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The Future of Manufacturing: What is the Role of the Federal Government in Supporting Innovation by U.S. Manufacturers?

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The Competitive Enterprise Institute (CEI) is a non-profit public policy research organization dedicated to individual liberty, limited government, and free enterprise. We appreciate the opportunity to discuss vital policy issues surrounding innovation in science and manufacturing.

Policy dilemmas are common but not necessary on the frontiers of evolving sciences with respect to their practical applications. CEI maintains that competitive approaches to creating "scientific wealth" will be more nimble and effective than political ones at boosting innovation, enhancing consumer well-being and safety, facilitating commerce, and contributing to the rise of an unprecedented prosperity and global competitive prominence for the United States. My written testimony follows.

Separation of State and Economics:
A 21st Century American Manufacturing Stimulus Package

Everyone agrees we still want to make a lot of stuff in the United States of America and create jobs. So what are the prerequisites for prosperity? Mired in recession now, how do we "manufacture' a robust American manufacturing economy?

For starters, we avoid fostering a "Declaration of *De*pendence" on the part of America's most crucial frontier industries.

The purpose of this hearing ("The Future of Manufacturing: What is the Role of the Federal Government in Supporting Innovation by U.S. Manufacturers?") is to examine "the need to adopt innovative technologies and processes" and assess the National Government's role.

The positive message is that most of America's wealth has not been created yet. But to fulfill that optimism, recognizing limitations of politically driven research and development compared to what capital markets and economic liberalization can achieve is vital. Most politicians defend a significant, even pivotal, governmental role. I say instead that when it comes to the creation of knowledge wealth itself, that's a worrisome stance and better alternatives exist.

To go overboard in enshrining Washington predominance in terms of "America COMPETES Act" and "Recovery and Reinvestment Act"-style spending in a sense is taking the easy way out. The latter in particular shirked genuine duties as the nation endured economic upheaval. Instead, there's difficult, important *actual* work for Washington to do. At this vulnerable stage of business, economic, and American history, Washington can't spend money on technology education, science and manufacturing and think it's done any of the work required to reinvigorate manufacturing.

The America COMPETES Act you might reauthorize should be different in kind, not degree. It is now a vehicle for subsidizing various popular education and technology ventures; it instead should removing accumulated impediments to innovation: it should "liberate to stimulate."

"COMPETE"ing Visions:
Let's Avoid Having Government Steer While the Market Rows

The America COMPETES Act is bipartisan, but fifteen years ago the tone was different; Congress sought to reduce government with sweeping proposals like privatizing national labs and curbing business and corporate welfare. Ironically, The National Nanotechnology Initiative signed by President Bush directed about a third of funding to the very Energy Department slated for abolition in 1995.

Aggressive taxpayer funding of scientific and manufacturing research is not compatible with a future of optimally and lightly regulated science and manufacturing specifically, or with limited government generally.

Moreover there are opportunity costs—tradeoffs. Politics cannot determine optimal research portfolios: Why nanotech instead of biotech, or space travel, or bioengineering gills so we can live in the oceans? Or fuel cells and the hydrogen economy? All such rifts are impervious to political resolution. And that's good.

No political party is immune from exacerbating distortions created by politicized science, as politicians channel federal dollars back home regardless of scientific merit. In a sense, the debate over science policy and where to allocate taxpayer resources isn't one over

science policy as such; rather, it's over problems of allocating the spoils artificially created when government (an institution with the power to tax) gets involved in the very production of knowledge itself (and seducing industry), rather than in merely protecting rights in the property that knowledge makes possible. Further, we want to avoid politicized situations like "junk science," "climategate," bubbles created by governmental investment, the undermining of freedom of "research speech" (or of its corollary, withholding one's speech/research).

Today, we see examples of artificially created conflicts rooted in governmental science policy. These disputes include disagreements over:

- The fundamental merit of basic vs. applied research
- The impact of private vs. public funding on discovery and well-being
- The alleged objectivity of government vs. "industry" science and the chastisement of industry science in the marketplace of ideas
- Potential confusions over the ownership or intellectual property status of federally funded discoveries (for example does the Genome belong in the public domain, or are components patentable?)
- Related information commons vs. proprietary views of information; that is, the "information wants to be free" ethic that permeates Internet policy but can threaten scientific endeavors
- Public access to scientific data upon which regulations are based
- The right to not fund science with which one disagrees
- Purported (but often exaggerated) conflicts of interest among federally funded scientists[1]

We need at least some consideration of rising above or stepping outside such seemingly irresolvable policy conflicts. Indeed, there are lessons from other non-scientific areas—such as entertainment intellectual property, financial and privacy debates, and the media ownership debate (where many presume that information can be "monopolized")—that have implications for the science policy debate.

Disconnecting science from the technological gains to mankind in the name of "basic" research can become a misguided passion. Science is likely to advance human welfare and remain most relevant to mankind if it is pulled into being by the actual needs of humanity, including practical ones. There are also stories to tell about how practical R&D led to general "truths" with wider application. Many are aware how the attempt to solve problems in microwave transmission led to discovery of the cosmic f background radiation, helping validate the big bang.

To advance science and manufacturing, it's right for the committee to ask what the federal government should be doing; but rather than run with the implied invitation to

[1] Iain Murray, "The Nationalization of Basic Science: Overzealous Attempts to "Protect" Scientific Integrity will Damage American Science as a Whole, *CEI OnPoint No. 100*, July 21, 2005. http://cei.org/pdf/4696.pdf.

propose spending on scientific endeavors (obviously Washington can't fund them all), Congress should "liberate to stimulate" rather than try to steer research and investment in particular directions. The national government's role in actually fostering "knowledge wealth" is properly limited, but it's role in liberalizing the American economy so that *others* can foster that wealth is of the utmost importance.

I'll probably stand alone in suggesting to you that for the most part, in civil society, "science" is not properly a public policy issue. What fosters fundamental scientific and in turn manufacturing wealth? What made the newborn United States lurch ahead of all the world's economies in only 100 years, including Great Britain? Not the power of taxation and dispensation. The nature of the relationship of the state to free enterprise hasn't changed because our economy has become high-tech. And getting policy right now is arguably more important now than at America's founding; free enterprise is even more crucial to tomorrow's scientific and information wealth than to the paper clips and widgets of yesteryear.

Markets maximize output in tangible products and intangible services. But what we forget is that markets maximize the production of useful information economy-wide—*including scientific information*. It's important for Washington to recognize free markets in knowledge-creation as the source of true and more objective "information wealth" and the resulting advances in manufacturing.

In asking about fostering innovation, we're really talking about what conditions create a better business environment whether we're talking about tangible manufacturing on the other hand the creation of knowledge underlying it.

