

Evolution of the Regulatory State: The Mixed Economy Viewed Through a Complexity Lens

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This paper examines the implications for public policy of Hayek's conception of complexity, Prigogine's conception of complex, self-organizing systems, and the Santa Fe evolutionary paradigm as applied to social and economic relationships. It argues that, in a dynamic economic environment, the best regulatory policy is flexible rules within which economic relationships can continue to permutate, rather than very specific regulations which constrain, temporarily, and redirect often erroneously the market's dynamic growth path and future demand/supply relationships. This conclusion follows directly from the implications of complexity for our ability to predict accurately.

Ludwig von Mises used an interesting analogy to discuss the problems faced by government regulators. Regulations, Mises contended, were like an effort to dam a desert. Immediately, no matter how long the dam, water would run around each side until, inevitably, the entire expanse of the desert (implying *freedom of action*) would have to be blocked. Mises was suggesting that people, like water, always seek a free path that circumvents obstacles placed in their way. The evidence for such a contention surrounds us and is growing along with regulation itself. Consider the following recent description of this ongoing conflict between the dam builders and the recalcitrant water:

In scope, it was remarkable. In less than two months of using the maneuver, blue chip companies that needed to raise money had put themselves in position to avoid billions of dollars in federal income taxes by increasing the deductibility of loan

payments. In the same period, the investment banks helping them reaped millions in fees.

This is only an extreme example of a cat-and-mouse game that...pits Wall Street tax planners against federal bureaucrats...[B]ureaucrats are Aout manned and outgunned...the world is more complex, and there are more great minds (on Wall Street) thinking faster than the government side than there were 10 or 20 years ago,@ says Kenneth J. Kies, chief of staff for Congress=s Joint Committee on Taxation (Raghavana & Schlesinger, 1997).

Those who believe that government exists to solve something called Asocial problems@ seem to view the state as a sort of physician that ministers to its citizens= seemingly endless capacity to create such problems. In fact, this analogy is specifically mentioned in *The Federalist Papers*, (Madison, 1965) and has a long history of both implicit and explicit advocacy in American politics. This Agovernment as social savior@ paradigm reached its apogee during the Progressive Era, but remains a cultural staple in both Democratic and Republican party platforms, and in the legal-regulatory apparatus that has been handed down to us by Congress, and by court precedents, since the late-19th century.

As a society moves from small government to large, both the number and types of regulatory intrusions change. At first, large and rather self-evident matters will be addressed, such as property disputes, blood feuds, courts, law enforcement personnel, external security threats and wars, public health issues, and infrastructure. When the system has Amatured,@ however, two things will likely have occurred: (1) the number of interventions will have risen over time and will show no sign of decrease, and (2) the problems which these regulations allegedly target will have become both progressively more matters of personal lifestyle, and therefore smaller in scope, than their predecessors. Calls for government to solve huge national problems will have been replaced by calls for it to regulate because a mere

handful of people areCor *could be* affected by some process, entity, existing or predicted condition(s).

American governmental policies confirm the above scenario. Today, most advocates of government problem solving no longer wish to go to the moon, nor build an interstate highway system. Instead, they want the state to regulate the lyrics of popular songs, to keep minors (or everyone) from smoking, to force retailers to make certain kinds of minute information available on their products= labels, to force the redesign of computer operating systems so that some desktop icons can be deleted, or to try to ensure that people who are in physical pain can=t get the drugs that would alleviate some of their suffering. The list is endless, as any casual reading of newspapers and magazines or viewing of daily television reportage will verify. We are not only a nation addicted to regulation: we are a nation addicted to a regulatory approach that has abandoned any pretense of *de minimus non curat lex*. Nothing is so trivial, or affects a small enough number of people (or even *potentially* affects them) that it cannot become a candidate for regulation and/or expensive litigation which today often acts as a kind of *de facto* regulation.

In a static world of known causes and effects, endlessly playing out the same actions and outcomes, regulation would be a good deal easier, although F.A. Hayek has suggested that:

However greatly our theories and techniques...assist us to interpret the observed fact, they give little help in ascertaining all those particulars which enter into the determination of...complex patterns and which we would have to know to achieve complete explanations, or precise predictions.

Of course we do not live in such a world. And, in fact, as Hayek put it:

..[t]he aspects of the events to be accounted for about which we can get quantitative data are necessarily limited, and may not include the important ones...[the results of research endeavors] remain dependent on circumstances about which we know little or nothing (Hamouda & Rowley, 1996).

This is not a problem when one is writing laws based on moral certainties with their logically generated implications. For example, the Founders wrote the Constitution, which is a rather large and complicated set of regulations and procedures, without securing the testimony of a single social scientist and without the viewing of evidence supplied by even one >expert= empirical study. Imagine attempting today to write and pass the Bill of Right in Congress. Why would this be a virtual impossibility? Because we now believe that, with the techniques of scientific investigation, we can craft better laws and regulations than did the Founders, and that those laws and regulations can be subjected to scientific scrutiny which then leads to an intellectual and moral justification. But do we succeed in this endeavor and, if not, then why not (Mises, 1974; Formaini, 1998)¹?

