond* (New York: Cambridge University Press, 1999).
[22] John Arquilla et al., *The Emergence of Noopolitik : Toward an American Information Strategy* (Santa Monica, CA: Rand, 1999), 74.
[23] Robert Gilpin, *War and Change in World Politics* (Cambridge ; New York: Cambridge University Press, 1981), George Modelski, *Long Cycles in World Politics* (Seattle: University of Washington Press, 1987).
[24] Joanne S. Gowa, *Allies, Adversaries, and International Trade* (Princeton, N.J.: Princeton University Press, 1994), Robert O. Keohane, *After Hegemony : Cooperation and Discord in the World Political Economy* (Princeton, N.J.: Princeton University Press, 1984), Duncan Snidal, "The Limits of Hegemonic Stability Theory," *International Organization* 39, no. 4 (1985).
[25] Some of the best works include: Robert M. Axelrod and Michael D. Cohen, *Harnessing Complexity : Organizational Implications of a Scientific Frontier* (New York: Free Press, 1999), Eric Bonabeau, Marco Dorigo, and Guy Theraulaz, *Swarm Intelligence : From Natural to Artificial Systems* (New York: Oxford University Press, 1999), Bricklin, "The Cornucopia of the Commons.", Mark Buchanan, *Nexus : Small Worlds and the Groundbreaking Science of Networks*, 1st ed. (New York: W.W. Norton, 2002), Robert Jervis, *System Effects : Complexity in Political and Social Life* (Princeton, N.J.: Princeton University Press, 1997), Stuart A. Kauffman, *The Origins of Order : Self Organization and Selection in Evolution* (New York: Oxford University Press, 1993), Mark C. Taylor, *The Moment of Complexity : Emerging Network Culture* (Chicago: University of Chicago Press, 2001), M. Mitchell Waldrop, *Complexity: The Emerging Science at the Edge of Order and Chaos* (New York: Simon & Schuster, 1992).

Windows operating system appeared, unable to compete on technical merits, Microsoft resorted to restrictive licensing in order to gain market share. Any home computer dealer who sold computers with Microsoft Windows was required to sign a license forbidding that dealer from selling any computers with any competing operating system. Before the Internet protocol had been standardized, computer networks implemented numerous protocols: TCP/IP, NetBeui, and IPX. Microsoft's protocol NetBeui was proprietary, and only implemented on Microsoft Windows PC's. This prevented it from developing into a large network (IPX, another proprietary protocol suffered from the same flaw). After the widespread adoption of HTML, a public domain computer "markup" language, Microsoft introduced customized "improvements" to its HTML interpreter Internet Explorer in an attempt to co-opt HTML. Had Microsoft's HTML been accepted as a standard, then Microsoft could have controlled the future development of what had started as a public domain resource, effectively "proprietizing" it.[26]

By way of contrast, we turn to Linux and the "open-source" community. The Internet protocol TCP/IP was given into the public domain by Bob Metcalfe. Any computer could implement it. It quickly beat out both NetBeui and IPX as the protocol of choice because it was freely available. As more computers began to implement TCP/IP, the demand for TCP/IP enabled computers increased, and network effects began to emerge.

The Linux operating system was originally created as a variant of the UNIX operating system. Linux's creator, Linus Torvalds, gifted Linux firmly into the public domain, inviting others to not only use Linux, but also to contribute to its development.

[26] This is no surprise. Microsoft's business strategy has always been a series of attempts to proprietize public goods – computer languages, programs, business practices, and most recently internet protocols.

Linus himself would only occasionally sign-off on new parts of the code as it was integrated into the existing code. As a result of this open development, the more people who *used* Linux, the better. Linux development implements a methodology called "open-source" development because the original code for the software is given away freely with the software so that others may make improvements. The open-source methodology leverages the power of large pools of contributing developers in what Yochai Benkler has termed "commons-based peer production."[27] Moreover, because bugs must be found and improvements must be tested, the system benefits from free-riders.[28] "The value of a piece of software to any user increases as more people use the software on their machines."[29] In what has come to be known as Raymond's Law: "Given enough eyeballs, all bugs are shallow."[30] Peer-production is used to develop a plethora of software, including the free open-source webserver Apache, which is the most-used webserver in the world with 68% market share.[31]

In contributing to the provision and improvement of their public goods, the Linux community acts a lot like Putnam's "networks of civic engagement."[32] Despite its lack of a geographic location, there is a strong sense of "civic" pride among Linux users and developers. It is this incentive, which solves the problem of the provision of public goods, that insures that the Linux network continues to grow: Not only are Linux users

[27] Yochai Benkler, "Coase's Penguin," *The Yale Law Journal* 112 (2002).
[28] Bricklin, "The Cornucopia of the Commons."
[29] Weber, *The Success of Open Source*, 154.
[30] Raymond, *The Cathedral and the Bazaar : Musings on Linux and Open Source by an Accidental Revolutionary*.
[31] *Netcraft Web Server Survey* (2004 [cited December 2004]); available from http://news.netcraft.com/archives/web_server_survey.html.
[32] Robert D. Putnam, Robert Leonardi, and Raffaella Nanetti, *Making Democracy Work : Civic Traditions in Modern Italy* (Princeton, N.J.: Princeton University Press, 1993).

happy with Linux, but they actively encourage others to join the network. The profit motive has been displaced by the participation motive.