Anyone can propose a smorgasbord of subsidies to add to the ones already contained in the COMPETE Act; but that shouldn't necessarily be regarded as promotion of science and technology. There's also a bit of the broken window fallacy here: not seen is the science not created by the redirection of resources to this or that temporarily favored project or field. Bolstering manufacturing and science requires vigorous competition among ideas for funding, not a Scientific New Deal. Nor is it optimal for sciences and applications to proceed walled off apart from one another in an appropriations environment; that undermines the swirling competition, cooperation, and "co-opetition" needed for the U.S. economy to surge and to stand up against overseas competition.

So what is the national government's proper role in manufacturing? Promote it? Constrain it? Or leave it alone?

The national government can't be the supercompliant superprovider in an increasingly complex society with tacit knowledge dispersed in countless ways; your outcome-oriented interventions, as opposed to liberalizations that leave outcomes up to the free choices of others, will produce prominent successes, but fail taken as a whole. Interventions, subsidies and regulations create an economy made up of suboptimal commercial entities that don't resemble what they would under free enterprise, and that cannot function as the job engines needed now.

Basically, you don't need to tell the grass to grow, just take the rock off of it. Following the next section on some specific hazards of government steering the market, I'll point to some of the rocks to move; that is, alternative approaches to advancing science and manufacturing that you should implement.

Why Subsidies and Steering Can Mean "Sub-Prime" Technology Policy

Government Steering can create artificial booms

Vigorous calls for government research seem in part a reaction to the tech market downturn and the harshness of America's recession. But one lesson of the telecom meltdown is that government can contribute to the inflation of artificial technology bubbles; we are at risk of a similar "green technology" bubble or conversely inefficiencies right now. For example, Spain's King Juan Carlos University released findings that each "green job" created by the Spanish wind industry cost 4 other jobs elsewhere.)[2]

In another sector, policies may be teeing up another real estate bubble as well. A brand new National Broadband Plan will distort evolution in the crucial field of communications. Forthcoming technologies should be products of capitalism, not central planning, government-favored R&D, and pork barrel. That helps discipline excess.

We don't want a scientific world of researchers chasing politically favored fads and steering their grant requests according to politics, whether biofuels, alleged energy conservation, materials conservation, smart grids, politically favored medical research, or whatever. Eisenhower warned in his 1961 Farewell Address of the risks of researchers designing proposals to link politically fashionable themes. It should worry us that:

> public policy could itself become the captive of a scientific- technological elite…Partly because of the huge costs involved, a government contract becomes virtually a substitute for intellectual curiosity…The prospect of domination of the nation's scholars by Federal employment, project allocations, and the power of money is ever present—and is gravely to be regarded.[3]

Government funding comes with strings attached

Washington passed the bipartisan 21st Century Nanotech Research and Development Act in 2003 to provide nearly $4 billion to establish numerous research grants for nanotechnology initiatives, set up nanotechnology agencies, programs, subsidies, and steer students toward nanotechnology research. Anti-nanotech groups were already lined up in opposition, but federal agencies are positioning themselves to regulate risks of nanotech, not necessarily to the good.

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[2] "The Big Wind Power Cover-Up," *Investor's Business Daily*, March 12, 2010. http://www.investors.com/NewsAndAnalysis/Article.aspx?id=527214

[3] Eisenhower's Farewell Address to the Nation. http://mcadams.posc.mu.edu/ike.htm.

Still another government/business funded report, called "Nanotechnology: a UK Industry View" reaches yet again the same conclusions about nanotechnology as the ones that appear occasionally like the U.S. Environmental Protection Agency's "Nanotechnology White Paper" or the Food and Drug Administration's "Nanotechnology". Such reports uniformly call for open-ended role for political bodies to govern otherwise private endeavors in frontier sciences like nanotechnology.

The reports say–brace for it–that governments should fund nanotechnology and study (endlessly) nanotechnology's risks; and that they should then regulate the technology's undefined and unknown risks besides. Since the business parties can become so dependent on political funding, they go along, cut off from envisioning an alternative approaches either to funding or managing hazards.

Fundamentally, we face the choice of treating frontier manufacturing research, development and production like software and essentially leaving them alone, or of treating them like medical research such that they are regulated at every stage by an entity like the Food and Drug Administration (which may not necessarily foster safety).

Unfortunately, the approach of government steering while the market rows is opposite from the way software is produced and marketed, and assures that there will never be a "Bill Gates of nanotechnology" as CEI's Fred Smith often puts it. That is, if every new nanotechnology advance faces FDA medical-device-style hurdles, this is an industry that cannot begin to reach its potential. Naturally we must defend against risks (and this report will cover approaches shortly), but the strings attached to American frontier sciences' practical applications may move our entrepreneurs overseas, assuming overseas markets don't overtake ours first.

Political failure overwhelms "market failure" in basic research investment

The intellectual case for taxpayer funding of science and favored manufacturing is based on the market failure argument. Supposedly research creates value not easily captured, and rivals can free ride. Some also suggest an investment payback period intolerably distant for market entrepreneurs. The market, it is argued, will under-invest. Of course, everything about competitive rivalry is geared toward compressing that discovery-to-deployment phase.

Part of the problem here is a false dichotomy between basic and applied research. Regardless, price signals are needed to allocate scarce R&D resources to challenges that, if overcome, would most reward innovators, advance human needs, and maximize the rate of technological progress and job creation. The absence of a residual claimant who can garner windfall returns undermines the political appropriations environment, but private investors can rationally invest in a range of low probability projects, counting on the profits from the rare success to offset the many failures (somewhat like the music business).

Besides, Teflon, Tang and Velcro did not spin off from NASA. Memory foam did though.

Politicians can't choose rationally (no offense)

Except when a local earmark or pork-barrel project is at stake, almost any politician will admit that government has no innate ability to pick among competing technologies, particularly using taxpayer money. And government plans operate on an election timeline that doesn't conform to market needs; A current example, the Federal Communications Commission's "National Broadband Plan" was presented to Congress March 16, 2010, but it has little chance of going anywhere this year, [4] yet creates damaging uncertainty in the industry about what will or won't happen. Making America's precious scientific and manufacturing resources subordinate to such a process is sub-prime public policy to say the least.

Politicians cannot assign rational priorities to the endless parade of "significant" projects, thus will select popular ones benefitting local constituencies; just note the continuing funding of new libraries in the digital age (as opposed to just handing out wireless-enabled laptops), new Post Offices, elements of the just-noted National Broadband Plan, the Nanotech Initiative, recent jockeying over tech programs for rural small businesses, and so on and on. Scientific merit may be underwhelming, but the rhetoric of science and technology are assured.