One of the keys to understanding why we often fail to regulate efficiently is to be found, I believe, in the theory of complex phenomena. Specifically, it is the claim that AComplexity theory is about...open systems that become increasingly more organized over time. What makes them open systems is the continual supply of additional energy that reverses the force of entropy.@ And again, quoting Chris Langton: AComplex systems are those that exist on the border between order and chaos. That is, a system with too little energy will settle down to an equilibrium where nothing happensCit is essentially deadCand a system with too much energy will be chaotic and unpredictable. Between the two lies complexity, where there is enough order to put bounds on possible outcomes, but not so much as to kill off novelty and change@ (Vought and Poulsen, 1997).

¹A wonderful recent example of Mises=s analogy about regulation is the new air bag disconnect option. First, the federal government mandates air bags for all passenger vehicles. Then as information accumulates that they pose a danger all their own, new regulations are piled on top of existing regulations allowing, under certain highly restrictive conditions, some owners to disconnect (though not to elude original payment for) the air bags. This process is itself, of course, very bureaucratic, costly, and a genuine nuisance for those affected. Further, no one can be allowed to choose *not to buy the bags*; they are still mandated. Americans cannot be allowed any longer to choose their personal risk trade-offs. Experts must make those decisions for them. And when the redistribution of risk becomes politically sensitive, or even fails outright, the regulators are given even more rules, larger budgets and more staff.

I believe that a regulated economy is an example of a complex system, requiring and receiving stimuli from both the regulated, and the regulators, in order to avoid an entropic, stagnant end state. And I believe that the important lesson for regulators is precisely how to change the inputs, from their view of the system, so as not to preclude needed systemic change even as they supply the aforementioned parameters which, in theory, constrain that very change.

Looking at policy through the complexity lens

The policy model that I believe would more accurately explain today's rather irrational-appearing regulatory environment would include the following assumptions:

(a) *most* people are self-interested, including government employees;

(b) *many* people will try and possess things of value regardless of who owns them; this will occur both legally and illegally, and it motivates the individual bureaucrat, the respected lawyer, the smooth adulterer, every bit as much as it does the meanest street thief;

(c) *most* people affected will always seek to minimize the impact of controls on their behavior, and will do so either by disregarding existing law, or by changing the regulatory environment altogether by transforming the very nature of what is being regulated.

Now assumption (a) is neither original nor shocking. Over two centuries after Adam Smith, and all the years since the Public Choice school's early writings, it seems a complete triviality, unnecessary even to state. But in fairness to readers, and as an attempt at thoroughness, there it is. Let me explain (b), to the extent I can. It asserts that many people in and out of government will seek to possess (either temporarily or permanently) things that are commonly valued. In the private sphere, examples would be burglary, forgery, extortion, car jacking, and adultery, although that hardly comes even close to exhausting the possibilities. In the public sphere, it would include tax collections, seizures of property, corruption in general for individual gain, and legal actions aimed at tapping concentrations of wealth although, again, this list is hardly exhaustive. Finally, the last assumption asserts that the policy environment will exhibit the sort of

A complexity@ described above as regulatorsCand the regulatedCplay their *always-in-disequilibrium*, complex game.²

²I agree with Peter Lewin=s contention that the real world is always in Hayekian disequilibrium. To me, this means that Hayekian disequilibrium must logically be connected, in the most fundamentally *causal* way, to Hayekian complexity. Consider further the following description of complexity as M. Mitchell Waldrop, in his book *Complexity*, (p. 147) quotes the ideas of computer scientist John Holland at the Santa Fe Institute program on complexity in 1987:

...complex adaptive systems typically have many *niches*, each one of which can be exploited by an agent adapted to fill that niche. Thus the economic world has a place for computer programmers, plumbers, steel mills, and pet stores, just as a rain forests has a place for tree sloths and butterflies. Moreover, the very act of filling one niche opens up more nichesCfor new parasites, for new predators and prey, for new symbiotic partners. So new opportunities are always being created by the system. And that, in turn, means that *it=s essentially meaningless to talk about a complex adaptative system being in equilibrium*: the system can never get there. It is always unfolding, always in transition. In fact, if the system ever does reach equilibrium, it isn=t just stable. It=s dead....

...[t]here=s no point in imaging that the agents in the system can ever Aoptimize@ their fitness, or their utility, or whatever. (Emphasis added.)

How would one model this process? Put simply: one cannot. The best that can be done is partial and incomplete game models with multiple assumptions, such as Neary's (Neary, 1997). Purely verbal extensions of public choice insights are also useful when analyzing interrelationships between regulators and their opponents³ (McChesney, 1997). But no one's work to date has captured, nor will any ever completely capture, the sort of complex game that plays itself out daily in regulated markets, because it is not a game that can be modeled well. It is, by assumption, *non-equilibrium, non-linear, and imbued with uncertainty*.

To some unknown extent, expectations about the game's observed, and probable, short-run outcomes are a component of the selling price of every good and service that is regulated or *might become regulated*. If you assume that profits draw legal/regulatory threats, then every industry must try to amass a war chest that will protect it when the feared assault actually materializes.⁴

³Examples confirming some of the claims in this book are very easy to document. See *How Insurance Firms Beat Back An Effort for Stricter Controls*, @ *Wall Street Journal*, February 5, 1998, 1. Even though it was the industry that won this round, perhaps temporarily, the ongoing process, as outlined in this story, is fascinating. See also Carl Horowitz, *Legislation Aims Fair Housing Laws at Insurance*, @ *Investor's Business Daily*, February 6, 1998 for why the victory might well be temporary.