Thus, it is possible to contrast the hegemonic principle, which is one of control, with the network principle, which is one of coordination. Because it existed in a control economy, Rockefeller's Standard Oil found itself forced to control the production and distribution of oil.[33] Microsoft's success has come from the same, often illegal, methods employed by Standard Oil.[34] By contrast, Linus Torvalds only needs to coordinate the decentralized mass of Linux developers. Andrew Shapiro argues that we are witnessing a "control revolution," and Thomas Malone asserts that we are moving from hierarchies that "command and control" to networks that "coordinate and cultivate."[35] Eric Raymond goes so far as to state, "the industrial/factory mode of software production was doomed to be outcompeted from the moment capitalism began to create enough of a wealth surplus that many programmers could live in a post-scarcity gift culture."[36] Thus economic innovation not only fits into economic webs (as it always did), but because those webs are increasingly dense and interconnected, *control* of them is impossible. As innovation proceeds, standards must be continually renegotiated. Any choice among paths therefore must begin with a "standards war."[37] In politics, as always, this means negotiation over the rules, norms, and practices which will be allowed in the global

[33] Ron Chernow, *Titan : The Life of John D. Rockefeller, Sr*, 1st ed. (New York: Random House, 1998).
[34] Not surprisingly, Microsoft is being taken to court on many of the same anti-trust charges as Standard Oil.
[35] Thomas W. Malone, *The Future of Work : How the New Order of Business Will Shape Your Organization, Your Management Style, and Your Life* (Boston, Mass.: Harvard Business School Press, 2004), Andrew L. Shapiro, *The Control Revolution : How the Internet Is Putting Individuals in Charge and Changing the World We Know*, 1st ed. (New York: PublicAffairs, 1999).
[36] Raymond, *The Cathedral and the Bazaar : Musings on Linux and Open Source by an Accidental Revolutionary*, 109.
[37] Shapiro and Varian, *Information Rules : A Strategic Guide to the Network Economy*.

economy.[38] The unsustainability of proprietary practices in the face of open collaborative networks is a lesson to nation-states in the era of networks. Thus it is my contention that the first nation to do away with proprietary rights in favor of commons-based peer production has a good chance of becoming an information "hegemon." It is crucial to understand however, that network hegemony comes from playing well with others, not from imposing dominance. As Eric Raymond has pointed out, players in peer systems are judged on the value that they bring to the table. Once network effects are acknowledged, then it becomes possible to benefit from "winning by playing." Kratochwil has argued persuasively that just getting nation-states to come to the table is a public good with its own value, independent of any substantive outcomes of negotiation.[39] Cooperation can be a norm, or standard, in and of itself. Ultimately, success in the current era requires that actors *create and sustain networks of cooperation* to agree on standards which can be used to enable widespread decentralized innovation.

The IPE of Networks

Before concluding, we need to examine a few caveats to the foregoing analysis.

Initial ideas are crude and open to refinement. As they are refined however, they become open to *less and less* refinement, eventually optimizing at some equilbrium. Kauffman

[38] Friedrich V. Kratochwil, *Rules, Norms, and Decisions : On the Conditions of Practical and Legal Reasoning in International Relations and Domestic Affairs*, *Cambridge Studies in International Relations ; 2* (Cambridge [Cambridgeshire] ; New York: Cambridge University Press, 1989).
[39] Friedrich Kratochwil, "Norms Versus Numbers: Multilateralism and the Rationalist and Reflexivist Approaches to Institutions -- a Unilateral Plea for Communicate Rationality," in *Multilateralism Matters: The Theory and Praxis of an Institutional Form*, ed. John Gerard Ruggie (New York: Columbia University Press, 1993).

refers to this as the "progressive increase in the difficulty of further improvement."[40] Similarly, an economic web becomes more rigid over time as its individual nodes become more tightly coupled, or "fitted," to each other. There exists an optimal level of coupling in an economic web that lies between too much and too little connectivity. An overly strong intellectual property rights regime would enforce innovators to "go it alone" (under-connected), whereas very large collaborative groups could become overly dependent on the complementarity of its parts such that any change in the parts would require a change in the entire structure (over-connected). Interestingly, given the profit motive, it is unlikely that purely economic agents would ever successfully negotiate out of strongly coupled economic webs. Kelly's metaphor, "don't invest in Esperanto," acts to keep economic actors vested in current schema of complementarity.

The second caveat involves something called "path dependency." Early movers in a network can, through feedback, gain monopoly status. For example, "in 1926, General Motors began the systematic purchase and destruction of trolley lines across the country, and by 1950 it had replaced street cars with its own buses in more than 100 cities."[41] Not only is there no guarantee that a self-reinforcing network will represent an optimal equilibrium, but there is also no guarantee that the process by which it arrives at equilibrium will be "fair."