The hazards of a government appropriations process and the accompanying beehive of lobbying for sub-optimal projects are numerous. And expensive. Consider the Superconducting Supercollider. Or the Space Station (recently called "scientifically worthless"). In the space program, entrenched contractors and legislators from flight-center districts enjoy cost overruns, and lobby against cheaper unmanned flights. An ethic of revolutionizing space flight becomes unthinkable, and is a lesson for future technology implementation.

International competition is not zero sum

Sometimes politicians will bolster the market failure argument and urge national government investment by characterizing technology as a race against other nations that we stand to lose.

Experience suggests foreign investments like supersonic airliners and before-its-time high definition TV can be turkeys as easily as some U.S. domestic boondoggles.

But more importantly, we all benefit globally when countries find more efficient ways of producing some good or service. Viewing such gains as losses is to revert to the old mercantilist idea that international trade and commerce are like war.

Besides, a better way to deal with this particular concern of overseas competitors is for our policy to allow more of the world's best and brightest to become American citizens and entrepreneurs. As CEI analyst Alex Nowrasteh put it in a recent *Detroit News* column, "Either businesses will move to the talent or the talent will move to where the opportunities are. What movement occurs depends on immigration, trade, and other

[4] http://www.pcworld.com/businesscenter/article/191438/fccs_national_broadband_plan_whats_in_it.html

regulatory regimes. Generally, all else remaining equal, it is far cheaper and more beneficial to all concerned when talent moves toward opportunities."[5]

Taxpayer Funding Misdirects Resources

Markets have to be good at killing bad projects as well as creating new ones to prosper,[6] but appropriations processes are less capable of systematic pruning. The problem with government science is that virtually all interested parties seek to grow government rather than pull the plug on exhausted ill-considered projects, from tiny ones to the gargantuan like the space station, shuttle or the supercollider. The result is higher taxation and dollars directed to multiplying unchosen ends. Science resembles any other rent-seeking interest in this respect. In an examination of testimony before congressional panels, nearly all ask for more money, not less, and the ratio was hundreds seeking growth to one asking for less government.

Expansion of government-funded science doesn't help anyway if the metric is the proportion of a nation's GDP devoted to R&D. Research by scientist Terence Kealey suggests both that the private sector funds basic research out of competitive necessity in a global economy, and that total R&D expenditures tend to correlate to GDP rather than to particular national policies.[7] That is, where government R&D is low, the private sector simply invests more. Higher GDP begets higher R&D, in other words. Substitution and tradeoffs mean taxpayers gain little from increased political R&D, and may lose a lot because of the inefficiencies, sub-par policy and anti-competitive political choices. (See **Appendix I** for a summary of some of Kealey's findings and other bullets about government science funding.)

Taxpayer funding can create a glut of or the wrong kind of graduates

The COMPETE legislation is not alone in proposing higher numbers of technology graduates; another is the recent cybersecurity legislation. But if the market needs them, higher salaries will draw people to the application-specific training actually required. Creating a premature government-sponsored glut of Ph.D.s in this or that technological field is not the same as actually advancing useful knowledge sought in the marketplace. America's companies don't need Ph.D.s as such, they need knowledge, which in the Internet age materializes in ways unrelated to brick and mortar universities' offerings or to subsidies. It also appears that government funding may have potentially detrimental impacts on scientists' salaries (Appendix I)

Taxpayer funding artificially complicates intellectual property disputes

Other complications involve patent ownership disputes between university and corporate collaborators over who controls future profits, the rights of taxpayers to the spoils, and access to research results or data for competitors or the public. Examples are disputes

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[5] Alex Nowrasteh, "Let Immigrants Power America's Scientific Progress," *Detroit News*, December 2, 2009.

[6] Auren Hoffman, "To Grow a Company, You Need to Be Good at Killing Things," *Summation*, February 21, 2010. http://blog.summation.net/2010/02/to-grow-a-company-you-need-to-be-good-at-killing-things.html.

[7] See, for example, Terence Kealey, "End Government Science Funding," Cato Institute, April 11, 1997. http://www.cato.org/pub_display.php?pub_id=6168.

over the ownership status of genetic discoveries or basic molecular information, the current controversy over access to source data underlying predictions of global warming models (so-called "climate-gate"). Pharmaceuticals routinely face compulsory licensing threats globally. Taxpayer funding as such assures similar vulnerability for other frontier sciences.

Nanotechnology, biotechnology and other "information wealth" fields arise against a backdrop of disputes in seemingly unrelated fields that nonetheless should set off alarms, such as the open source vs. proprietary debate surrounding software. Even entertainment—online music—faces calls for compulsory licensing, when digitization itself has undermined the very "market failures" that led to compulsory licenses in the first place. Property rights are also vulnerable in the so called "net neutrality" debate, by which some hope to outlaw proprietary business models altogether in favor of compulsory "openness" on communications networks. Taxpayer funded science and manufacturing are inescapably vulnerable in this environment. Congress must recognize that while we had a John Locke for the tangible property, industrial age, we regrettably lack one for today's information and knowledge-economy age.

One answer to the question raised in this hearing, "What is the Role of the Federal Government in Supporting Innovation by U.S. Manufacturers?" is that we urgently must legitimize the private-property status of new forms of wealth, and not pursue policies that delay these underlying institutional innovations.

Taxpayer funding may confront a "Regulatory Bias Problem"

The Regulatory Bias Problem occurs when agencies' charters encourage them to consider only certain risks or certain benefits. As CEI president Fred L. Smith Jr. has pointed out in past testimony, DOE and EPA both view energy efficiency as a "good thing" rather than one of multiple product features. But a less safe energy efficient car may be a "bad thing." Inadequate attention to research on the unintended consequences of funding and overregulation impacts technological evolution.

Substituting Government Funding For Competitive Discipline Can Undermine Safety

Policymakers rarely can admit it, but their "safety" regulation can undermine safety.

That's a problem, because "undiscovery," or abandoning even the riskiest scientific research is likely out of the question. Bans will be ignored in a global environment, as failed cryptography bans and spam laws and overseas (and likely domestic) efforts to clone demonstrate.

Government can exacerbate risks of new technologies. An appropriations environment can send technology lurching in non-market directions (again like the broadband plan), all subject to future political rug-pulls. Meanwhile while political funding comes with strings attached on the one hand, it can indemnify companies for the hazards they create on the other. Homeland security technologies like gas masks for example, can be indemnified in the event they fail.

Free enterprise actually can do a better job regulating risk. In normal markets, before your nanotech company (for one example) can attract investors and get off the ground, disciplinary institutions like liability and insurance have to accompany you; One must satisfy capital markets, insurers, upstream business suppliers, horizontal business partners and institutional buyers, downstream business customers, investors, consumers, public and global markets. Markets and capitalism should, and do, bring highly risky products forth (financial instruments, electricity, new forms of energy, behavioral advertising, cybersecurity for sensitive-information networking, emergent low-earth-orbit space touring); but government promotion, subsidies and indemnification can short circuit the risk-mitigating disciplines that must emerge alongside.