McChesney's book is, in many respects, a pathbreaking work which extends, and corrects, for some of the obvious deficiencies in neoclassical-public choice theories of regulation. He credits several others with earlier insights, among them: J. Patrick Gunning, Dwight Lee, James Lindgren, Gordon Tullock, Robert Tollison, Richard Posner, Mancur Olson, and Gary Becker.

⁴The current atmosphere of threat tactics is well examined in *Will Other Vices Be Targeted?* @ High-revenue/profit industries are especially tempting targets, and now that tobacco has been conquered, look for alcohol, firearms and drug makers to be next as trial lawyers continue their alliance with various levels of government to attempt legal redistributions of wealth. Of course, industries can fail to financially weather such attacks, as the Johns Manville asbestos and Dow Corning silicon implant examples demonstrate.

The Microsoft case is yet another instructive example that confirms the outline of the model. As the *Wall Street Journal* editorialized (March 4, 1998) after Bill Gate's testimony the previous day before the Senate:

But the Bill Gates grilling fits the familiar Washington pattern. A Business or industry grows and prospers into a national asset when left alone. But

The inability to sometimes protect one's assets can be traced to the inability to predict, with accuracy, what the future legal/regulatory environment will be like. It is perhaps apposite to quote Ludwig Lachmann in this regard, although he was not specifically considering legal/regulatory prediction at the time:

eventually it gets large enough, or rich enough, that the pols and the lawyers start clamoring for a share...[A]s often as not, the politicians are invited to meddle by competitors mauled in the marketplace...[o]nce invited in, the politicians won't stop their meddling at Microsoft. Vermont Democrat Pat Leahy suggested as much when he asked if the CEO's (Microsoft competitors) might welcome software regulation next year. Faustian bargains aren't free.

The impossibility of prediction in economics follows from the fact that economic change is linked to change in knowledge, and future knowledge cannot be gained before its time. Knowledge is generated by spontaneous acts of the mind (Buchanan & Vanberg, 1990).

It is not possible to know what game players on either side will do next. Regulators cannot know how technological change will transform the areas under their control, and private interests cannot know how future legal decisions and regulatory initiatives might/will alter their economic parameters, liabilities, and potential profitability.⁵ And this flows directly from the nature of the system itself:

But regardless of how you define them, each agent finds itself in an environment produced by its interactions with the other agents in the system. It is constantly acting and reacting to what the other agents are doing. And because of that, essentially nothing in its environment is fixed (Waldrop, 1992).

⁵Regulations create entrepreneurial opportunities as well as constrain existing options. Therefore, every regulation creates both evasion tactic, and more entities that will require more future regulation. The long-run tendency is always to moreCnever lessCregulation. When this does not occurCas in the case of the dismantling of the CAB and so-called Aairline deregulation@:---it is so untypical that it invariably becomes a major, even decades-long, media topic. This process flows directly from the very nature of complex, adaptive, self-organizing systems.

If this is a more accurate picture of what is happening on a continuing basis in the real world than the neoclassical model of optimizing agents with perfect information, then the implications for legal rules and procedures are profound. It becomes rather pointless to suggest, as many legal theorists and critics do regularly, unchanging rules and legal precedents because the complex, adaptive model predicts—and quite accurately—that the players will not allow such a system to stagnate to endure for very long. In fact, legal precedent changes every day. Regulations, or their interpretation, change every day. Markets, and the technology which currently drives them, do likewise. The timeless neoclassical general equilibrium model is a wonderful achievement in its own right, but it really does not explain the mixed economy—in other words, reality—very well in many important ways.

Moral equivalence, teleology and entrepreneurship

There is no implicit endorsement of moral equivalence in this analysis, which is to say that just because all involved are >game players= that does not make their goals, methods, and/or actions morally equal. Further, there is no teleological benchmark against which these game outcomes can be measured as either >optimal= or >suboptimal,= no >equilibrium= toward which the system is moving. To quote Buchanan and Vanberg:

And all conceptualizations of the market process that suppose, whether explicitly or implicitly, a >something= toward which the process is moving are, by this very fact, teleological, whether the >something= is specified as an >equilibrium= or otherwise...[B]ut such adaptive behavior does not imply that the overall process is moving toward some determined goal, whether conceived as a predetermined equilibrium or as a >moving cat.= The market economy, as an aggregation, neither maximizes nor minimizes anything... [T]he results of market process cannot be evaluated against some independently-defined scalar (Buchanan and Vanberg).

What kind of entrepreneurial activity does this model suggest? Instead of the common views that entrepreneurship creates huge technological changes (Schumpeter, 1989), or inter-temporal correction of errors (Kirzner, 1985), or is the sole recipient of profit for risk-taking (standard neoclassical analysis), the view of the economy as an ongoing adaptive, complex, self-organizing game suggests that there will be at least six kinds of different entrepreneurial activity:

- 1) simple arbitrage, including inter-temporal;
- 2) risk-taking based on existing knowledge structures, franchises, etc;
- 3) visionary creative destruction with its capital/technology changes;
- 4) new regulation/legal avoidance strategies and techniques;
- 5) innovatively rationalized legal raids on concentrations of wealth by politicians, the interest groups that support them, and/or entrepreneurial trial lawyers and judges, generally;
- 6) extensions of existing (and the addition of new) regulations to shake-up and/or extend the game's current or future payouts.