Third, one of the problems inherent in self-reinforcing networks is their resistance to change. In international institutions, governments can solve the assurance games necessary to get substantial adoption of new standards before those standards go into effect, thus easing the transition and streamlining change. International institutions

[40] Kauffman, "The Evolution of Economic Webs," 127.
[41] Michael Oppenheimer and Robert H. Boyle, *Dead Heat : The Race against the Greenhouse Effect* (New York: Basic Books, 1990), 117.

concerned with commons management in the environmental regime have already demonstrated their effectiveness at mediating standards agreements. Without this mechanism, purely economic webs would ossify or get stuck in costly standards wars. This kind of commons-based peer production, particularly of information, is nothing new to the international society of states. International institutions have been performing this function for decades. As a result, nation-states should have an advantage in their familiarity with and understanding of the challenges and obstacles to achieving "cooperation under anarchy."[42] In addition, scholars of environmental regimes have accumulated extensive evidence of the ways in which reputation, trust, and transparency contribute to the provision of public goods and the management of commons.[43] The parallels between the environmental and information commons are so striking, in fact, that the leading theorist on traditional (environmental) commons, Elinor Ostrom, has recently begun writing about the information commons as well.[44]

Given these market failures, it falls to the state, acting on behalf of the public good, to keep economic webs acting in the public economic interest. First, nation-states can help economic webs to strike a balance between fragmentation and integration. Second, states can insure that the normative landscape provides "fair play" for all actors.

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[42] Robert M. Axelrod and Robert O. Keohane, "Achieving Cooperation under Anarchy: Strategies and Institutions," in *Cooperation under Anarchy*, ed. Kenneth A. Oye (Princeton, N.J.: Princeton University Press, 1986), Keohane, *After Hegemony : Cooperation and Discord in the World Political Economy,* Kenneth A. Oye, "Explaining Cooperation under Anarchy," in *Cooperation under Anarchy*, ed. Kenneth A. Oye (Princeton, N.J.: Princeton University Press, 1986).

[43] Abram Chayes and Antonia Handler Chayes, "On Compliance," *International Organization* 47, no. 2 (1993), Robert O. Keohane and Elinor Ostrom, *Local Commons and Global Interdependence : Heterogeneity and Cooperation in Two Domains* (London ; Thousand Oaks, Calif.: Sage Publications, 1995), Elinor Ostrom, *Governing the Commons : The Evolution of Institutions for Collective Action*, *The Political Economy of Institutions and Decisions* (Cambridge ; New York: Cambridge University Press, 1990).

[44] Elinor Ostrom and Charlotte Hess, *Ideas, Artifacts, and Facilities: Information as a Common-Pool Resource* [Journal] (Duke School of Law, 2003 [cited 2004]); available from http://www.law.duke.edu/journals/66LCPHess.

Whether this management comes from cooperation or hegemony, or is instead some combination of the two, economic cooperation still requires negotiation and agreement on standards. This is, and likely will always be, a fundamentally political process, not an economic one. Politics can successfully navigate this process by employing "a relational understanding that takes seriously the power dynamics, structural processes, and material effects of 'economics' while revealing their embeddedness in symbolic/cultural systems and the values they encode."[45] These values are negotiated and promulgated through institutions.

International institutions act as forums for creating and sustaining the global networks through which norms and standards are promulgated. While non-governmental institutions can adequately provide for technical standards, governmental institutions are still needed for broader social standards. For example, the World Wide Web consortium is quite capable of managing HTML, XML, and some other Internet standards, but, intellectual property standards and even DNS issues have required the creation of the World Intellectual Property Organization (WIPO) as well as the Internet Corporation For Assigned Names and Numbers (ICANN). Admittedly, there is considerable debate over how these institutions should function, but their presence is at least indicative of the recognition that the global marketplace cannot solve complex social dilemmas.[46]

Highly integrated economic institutions like the European Union have more experience at navigating these issues. Mattli's logic of regional integration could certainly be applied to cooperation on political economy issues in general: intellectual

[45] V. Spike Peterson, *A Critical Rewriting of Global Political Economy : Integrating Reproductive, Productive, and Virtual Economies* (New York: Routledge, 2003), 173.
[46] Lawrence Lessig, *The Future of Ideas : The Fate of the Commons in a Connected World*, 1st Vintage Books ed. (New York: Vintage Books, 2002), Milton Mueller, *Ruling the Root : Internet Governance and the Taming of Cyberspace* (Cambridge, Mass.: MIT Press, 2002).

property, taxation, etc. If the supply-side and demand-side conditions are fulfilled then we can expect to see cooperation occur (i.e. policy integration).[47]

In conclusion, the existence of economic webs creates a dynamic where complementary ideas are reinforced by network effects, and competing ideas face substantial barriers to entry. The dynamics of networks insure that network-builders succeed, while rogue actors fail. Because economic webs exacerbate market polarities, nation-states must take responsibility for mediating the middle ground between stasis and change. Finally, international institutions provide a forum for states to build their own networks to moderate the dangers of self-reinforcing economic webs.

[47] Mattli, *The Logic of Regional Integration : Europe and Beyond*.

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