Dangerous, uninsurable ventures rightly scare off investors. But government domination of risky, but promising frontier research can take it out of the realm of insurability and an otherwise impossible appearance in the marketplace, and even provide immunity. The Price Andersen Act artificially limited the liability of nuclear power plants but meant total regulation. Would a more market-oriented development path have made nuclear power more viable over the past decades? We may never know.

Today's military and homeland security emphasis for technologies has significant implications for the evolution of and for the public policy stances taken new technologies. Homeland security legislation indemnifies companies from liability when their "security technologies" fail. Taken too far, liability markets in crucial areas may never emerge. But in a healthy marketplace, liability coverage and product certification will likely flourish contingent upon adhering to guidelines demanded by many stakeholders.

We want the defensive mechanisms to emerge, as well as appropriate professional ethics regimes, but the way we choose to fund frontier scientific fields will impact safety and the prospects for competitive discipline as well as the horizon available to engineer counterbalancing technologies to offset any risks that emerge. Market "regulation" or competitive discipline is quite demanding. If nanotechnology (for example) introduces a risk of "gray goo,"[8] the competitive disciplines arrayed against it can constitute "blue goo," or a policing mechanism. Government dominance can give our most promising new industries an undeserved black eye, and guarantee counterproductive regulation and less innovation.

Moving the Rocks So the Grass Can Grow
"COMPETE" by Separating State and Economics

We need an agenda for strengthening private manufacturing that offers specifics on separating state and economics. This includes the obvious, like systematically evaluating and reducing tax and regulatory burdens. It also means thinking about how it was that the U.S.—only 235 years old—became richer than the rest of the world in a historical eye-

[8] As for the "gray goo" catastrophe scenario of runaway "nanobots," it's not compelling since in every other instance environmentalists say an organism needs an eco-system to survive. The scenarios are silly, and moreover there's no shortage of proposed solutions to the problem were it genuine.

blink; and how that remarkable achievement can be sustained as other nations embrace institutions of liberty and create ever-competitive markets.

"Doing something" is not the same as just spending money. When linking research to human needs and promoting manufacturing wealth, capital markets trump the appropriations process. Interestingly, adding up the dollars in the COMPETE Act, seems to total perhaps a few billion. But the gains from removing barriers to private research could yield far greater benefits. Emphasizing spending stimulus for science and manufacturing has strings attached, invites rent-seeking and can have a detrimental impact on safety. Government's proper stance is one of indifference or neutrality, since *many* technologies, some not in existence yet, will always compete for scarce investment dollars. A better approach now is to *"liberate to stimulate."*

It was noted earlier that that Congress has a far more important job to do that it can't escape by sprinkling cash on the technology sector. As discussed in *Still Stimulating Like It's 1999*,[9] there exists a natural tendency toward recession when government fails to perform its "classical" function of ensuring that prices of materials, labor and other inputs aren't hoisted above market clearing levels by rent-seeking behavior in the economy.

The job now is to liberalize, to perform the actual job of removing impediments that hobble wealth creation, in particular in science and technology. Borrowing from Friedrich Hayek in "The New Confusion About Planning," the issue is not whether industry has to be regulated, or "planned." Rather, the question is who will do that planning; the right approach is to unleash competitive discipline. Suggestions follow.

First, Avoid Picking Favorites Among Technologies

As CEI's Fred Smith points out, in the federal R&D sweepstakes, bolstering promising technologies has been compared to efforts to improve the speed records at a racetrack by picking the R&D horses to run. However the condition of the track and the rewards available also matter. Faster speeds might also be had by improving the track, the business and regulatory environment, and by letting jockeys keep more of their earnings.

The government-picking-technologies model undermines economic liberty, innovation, wealth creation, "national competitiveness" (the ever-present rationale for government R&D) and consumer benefits, and is itself a source of risk. Many have argued that viable technology doesn't need a subsidy, and non-viable technologies probably can't be helped by one. Otherwise, we are distorting markets, creating bubbles, and teeing up future rippling recessions. Rather than picking the winning horses (or worse, actually *being one* of the horses), government's legitimate role is to improve the track on which all the horses run; that means liberalizing the tax and regulatory environment within which entrepreneurs operate, for starters.

Interestingly, when the Wright Brothers made their historic flight, their rival was Samuel Langley's War Department-funded, "Aerodrome." He was catapulting the thing out over

[9] http://cei.org/cei_files/fm/active/0/6425.pdf

the Potomac river. The Wrights ran a *bike shop*, but it became a state of the art aeronautics lab.

Frontier scientific manufacturing fields are plainly viable on their own, moving forward on fronts too numerous to catalog. To approach the matter otherwise is an impediment.

Minimize Tax Burdens and Implement Rational Tax Policy

Other commentators routinely address tax burdens. This report focuses instead on the regulatory environment, which policy more often tends to ignore. Nonetheless, accounting standards that treat R&D as an investment to amortize, rather than an immediate expense, can be a deterrent to non-governmental basic research that Congress should evaluate. (Tax credits would be a poor substitute because they amount to picking among technologies.)

Allow freer "trade" in skilled labor in the US

As noted briefly before, many knowledge workers want to move to the United States and create companies and jobs, or want to stay after being educated here.

Avoid Safety Regulation that Makes Us Less Safe

As Henry Miller of the Hoover Institution explained, "A regulator can approve a harmful product, or delay a beneficial product. Both outcomes are bad, but regulators are attacked by the media and politicians only approving a harmful product. Delaying beneficial ones is a non-event."

Biotech, nanotechnology and other frontier sciences introduce risks but can also mitigate them. We should care about this not merely because of the fact that wealth is enhanced by keeping precaution in perspective, but because the precautionary principle is itself a hazard; moving forward has risks, but so does stagnation. For example, rather than being the asbestos or "gray goo" of tomorrow, nanotechnology could be an input to make our environment cleaner. Most agency studies emphasize the hazards of nanotechnology; they should study the hazards of *regulation* and the hazards of government funding hobbling the industry as well.

As described before, the drive to regulate safety isn't only undermining wealth creation in frontier science and manufacturing, but also threatening the emergence of needed safety and disciplinary practices. It's important to avoid safety regulation that either inadvertently or deliberately preempts superior competitive discipline.

Liberalize Capital Markets

While it doesn't enjoy the reputation for it, capitalism is among the greatest democratizing forces in the world. The corporate structure that emerged to spread risk in the days of sailing ships is now a system of spreading of ownership of companies to millions of citizens; the miracle of the fact that people unknown to one another can work together to create unprecedented wealth is one of the great advances of the millennium.