Markets are seen to be, from the complexity viewpoint, not collections of purely rational, optimized, allocation decisions made by rational, completely self-interested, fully-informed economic agents. This teleological view of markets is categorically rejected. Instead, markets are seen as an ongoing continually-changing creative arrangement of legally binding relationships where some creations are actually goods and services, while others are legal rather than economically rational redistributions of wealth achieved through written constructions (laws/regulations) that are used as strategic initiatives in the ongoing, complex, adaptive game that is any mixed economic system. The recent tobacco deal between states and companies, the Microsoft harassment, asset seizures without trial, ever-changing and expanding venues for trial lawyers to collect contingency fees, these are representative of the daily playing of the complex, self-organizing mixed economy game described above.

If one finds this model at all useful, then most common policy questions become transformed. Questions such as "Do tobacco

smokers pay the full social costs of their habits, or AIs Microsoft technically a true monopoly, while interesting perhaps in their own right, are not seen as the force actually driving the policy/legal decisions that will govern the answers eventually arrived at. Instead, it is to be predicted that, sooner or later, all such concentrations of wealth as those offered by large companies such as R.J. Reynolds, Phillip Morris, and Microsoft, will be siphoned off to some extent (perhaps entirely: remember Drexel Burnham?) by changes to the future public policy environment by regulatory/political/legal entrepreneurs. Typically, as is almost always the case, these highly profitable, micro-targeted changes will be argued (and propagandized by those whose wealth comes from riding on the backs of the redistributionist entrepreneurs—the media), as being in the macro-interest of A society in general. A Consumer protection, A protecting children, A securing social justice, C these and many more such rationales will be advanced for what are, essentially, narrowly-targeted microeconomic redistributions of wealth.

Public Choice theory is applicable to many such transactions, of course, to the extent that special interests A purchase certain policies from favored politicians which are then paid for by a much larger population which, given the small per-person costs of the transfer, have no rational incentive to oppose the policy. But Public Choice theory has no mechanism to explain the legal decisions that are required to make such outcomes possible. What incentive do sitting judges have to make possible the types of deals that politicians, hungry for reelection, make with their pet special interests? What are the incentives that drive juries to their awards decisions?

Public Choice models, besides being based often on the neoclassical telos, suggest that special interests are willing to pay up to the point where the cost just equals the benefit sought. But this surely isn't right. The payoff for any interest has to be a good deal greater than the cost to that interest of obtaining the favor or legislation or whatever. The very process of obtaining the favor C rent-seeking C is itself a disutility. Further, the threat/counter-threat expenditures require a two-way process: special interests seek favors, and politicians threaten to confiscate, which requires those interests to take defensive action. It is not enough for an interest to have a politician or two in its

pocket; other politicians and/or judges, can use the system to threaten those interests anyway. This requires that every special interest provide for self-defensive strategies and the expenditures to support those strategies, or simply Apay up.@⁶

Statics and dynamics

⁶As the *Wall Street Journal* put it in a March 5, 1998 editorial on the latest exaction from Michael Milken:

But we guess that=s the point of this game: discourage the target from putting up a defense and then collect a headline-grabbing sum. We saw this in the S&L, prosecutions, few of which actually went to trial, and those that did almost always ended badly for the government.

The editorial (titled *Predatory Government*) also alludes to one Tim Howard, a trial attorney who was present at the Adeal@ session struck between the State of Florida and trial lawyers regarding suing the tobacco companies. Evidently, this session was a Afar from pretty thing,@ as might well be expected. But it=s clearly all a part of the ongoing game.

One of the major problems with regulation has always been that laws are static while the economic markets to which they apply are dynamic. This is the source as well of the main argument about the U.S. Constitution. Is it a fixed document whose language represents Aoriginal intent,@ the decisions which flow from that language also to remain fixed (*stare decisis*, in legalese)? Or is it a Aliving@ document whose interpretation must be rediscovered generation-to-generation as conditions change? How can it be applied when conditions emerge that the founders never imagined at the time they wrote the original language? This is always a conundrum for legal rules and regulations: the passage of time will change, or even sometimes altogether eliminate, the rationale for the original rule(s), or simply make the rule(s) irrelevant to new circumstances. It is impossible to get around this problem because as Lachmann reminded us, AFuture knowledge cannot be gained before its time.@⁷ What, then, is a writer of regulations to do? It depends, of course, on what the ends are toward which the drafter of new regulations is seeking to move. There is, of course, more than one motive for writing laws and regulations, and more than one strategy for playing the game. For a taxonomy comparing the various ways to look at the ongoing, complex, mixed economy see Figure 1.

Each listed group also has a game strategy that it typically follows, as well as a payoff that it is seeking. Naturally, not everyone in each group uses the same strategy, nor does every person in each grouping necessarily seek the same payoff. For examples, see Figure 2.

Regulators: angels, average people, or anti-life?

One of the implications of adopting that complexity view of the mixed economy is that there are no longer simple Awhite@ and

⁷Quoted in Buchanan and Vanberg, 14. An excellent example of the entrepreneurial exploitation of old regulations that the drafters could never have foreseen being used the way they are currently used in the federal land purchase program. Crafty land buyers now routinely purchase Asensitive@ lands, threaten to mine or cut trees, and get bribed to stop. Sometimes they receive lucrative land Atrades,@ federal land exchanges originally designed to protect land that have become, over time, the very mechanism by which its value is increased, with private owners walking away with huge profits. See Ryan Lizza AGold Diggers,@ *The New Republic*, May 4, 1998, 17-18.

A black@ hats for the major participants. Business interests can be bad or good, depending on the ends sought and the particular ethical framework used to judge those ends. A separate ethical framework is always required anyway, regardless of which viewpoint is chosen. Government regulators can, while pursuing other long term aims and ends, possibly do some good anyway. Unless one subscribes to the anarchist position of the proper role of state action, there are indeed

Figure 1

	OLD VIEW	PUBLIC CHOICE	COMPLEXITY
<i>Politicians</i>	Public-spirited	Dispensers of rents	Threats to any concentration of wealth
<i>Economic special interests</i>	ABad@Bdriven by personal Agreed@	ABad@Brent seekers	ANatural@ response to ever-changing legal/reg. structure
<i>Entrepreneurs</i>	Technology changing Agivens@	Often, rent seekers	Catalysts that lead to parameter changes in legal/reg. structure
<i>Regulators</i>	Public spirited	Self-interested aggrandizers	Major game-playing catalyst agents
<i>Ideological special interests</i>	ABad@Bsingle issue groups	Not well-modeled	Piggybacked on the legal/reg. process
<i>Judges/lawyers</i>	Precedent followers	Entrepreneurial law <i>creators</i>	Extortionists/catalyst agent overseers

Figure 2

	Primary Game Strategy	Expected Payoff(s)
<i>Politicians</i>	Threats create profit opportunities and money for re-election bids	Fame/immortality; affluent retirement; historic Alegacy@
<i>Economic special interests</i>	Lobbying/financial contributions	Economic rents; successful defenses against opponents= threat initiatives
<i>Entrepreneurs</i>	Evasion; parameter change; occasional bribes	Increases LR-profits or minimized SR losses
<i>Regulators</i>	Rule expansion/threats	Self-satisfaction; promotion/more power
<i>Ideological special interests</i>	AThink-tank@ piggybacking on politicians and lobbyists	Status; comfortable employment opportunities
<i>Judges/ lawyers</i>	Expand judicial reach; precedent changes to accomplish same	Fame/immortality; wealth; self-satisfaction and legal Alegacy@

things the government can do to make markets work better.⁸ Exactly what those things are, and the optimal extent of such activity, has always been intellectually contestable, but also has seldom been denied by the majority of economists.

The reality is that politicians and the regulators they employ do sometimes have as their motivation simple altruism. The results of using government force to try and achieve their altruistic ends is often another matter entirely, but it does economics little good to pretend that all such people are engaged in is simple self-promotion and self-aggrandizement. If that were true, it would be a good deal easier to buy them off. The same traits apply to lawyers, judges, and even to entrepreneurs. I may be awaiting a multi-million dollar payoff in the tobacco settlement as a participating trial attorney, yet also fervently believe that I have furthered the public interest by striking this financial blow against those companies by acting on behalf of their victims. The two things are not mutually incompatible, after all. In markets, people do good by doing well. At least that's what economists since Adam Smith have maintained. In other venues, they do well by doing what is taken to be good by a majority of those who either already vote, or are likely to in the next election.

⁸This was denied, of course, by writers such as Murray Rothbard. Some anti-anarchists, such as Ayn Rand, nonetheless wrote as if they believed that virtually every government rule, law, or regulation is promulgated by life-hating losers whose sole motivation seems to be the destruction of heroic entrepreneurs. In the complexity model, regulators are but one of several catalyst agents who keep the system from stagnating by playing their role in changing the system's parameters. Further, such change in this model is a necessity. Neither does Rand's view explain such attempts at regulation as described in footnote 9.

The alternative view, held by many libertarians and other defenders of little/no regulation is a sort of Randian reductionism that ascribes to all efforts to regulate markets as an evil intent and further assumes all such actions to be somehow questionable and counterproductive at best, anti-humanity and anti-life power grabs, at worst. Most of the politicians and regulators I have met in my life do not seem, to me anyway, to be carbon copies of James Taggart.⁹

Those who wish to argue for complete laissez-faire must convince average people with vast empirical experience to the contrary that businesses can be relied upon to do the right thing. Consider the recent crash of ValuJet 592. At several points in an unfortunate chain of events, ValuJet personnel failed to follow existing regulations which applied to the tasks which they were performing, and along the way falsified documents to suggest they had followed these regulations.¹⁰ What is a defender of laissez-faire to reply? That the airline had no financial incentive to crash airplanes? Of course it didn't. That if the regulations had not existed, the crash would not have occurred? Highly unlikely. That

⁹James Taggart was the life-hating brother of the heroine in Ayn Rand's novel *Atlas Shrugged*. By the conclusion of that book, it is clear to readers that his entire motivation for all his actions, and for saying all he has said, is some sort of pathological hatred of reality itself, including his place within it. There may in fact be such people, but surely they are not typical, i.e., a majority, even in government?