Recent regulation in the wake of the Enron and WorldCom scandals has impacted smaller entities in unfavorable ways. While it did not pass late last year, the "Wall Street Reform and Consumer Protection Act of 2009," would have rolled back at least one of the excesses of Sarbanes-Oxley financial regulation impacting small public companies.

In a media advisory, the Biotechnology Industry Association praised two provisions: one would have permanently exempted companies with market capitalizations below $75 million from the SarbOx Act's Section 404(b) internal control requirements (which the Obama administration supported along with most Republicans and 101 House Democrats. The other provision would require an SEC study examining SarbOx compliance costs (and benefits) for companies with floats below $700 million and revenues under $250 million. Despite the bipartisan criticism of that legislation, no reforms for small business relief have yet passed.

Nor were the relaxation provisions a part of the Chris Dodd financial reform bill under consideration this March, but it could be offered as an amendment.

Privatize: (Remember That?)

One aspect of liberalization is privatization of federal research facilities, which itself would remove constituencies for government funding. Of course the America COMPETES emphasis is on government spending rather than privatization. During the 1990s, it was proposed that essential military aspects of federal labs be transferred to the Department of Defense, while commercial aspects should be privatized by offering them to the industries they supposedly benefit or by allowing research staffs to take them over via an employee buyout approach. Such options should be discussed more than they are.

Award "Prizes"for the time being

Privatization of federal research is a hard sell when the topic at hand is public funding expansion. Perhaps one approach is to forbid federal funding for technologies that do not yet exist, and grow out of the problem. In any event, a worthy idea noted in the discussions surrounding the America COMPETES Act is that of awarding prizes, the idea being that "Payment to researchers would reward accomplishments rather than promises."[10]

The idea is an appropriate one to consider in transitioning to a more privately funded regime and will be (and is) attractive to foundations. But why did grants take over prizes—which used to be prevalent—in the past?

> The answer appears to be the power of patronage. Research by Robin Hanson when he was at UC Berkeley suggests that during the 19th century, scientific societies that had collected money from bequests to distribute as prizes realized that they had much more power over the direction of scientific research if they distributed the money as grants instead. So they could finance favored scientists and preferred research directions, something that genuine prizes would not

[10] See Iain Murray, "A Wall of Separation Between Science and State," *Competitive Enterprise Institute*, October 19, 2006.

> allow....All of which suggests that scientific bureaucrats knew exactly what they were doing when they moved from prizes to grants.[11]

Enlarge regulatory flexibility to bolster small business

Congress can't manage and deal with the regulatory burden that undermines innovation if it doesn't measure it, so should regularly consider how regulations mount as a small firm grows. Especially in today's economic recession, it's important to inventory all the regulations that impact a small business as it grows, and look hard at rollbacks (See **Appendix II** for a draft chart of how regulations mount as a firm grows).

Relatedly, Congress could boost a more ambitious "R3" program (Regulatory Review and Reform) at the Small Business Administration's Office of Advocacy[12] to give entrepreneurs an avenue to protest onerous rules pouring out of more than 60 agencies.

Avoid New Regulatory Mandates in Service and Manufacturing Sectors

The challenge is to foster the creation of scientific and manufacturing wealth. Research and manufacturing do not happen in a vacuum, and all our communications and critical infrastructure impact the educational, scientific and manufacturing concerns at issue in the America COMPETES Act. To that end, Congress should avoid such sweeping policies as cybersecurity mandates that threaten infrastructure investment, avoid the likes of the new "National Broadband Plan," and avoid "net neutrality" mandates that either inappropriately influence funding decisions or dictate business models. New health care legislation likewise will inevitably affect the ability of firms to invest in research.

Liberalize the Nation's Communications Networks and Infrastructure

Innovation like basic research itself doesn't proceed in a vacuum; sectors inform and enrich one another, making it advisable to tear down regulatory silos artificially separating our great infrastructure industries wherever possible so that knowledge, ideas, products and collaboration flow more freely.

Maximizing infrastructure wealth creation--communications, transportation, energy, electricity, water and so on—bolsters the manufacturing sector that depends upon it all (as well as consumer well being). Here are a few steps Washington could implement:

- With respect to broadband deployment, declare "net neutrality" permanently off the table; announce that proprietary networks and investments will not be subjected to forced sharing and price controls, only voluntary agreements and alliances.
- Remove exclusive franchises that make it illegal, not difficult, for firms to compete with incumbent electric companies. Right now, it's illegal to run an extension cord across the street.[13]
- Establish an aggressive campaign to liberalize network and infrastructure industries, which are now artificially segregated into regulatory silos (telephone, electricity,

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[11] From Iain Murray, "Patronizing Science," National Review Online's Corner, September 24, 2007. http://corner.nationalreview.com/post/?q=Yzg0MThlYzFlMDA1MjY0NGM2NjlhOGM2ODQ0YzhiNjk=

[12] http://www.sba.gov/advo/r3.

[13] See Wayne Crews, "The Free Market Alternative to Mandatory Open Access," *Electricity Journal*.

water, sewer, cable, railroad, airline, air traffic control). This would create opportunities for them to work together and *jointly* invest in new power lines, fiber to the home, roads, bridges, airports, toll roads and more, and boost industries that depend upon them.

- Relax antitrust so that firms within and across industry sectors can combine and create business plans to bring capitalism and infrastructure wealth creation to the next level (described further in the following section).
- Liberalize spectrum and secondary markets in it such that wireless wealth is freely created apart from regulators.

Relax Counter-Productive Antitrust Laws

President Obama has suggested a desire to boost antitrust enforcement.[14] That's unfortunate. Antitrust can be a highly predatory anti-business and anti-consumer phenomenon.

Today, many universities and scientific centers pursue parallel research. In an alternative setup, innovators might pool efforts, and in so doing be a better target for VC investment with sophisticated profit sharing agreements. Such approaches may be hampered by government domination.

A recent *Financial Times* article noted over 800 research institutes involved in nanotehnolgoythe UK alone. What this reveals is an industry crying out for consolidation into perhaps a few large-scale research enterprises. Thus, antitrust liberalization obviously might occur to observant political authorities, for example, but you may rest assured that it likely has not. The same government-steers-while-the-market-rows approach dominates in the U.S.; nanotech funding is spread out not always according to market pressures, but across dozens of congressional districts.

The antitrust laws remain a significant barrier to a flowering of cooperative business efforts and private R&D. It is precisely in tech industries that private standard setting, joint research and risk sharing arrangements are most likely to overcome alleged market failures in basic research output. Yet some would block such arrangements, as well as mergers among firms engaged in like research. While vertical mergers are accepted, this sentiment should be extended to horizontal mergers or "collusion" that could bolster frontier research. Markets require competition, sometimes merger, and sometimes merely the kind of cooperation or "partial merger" often miscast as damaging collusion.