¹⁰The detailed ValuJet crash story is told in the March, 1998 issue of *The Atlantic Monthly*. Where lies the ultimate blame? The article cites this crash as an example of a system failure. What makes this conclusion troubling is that several parts of the system were designed to prevent the very outcome that occurred, and the article argues that this can never be eliminated from human activities no matter how hard we try. Reduction, however, is different from perfection which would be the complete elimination of aircraft accidents. The FAA has not been, of course, as efficient at enforcement as they ought to be. See Fred Bayles, "FAA Ignores Violations, Report," says *USA Today*, March 31, 1998. A survey of FAA inspectors reveals that the majority fail to write up many violations, overlook other violations, or otherwise bend existing rules. And if the inspectors themselves so often do it, why should we expect airline employees to act differently?

despite regulations there are always going to be accidents? Undoubtedly. But the important question for our purposes is: if airlines are subject to regulations, are accidents more, or less, likely to occur?

The incentives faced by air carriers do not revolve solely around safety. There are other pressing concerns that create competing incentives. Being Aon-time.@ Competing through efficiency to lower price. Stock price performance. Add a dose of human fallibility, basic human nature, mix, and serve up a disaster scenario. The truth is we simply don=t know how many accidents have not occurred because regulations were followed. It is true that government often does a rather poor job, but markets cannot be relied upon to do better in many cases. Private markets ought to have provided financial deposit insurance, but they didn=t. Government did. Every idea that involves state action is not, *ipso facto*, a bad idea. We do know with absolute certainty that had FAA regulations been followed, the ValuJet crash would not have occurred, investors and insurance companies would therefore have saved a great deal of money, the ground would not have been littered with debris and bodies, and the victims= families would be a good deal happier today. Further, the airline would not have been thrust into bankruptcy, grounded, and required a renaming, and reorganization, during which many of its employees were furloughed or eliminated.

So regulation is, generally, a good thing? Not at all. Regulations can be everything that their opponents claim: inefficient, expensive, politically motivated, oppressively static and non-competitive in their effects, ineffective, and yes, even counterproductive.¹¹ It=s even possible that evading certain

¹¹The estimated monetary cost (*Brookings Review, Winter 1998*) of all regulations will be about \$700 billion a year by 2000, or almost \$3000 for every person currently living in America. This is no small amount, and certainly not a negligible burden on growth, etc. Although no benefit calculation was estimated, it is safe to argue that it would be a considerably lower amount. The calculation of regulatory costs is difficult, and different estimates are made by different Accounters.@ There are the direct

regulations actually enhances overall safety. That's the entire point: in a complex world, economic agents must evaluate their environment, adapt to it, change it, and then adapt once again. This is a continuing process, sometimes dangerous to the individual agent's fortunes, and always intellectually demanding. And most importantly, this process is dynamic. In this kind of complex economy, what kinds of regulatory rules would be best?

Static regulations statically enforced through time (i.e., rigidly, regardless of circumstances) by the legal system are not a good idea, although this approach does have eloquent defenders in the popular and oft-quoted "Ruled by laws not men" tradition. Nonetheless, they are not a good idea because the time lag between their origination and implementation has already made them partially obsolete at the moment when they are first enforced, with their inevitable obsolescence increasing with the passage of time. This is a fact upon which both proponents and opponents of regulations often seem to agree. They become obsolete because complex, evasive action is taken, and because markets are transformed by new technologies even as they accommodate (adapt) to the regulations which are being evaded. The real culprit in this process is the tension between the nature of republican government and our modern, extremely complex world. For republican government is a static set of rules rigidly adhered to through time which cannot reasonably be used to regulate an ever-changing, complex economy. This is why the regulatory agencies now make their own law which is, of course, something that judges and lawyers have been doing for much longer.

costs, and more importantly, the indirect costs. While we cannot agree on a precise figure, we know they are quite high and getting higher every year.

One can write a general rule such as "No person not a citizen of the United States can be its president," and easily enforce this rule through time with little consequence to anyone save non-citizens who might wish to be president. Hardly much of a cost in that, although the nation loses the chance to elect potentially great presidents who happen not to be citizens. But a specific rule governing the definition of "natural" or "drug," or "browser" or any one of thousands of other entities, cannot be held rigid for very long without making the original regulation increasingly ineffective and, eventually, just plain silly. And this type of rule can wind up being very costly either as a direct market burden, or as a distorter of developing markets where conditions change and development then proceeds along less than the optimal path. Is there a solution for this problem?

Is Flexible regulation possible?