Through artificial constraints and interference, antitrust sends our great, productive firms into directions the market never intended, hobbling entire industry sectors. Antitrust vetoes market decisions and subdues enterprise by keeping it fearful. That destroys the very process of wealth creation itself. The misallocation of time, talent and resources, and wealth destroyed over the years by antitrust, is difficult to envision.

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[14] http://www.nytimes.com/2009/05/12/business/economy/12antitrust.html?_r=1&adxnnl=1&adxnnlx=1268514088-MohE/8/mpcqIAEXJNqJ1JQ.

No firm is "larger" than the rivals, upstream suppliers, downstream business customers downstream purchasers, partners, consumers, Wall Street, advertisers, future competitors, global competitors media watchdogs, trade press, local-national-and-global capital markets. All of these discipline behavior, arrayed against the firm if it misbehaves.

Antitrust deprives the marketplace and consumers of the otherwise necessary competitive responses to the presumed monopolist's actions by these entities. Such short-circuiting of the frenzy of large-scale free enterprise causes economic disruption on a level a single firm could never do. Other ways to discipline errant market behavior include reinvigorating the market's own forces like hostile takeovers, the private "market for corporate control,"[15] that government itself in some instances has neutralized.

No "monopoly" is as large as the government. At a time when the economy needs stimulus we should not distract the wealth-creating sector's attention with artificial hindrances to growth rooted in smokestack era law.

Emphasize Rational Intellectual Property Policy

Give thought to the property rights regimes best suited to sustain wealth creation.

Government funding of research will increasingly present intellectual property dilemmas, such as calls for "open access" to either the data used in the conduct of research, or to the rights to the intellectual property underlying the fruits of the research, or use of the product itself.

Industries and companies seeking government funding of their pet projects would best reconsider. In an era in which so much new research in frontier scientific fields is government funded they should pause to consider that they are undermining their own chances at self-protecting their intellectual property, and are creating an environment for global "compulsory licenses" of sorts. Future hearings should address alternatives to compulsory licensing, and address the hazards to monitor regarding ownership status of government funded research. Ray Kurzweil testified that "The golden age of nanotechnology …will bring us the ability to essentially convert software, i.e., information, directly into physical products." If the product is the Ferrari he mentioned, we definitely want to get this policy right.

Public funding also creates often-needless conflict of interest disputes when government scientists interact with private ones. See "NIH Bans Collaboration With Outside Companies"[16] for example.

Public funding reintroduces the conflict between those who favor an "information commons," and those who feel information might best remain proprietary. The "information commons" approach is already leading to compulsory licensing calls in entertainment—movies and music—so it's a guarantee that open access will be

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[15] http://papers.ssrn.com/sol3/papers.cfm?abstract_id=244158.

[16] Rick Weiss, "NIH Bans Collaboration With Outside Companies: Policy Comes After Conflict-of-Interest Inquiry," Washington Post, September 24, 2004; Page A23.

demanded with respect to the genome, biotech, nanotech, pharmaceuticals, space science. If that occurs, even those who shun government money will not be immune to threats to their intellectual property. In our mixed, highly taxed and regulated economy, it's easy for anyone to claim that all research is subsidized in some way, leading to ever more public access, and a decrease in willingness to undertake research.

In certain respects public access to government data is appropriate (when that information is used to regulate, for example) but as a rule, that inclination is too sweeping, and we need to consider the broader implications; we need a different, more complete vision that cuts across issues, that warns of the downside of any expectation of automatic public access to research data.[17]

The ethic of public access sounds appealing and it is, but there can be downsides. Properly construed, in the productive economy, proprietary models can serve to increase the amount of information created more than open, non-proprietary ones do. In the productive sphere, all government needs to do is permit open access to information for those who prefer to operate that way (consider the case of open source software), but leave room for other business models too. Sometimes people and companies keep "secrets," and there's nothing sinister about their doing so, and it's ultimately good for basic research and for mankind, and others can reject their results.

It's one thing for policymakers to be reluctant to extend legal intellectual property protections; but for data and results to *automatically* belong in the public domain, to even forbid private intellectual property protection, seems to be the ultimate end of some points of view. (In entertainment, for example, full-blown opposition to copy protection technology is seen as a normal viewpoint.)

Open access policies are, of course, almost impossible to avoid when government is funding the science. Transparency is critical when government is involved since government does not rely on voluntary arrangements. Thus, the analytic basis for, say, air pollution regulations should be available. In contrast, no one should be able to demand that a scientist disclose the recipe for Red Bull.

Sunset Regulations and Implement a Regulatory Reduction Commission

More than 60 departments, agencies and commissions issue some 4,000 regulations a year in thousands of *Federal Register* pages, all of which are documented in *Ten Thousand Commandments: An Annual Snapshot of the Federal Regulatory State*.

Costs of regulations run at an estimated $1.2 trillion annually. Congress should implement a bi-partisan "Regulatory Reduction Commission" to survey existing rules and assemble a package to eliminate with a straight up-or-down vote, no amendments allowed.

[17] For a related debate see James Robinson, "MPs to call for free online access to science journals," July 11, 2004. http://politics.guardian.co.uk/news/story/0,9174,1258849,00.html.

Halt Regulation Without Representation" by Requiring Congressional Approval for Major Business Regulations

Of the 4,000 annual regulations, 100 plus are "economically significant." Rather than the current "resolution of disapproval" process, these rules should require an expedited congressional approval before they are effective. Apart from the competitiveness and innovation issues that concern the COMPETE Act, the delegation of legislative power to unelected agencies has long been something needing attention. We should continue to challenge delegation of legislative authority from Congress to agencies, and at least require congressional fast-track approval before major or significant non-quantifiable agency-promulgated regulations take effect.

Perform Basic Deregulatory Housekeeping

A difficulty is that the specific regulatory programs under each agency also have cheerleaders that make it difficult to reform. So in the meantime, freezes, purges and the like should be actively pursued; those can be based on gleaning better information about just what it is that the dozens of agencies are up to.

Performing government's proper task of liberating economic enterprise instead of spending stimulus requires tasks like the "move the rock" policies noted above; but also basic annual procedures, monitoring and housekeeping like the below are part of maintaining rational policy:

- Re-discover federalism, that is, circumscribe the federal role regarding investment and regulatory matters best left to states and private enterprise. Congress should look at what federal government does that it could eliminate, or that states could do instead to provide a manufacturing boost.
- Improve the ethic of quantifying regulatory costs, and selecting the least-cost compliance method.
- Codify President Clinton's executive order on "Regulatory Planning and Review" (E.O. 12866), or, Reagan's E.O. 12291 which provided for more external review.
- Require OMB's Regulatory Information Service Center to publish number of major and minor rules produced by each agency, and strengthen its oversight.
- Reinstate the *Regulatory Program of the U.S. Government*, which formerly appeared routinely as a companion document to the Budget.
- Declare *Federal Register* notices as insufficient notice to small business
- Hold hearings to boost the scope of the Small Business Administrations' "r3" regulatory review program.
- Lower the threshold at which a point-of-order against unfunded mandates applies.
- Implement a supermajority requirement for extraordinarily costly mandates.
- Lower the threshold for what counts as an "economically significant" rule, and improve explicit cost analysis.
- Explore, hold hearings on, and devise a limited "regulatory budget."
- Establish an annual Presidential address or statement on the state of regulation and its impact on productivity and GDP.
- Sunset regulations after fixed period unless explicit reauthorization is made.

- Require that agencies calculate Costs, but not benefits, which Congress should have considered already
- Create new categories of major rules to improve analysis
- Publish data on economic and health/safety regulations separately
- Disclose transfer, administrative and procedural regulatory costs
- Explicitly note indirect regulatory costs
- Require agencies and the OMB to: (1) Recommend rules to eliminate and (2) Rank rules' effectiveness
- Create benefit yardsticks to compare agency effectiveness

Issue and Act Upon a Annual Regulatory Report Card to Accompany the Federal Budget

In attempting to implement economic liberalization for the wealth creating sector, a "Regulatory Report Card" should be part of the basic housekeeping just noted.

Regulatory Report Card …with 5-year historical tables…

- Total major ($100 million-plus) rules and minor rules by regulatory agency
- Numbers/percentages of rules impacting small business
- Numbers/percentages featuring numerical cost estimates
- Tallies of cost estimates, with subtotals by agencies and grand total
- Numbers and percentages failing to provide cost estimates
- Federal Register analysis: Pages, proposed and final rules by agency
- Most active rule-making agencies
- Rules that are deregulatory rather than regulatory
- Rules that affect internal agency procedures alone
- Numbers/percentages required by statute vs. rules agency discretionary rules
- Rules for which weighing costs and benefits is statutorily prohibited
- Detail on rules reviewed by the OMB, and action taken

If Taxpayers Do the Funding, Let Taxpayers Call the Shots

Other people have goals that are just as legitimate as those with the wherewithal to get representation by lobbyists in Washington or to appear at a hearing. We don't always hear their voices. My Cato Institute colleague Tom Miller put it best when asked by tech reporter about federal nanotech funding: he said, "I suggest giving them nanodollars."

In proposing an end to the Advanced Technology Program years ago, Michael Gough offered a real test of taxpayer support: "Let the government give taxpayers who want to invest … a deduction from their income …[and] share in any profits that flow from it. That's what taxpayers get from private investments. It's not what they get [when government] takes tax money…and invests it in private enterprise."

In Conclusion, Compete for Real

As sometimes noted, occasionally the problem with research isn't market failure but the failure to have markets.

This call for reassessment coincides with many months of recession. The bold political action and genuine leadership needed in a crisis today is different from what's going on. Indeed, the political price can be too high for election-bound lawmakers or career politicians to entertain non-governmental recession recovery.

As Friedrich Hayek pointed out, the politicians blamed during a bumpy transition to something closer to laissez-faire will be the ones who stop interest-group benefits, stop labor union benefits, or stop the inflation, stop the mal-investment created by earlier government interventions and favoritism, and so on—not the ones who started those costly processes decades ago. Instead, government proposes to spend a great deal of money, but leave all these interventions in place and add more besides, cementing a national government "role" in science and manufacturing.

Real stimulus, that of comprehensive liberalization of a fettered economy, requires perhaps unpalatable changes in what people expect from government now that they've come to depend on what it redistributes. That's a seemingly intractable problem, and I'm not sure the country can recover from it—but leadership would require making the attempt. So, again, political reality prevents halting the compounded economic damage that artificial stimulation and financial "bailouts to nowhere" promise to deliver. Political reality tends to prevent the separation of state and economics.

Markets and capitalism manage risk and generate wealth; our shortfall is often to have too little capitalism and free enterprise, properly understood, not too much. Unfortunately that lesson isn't being learned, and the ability to reinvigorate the disciplinary institutions of capitalism diminish by the day as governments assume greater control and powers over important economic sectors like science and technology that will be difficult, if not impossible, to wrest from them. Another Contract with America may or may not be welcome, but a handshake in deference to free enterprise would go a long way today.

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APPENDIX I

Terrence Kealey* and others on Government R&D

Prepared by Roger Abbott, research assistant, CEI

Government funding is UNNECESSARY:
Industry has an incentive to fund pure & applied research: Nelson / Arrow argue that industry will not fund basic science, because it cannot capture all of the benefits accruing from their investment. Kealey refutes this by arguing that aside from the protections offered by IP law, efforts to assimilate new technological development are expensive and require industries to fund pure research. "It takes years of training before a scientist can read research papers properly and understand their implication for the future. It takes hours, every week, to read all the new research papers, to assimilate them and to integrate them into a future research strategy… To retain good scientists, therefore, companies – essentially – bribe them with laboratories, money and the freedom to publish, much as a company pays lawyers' fees."

Government funding is HARMFUL:
"Politicians are poor judges of commercial opportunity, generally lack the necessary expertise, and are unduly influenced by short-term political considerations."

- Wrong Incentives result in waste. Large projects, therefore, are frequently awarded as pork barrel grants (regardless of actual need), or out of a nationalistic fear of "falling behind" other governments in funding science.
- Politicians have historically been inept at judging commercial opportunity, as the heady pace of technological development frequently renders grandiose projects redundant before they are even completed. As Kealey points out, European governments wasted huge sums of money in the early 1990s to improve domestic electronic manufacturing: e.g. Alvey and ESPRIT, include BRITE/EURAM, COMETT, COST, EUREKA, MONITOR, RACE, SPRINT, Telematics and VALVE.
- Government funding unreliable: Finally, it is risky for scientists to stake their careers on government projects that could easily be killed by politicians, either due to low revenues or to some other political whim. For instance, in 1993, Congress suddenly cut the Superconducting Super Collider (SSC) project. "This project, which had already consumed $2B of its $11B budget, employed 2000 scientists and engineers who, on 21 Oct 1993, were given just 90 days' severance pay – insulting treatment." [Kealey]
- Scientists waste thousands of hours filling out grant applications: e.g. within two months of the passage of the stimulus bill, 21,000 applications had been made for stimulus funds. Due to the complexity of the process (each lengthy application is judged on a 41-point scale), an average application takes three reviewers twelve hours to consider. http://blogs.sciencemag.org/scienceinsider/2009/06/nih-feeling-ove.html
- Grant process awards networking skills / encourages patronage, rather than rewarding results. This argument is convincingly made by Robin Hanson, who highlights the nexus between government centralization, the use of grants rather than prizes, and the rising importance of patronage ties.
- Taxpayer funding crowds out private funding by reducing the availability of capital / increasing the tax burden on companies, and creating an incentive for companies to "fish" for cheap research by building ties with universities (e.g. relying on cheap post-docs) rather than funding their own. Kealey points out that this trend results in much lower wages for scientists.