Is "flexible regulation" an oxymoron? Perhaps it is. It is easy enough to write about flexible regulation, producing political statements about how good it is and to how many undertakings it can be usefully applied. Take the state of Iowa's regulation manifesto, which is, according to its Commerce Department, committed to regulation that:

- \$ fosters economic development
- \$ maintains public confidence in the integrity of regulation
- \$ establishes policies that protect the public interest
- \$ regulates in a manner that minimizes cost and complexity
- \$ identified competitive alternatives and deregulates when possible
- \$ provides information so the public can respond (adapt?) to the regulations, or even the regulator (Iowa Dept. of Commerce)

The dangers of not revising and improving regulation have been well-described and ingeniously analyzed by Mancur Olson (Olson, 1982). The question is not simply how much regulation ought to be, but how ought it be defined and implemented? Some types might lead to the hardening of the economic arteries of which Olson wrote, i.e., if interests can use it to coalesce and shut out potential competitors. Badly written/implemented regulation leads to cosmically suboptimal results as well, but results nonetheless as John Holland noted in another context:

Evolution doesn't care whether problems are well-defined or not (Waldrop).

Substitute the word >regulations= for >problems= and the result is no different. Adaptive agents do not optimize in a neoclassical sense, they endure and change and adapt. However, the only perspective from which that can be appreciated is the god-like one of omniscience. That=s the genesis of the necessity for the >perfect information= assumption in neoclassical analyses.

Flexible regulation is necessary because our ability to predict, as Hayek tirelessly reminded us, is so very limited. But isn't prediction the end of science as well as its prime evaluational criterion¹² (Friedman, 1953)? The short answer is: no, and it never has been. Consider (to use the same example John Holland used to answer the objections of economists that dynamic, adaptive, self-organizing systems might leave economists with nothing to say since they never reach an equilibrium) the case of meteorology. Although weather never repeats itself exactly, never settles down, and our ability to predict its course is very limited, meteorologists can explain everything that occurs in terms of their science. The essence of their

¹²Although Friedman has always been wrong on this issue (the purposes, uses, and ontological status of theory), his tract was absorbed as the gospel by countless economists in training who believed that he set forth the correct view of both the evaluation of scientific theory in general, and economic methodology in particular.

discipline is not prediction, but comprehension and understanding (Waldrop). So, even in a dynamic world where the system is never in equilibrium, nor even has a tendency to go there (Lachmann), scientific understanding is possible and useful and that kind of understanding might be used to craft better regulations. This is, of course, a potential *non sequitur*. But the inability to predict future economic conditions is no bar to using economic theory to examine markets and market transactions.

This inability to predict accurately is rooted in two separate problems: the dynamic, adaptive nature of the economic universe where every measurable thing is a variable in flux, and the ever-changing nature of social facts as definitions are changed and social reality is reconstructed over time.¹³ In a dynamic, adaptive system that is not in equilibrium, mathematical modeling becomes extremely difficult, if not impossible. For that reason, rational expectations models have become very popular in macroeconomics. The reason is stated quite succinctly by Chai:

First, unlike the alternatives, rational expectations adds no free parameters but instead, imposes restrictions across equations. In contrast, for example, the notion of adaptive expectations involves adding free parameters to describe how expectations are formed and revised. Second, rational expectations is consistent with individual maximization, since it rules out the existence of obvious profit opportunities. Third, the equilibrium point of view practically forces one to use rational expectations (Chari, 1998).

¹³The reason social phenomena change can be either an actual change in an unvaryingly-defined variable, or a change in the definition of that variable (Searle). The changing of definitions confounds all time series in economics and, hence, contaminates the models into which the facts are then injected in order to produce predictions. See Also, for a classic example of creating reality, Michael Fumento's "The Myth of Road Rage," *The Atlantic Monthly*, August, 1998.

While it is understandable why this framework appeals to those doing theoretical models in economics, it is also clear that it could hardly be further away from the sort of economy I have been describing in this paper.

The only technique that economists have come up with to attempt answers for some of the above is benefit-cost analysis, a branch of welfare economics and, hence, an almost entirely normative exercise. There is no purely scientific basis upon which to firmly base these judgments (Formaini, 1990).¹⁴ There is, finally, only the personal judgment of legislators, bureaucrats, and judges. This may not be especially encouraging, but it is the central fact about regulating an economy. And its corollary is that, having regulated with a set of words, the agents regulated, as well as their regulators, begin the complex, chaotic, but ultimately self-organizing dance of coevolution (Waldrop).

As Hayek had always maintained during the so-called socialist calculation debate, complex, dynamic systems are superior to planned ones. His example of an army whose parts could move and seize advantageous situations, versus one where each part had to wait for instructions, exactly parallels the germ of the idea behind adaptive, complex, self-organizing systems: they are superior, in their ability to survive, to planned systems.

Try doing that [avoiding unforeseen problems] with a single set of top-level rules.... The system would be impossibly cumbersome and complicated, with the rules telling each boid [part] what to do in every conceivable situation... since it=s impossible to cover every conceivable situation, top-down systems are forever running into combinations of events they don=t know how to handle. They tend to be

¹⁴Some people believe that subjecting all federal projects to CBA would, somehow, reduce the size of government and its expenditures. Such a belief must be an article of faith since the empirical record does not support this view. See, for example, James V. DeLong=s ADam Fools,@ in *Reason* magazine, April, 1988.

touchy and fragile, and they all too often grind to a halt in a dither of indecision (Waldrop).¹⁵

¹⁵The calculation debate is reprinted in *Socialism and War*. Collected Works of F.A. Hayek, Volume 10 (Chicago: University of Chicago Press), 1977 as well as summarized and explored in Don Lavoie, *National Economic Planning: What is Left?* (Cambridge, MA: Ballinger), 1985.

In contrast to a sole top-down approach to regulation, consider the description of what some complexity theorists believe they have proved about the economy:

Common sense, not to mention recent political experience, suggests that healthy economies and healthy societies alike have to keep order and chaos in balance. And not just a wishy-washy average, middle-of-the-road kind of balance either.

Like a living cell, they have to regulate themselves with a dense web of feedback and regulation, at the same time that they leave plenty of room for creativity, change, and response to new conditions.... There has to be a hierarchy of control-with information flowing from the bottom up, as well as from the top down. The dynamics of complexity at the edge of chaos, he says, seems to be ideal for this kind of behavior (Waldrop).¹⁶

¹⁶Waldrop quoting Doyne Farmer, p. 294.

But if there is a bias in the direction of such a regulated system, why is there? And why does the system remain there once it evolves? The best economic system is one where rapid response and adaptation is the norm, so planned systems will tend either to have their plans ignored by agents, or otherwise avoided, while chaotic-anarchistic systems will evolve into more orderly states quite naturally.¹⁷ The trick to the regulatory process becomes, quite obviously, writing regulations that enhance change and efficiency rather than freeze or inhibit them. Flexible regulation, again. And, of course, so much of it simply is not flexible or even rational but is, as this view predicts, pervasive in advanced economies (Weiderbaum). So the key question is not whether there is going to be regulation, but how much and what effects it will have on the ever-evolving market process (Greenspan, 1998)?

On the brighter side, future regulation will have to conform to the changing technological environment, or be ignored. To quote Greenspan once again:

...[t]he rapidly changing technology that is rendering much government bank regulation irrelevant also bids fair to undercut regulatory efforts in a much wider segment of our economy.

¹⁷No attempt is made in this paper to examine the question of the presumed relationship between anarchy and unacceptable turbulence in the economic system. Those who believe in the superiority of anarchy can always attempt to do business in parts of the former Soviet Union, or in other areas where governments, and their regulations, are non-existent. I do, however, make the claim that government or not regulations will evolve, indeed must evolve, for successful economic development to occur and be sustainable.

The reason is that such regulation is inherently conservative. It endeavors to maintain the status quo and the special interests who benefit therefrom. New ideas, new products, new ways of doing things, all, of necessity, raise the riskiness of any organization, riskiness for which regulators have a profound aversion. Yet since the value of all wealth reflects its future productive capabilities, all wealth creation rests on uncertain forecasts, which means every investment is risky. Or, put another way, you cannot have wealth creation without risktaking. (Sic) With technological change clearly accelerating, existing regulatory structures are being bypassed, freeing market forces to enhance wealth creation and economic growth...[A]s we move into a new century, market-stabilizing private regulatory forces should gradually displace many cumbersome, increasingly ineffective government structures. This is a likely outcome since governments, by their nature, cannot adjust sufficiently quickly to a changing environment, which too often veers in unforeseen directions (Greenspan).

This rather bright prognosis ignores two important questions: can regulations be made to better fit with this changing environment?, and what reaction will the state (and other interest groups) have when its regulations are simply ignored and/or bypassed? Greenspan seems to argue that regulations are, on a fundamental level, simply incompatible with our changing, technology-based future. Greenspan remains silent on the second issue, although he seems to suggest that government regulation will go quietly into the market's newly-created good night. In my view, this is not only politically doubtful, but the complexity model predicts that such a change would lead to an overall, systemic breakdown.

But this view that markets will technologically simply evolve faster than the ability to regulate them also is based on the old

Awhite/black hat@ dichotomy, the Aregulators versus the regulated@ scenario.

Conclusion: is there optimal regulation

The theory of regulation has been in flux for some time now, and each change has produced improvement in terms of explanatory power and illumination. The first change came when Stigler and Peltzman advanced the neoclassical model, the second when Tullock and Buchanan brought in the idea of rent-seeking, and the third when McChesney added rent extraction. Yet, in my view, further improvement can be gained by rejecting the extreme laissez-faire assumptions about the motivations and activities of government, and by adopting the complexity, or ASanta Fe@ view of what is going on in any economy...the daily working out of a complex, dynamic, non-linear, self-organizing, evolutionary, self-adaptive system. Much regulation now becomes understandable. And it becomes so without having to demonize the motives of those who advocate such policies and regulations. A recent example that clarifies my point is the petition to the FAA by the makers of lithium batteries (Motorola, Duracell, Sony, Toshiba, and Matsushita) to carefully examine and regulate in-flight portable computer recharging operations on airplanes. This is neither rent-seeking nor rent extraction. What is it, then? It is defensive procedure in the ever-evolving legal environment, perfectly comprehensible and understandable from the complexity viewpoint (Pasztor, 1998).

Optimal regulation, under this approach, depends on the goals of all game participants, and might well vary depending on external circumstance. Generally, a flexible regulation approach that allows for extensions and modifications without undue burdens on the regulated, would be most desirable for those who, like myself, support the creation of wealth. It is advisable to remember, however, that not all of the members of thisCor other societiesCshare the goals and assumptions of neoclassically-trained economists.



(The opinions expressed in this paper are solely those of the author and are not necessarily shared by either the Federal Reserve Bank of Dallas, or the Federal Reserve System.)

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