* Terence Kealey is professor of clinical biochemistry at the University of Cambridge, England, and author of The Economic Laws of Scientific Research.

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APPENDIX II

FEDERAL WORKPLACE REGULATION IMPOSED ON GROWING BUSINESSES
(Draft—Wayne Crews/CEI)

**Assumes non-union, non-government contractor, with interstate operations and a basic employee benefits package. Includes general workforce-related regulation only. Omitted are important categories such as environmental and consumer product safety regulations, and regulations applying to specific types of businesses such as mining, farming, trucking or financial firms.*

ONE EMPLOYEE
-Fair Labor Standards Act (overtime and minimum wage [27% min. wage increase since 1990])
-Social Security matching and deposits
-Medicare, FICA
-Military Selective Service Act (90 days leave for reservists; rehire discharged veterans)
-Equal Pay Act (no sex discrimination in wages)
-Immigration Reform Act (eligibility must be documented)
-Federal Unemployment Tax Act (unemployment compensation)
-Employee Retirement Income Security Act (standards for pension and benefit plans)
-Occupational Safety and Health Act
-Polygraph Protection Act

4 EMPLOYEES: ALL THE ABOVE, PLUS
-Immigration Reform Act (no discrimination with regard to national origin, citizenship, or intention to obtain citizenship)

15 EMPLOYEES: ALL THE ABOVE, PLUS
-Civil Rights Act Title VII (no discrimination with regard to race, color, origin, religion, or sex; pregnancy-related protections; recordkeeping)
-Americans with Disabilities Act (no discrimination, "reasonable accommodations")

20 EMPLOYEES: ALL THE ABOVE, PLUS
-Age Discrimination Act (no discrimination on the basis of age against those 40 and older)
-Older Worker Benefit Protection Act (benefits for older workers must be commensurate with younger workers)
-COBRA (continuation of medical benefits for up to 18 months upon termination)

25 EMPLOYEES: ALL THE ABOVE, PLUS
-Health Maintenance Organization Act (HMO Option required)
-Veterans' Reemployment Act (reemployment for persons returning from active duty, reserve, or Nat'l Guard)

50 EMPLOYEES: ALL THE ABOVE, PLUS
-Family and Medical Leave Act (12 weeks unpaid leave or care for newborn or ill family member)

100 EMPLOYEES: ALL THE ABOVE, PLUS
WARN Act (60-days written plant closing notice)
Civil Rights Act (annual EEO-1 form)

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APPENDIX III

BIO and Selected Writings

Clyde Wayne Crews Jr. is vice president for policy and director of technology studies at the Competitive Enterprise Institute and a former Cato Institute scholar. He is widely published and a frequent speaker at venues ranging from the DVD Awards in Hollywood, to the European Commission, to the National Academy of Sciences, and has testified before congressional committees on various policy issues. Wayne is a dad of four, can do a handstand on a skateboard, and loves his custom motorcycle.

Wayne's work explores the impact of government regulation of free enterprise on individual liberty, rights and innovation: Areas of interest include antitrust and competition policy, safety and environmental issues, and information age concerns like privacy, online security, broadband policy, intellectual property and frontier sciences.

Wayne is the author of the popular *Ten Thousand Commandments: An Annual Snapshot of the Federal Regulatory State*, and he co-authored the recent reports This Liberal Congress Went to Market? a Bipartisan Policy Agenda for the 110th Congress and Communications without Commissions: A National Plan for Reforming Telecom Regulation. Prior to the assorted government bailouts, he wrote the report Still Stimulating Like It's 1999: Time to Rethink Bipartisan Collusion on Economic Stimulus Packages.

Wayne is co-editor of the books *Who Rules the Net?: Internet Governance and Jurisdiction*, and Copy Fights: The Future of Intellectual Property In the Information Age. He is co-author of *What's Yours Is Mine: Open Access and the Rise of Infrastructure Socialism*, and a contributing author to other books. He has published in the *Wall Street Journal*, *Chicago Tribune*, *Forbes*, *Communications Lawyer*, the *International Herald Tribune* and others. He has made various TV appearances on Fox, CNN, ABC, CNBC and the Lehrer NewsHour, and his reform ideas have been featured prominently in such publications as the *Washington Post*, *Forbes* and *Investor's Business Daily*. He contributes to blogs such as OpenMarket, Tech Liberation Front and the Daily Caller.

Earlier Wayne was a legislative aide in the United States Senate to Sen. Phil Gramm, covering regulatory and welfare reform issues. He was an Economist and Policy Analyst at Citizens for a Sound Economy Foundation, and has worked as an economist at the U.S. Food and Drug Administration and as a Research Assistant at the Center for the Study of Public Choice at George Mason University. He holds an M.B.A. from William and Mary and a B.S. from Lander College in Greenwood, South Carolina. He was a candidate for state senate as a libertarian while at Lander. He started the Dysfunction Network as a side project.

Selected Writings

Here are links to some of Wayne's CEI articles, studies and media citations. Below appear some selected writings, congressional testimony and other official filings, as well as articles from the Cato Institute.

Books & Chapters

"The Revolution Spins toward More Regulation," in *The Republican Revolution: Ten Years Later* (2005).
Who Rules the Net?, edited by Adam Thierer and Clyde Wayne Crews Jr. (2003).
What's Yours Is Mine: Open Access and the Rise of Infrastructure Socialism, by Adam Thierer and Clyde Wayne Crews Jr. (2003).
The Half-Life of Policy Rationales: How New Technology Affects Old Policy Issues, contributor (2002)
Copy Fights: The Future of Intellectual Property Rights in the Information Age, coeditor (2002)
"Intellectual Property," Chapter 40 of the Cato Handbook for Congress, 108th Congress.

Congressional Testimony and Other Filings

Comment to the FCC on Preserving the Open Internet and Broadband Industry Practices, January 14, 2010.
Testimony before the Senate Commerce Committee on the Privacy Implications of Online Advertising, July 9, 2008.

The Antitrust Modernization Commission: Proposed Issues for Reform, Regulatory Comments and Testimony, September 30, 2004
"Spam and its Effects on Small Business," Congressional Testimony before the Subcommittee on Regulatory Reform and Oversight of the Committee on Small, October 30, 2003.
"Unsolicited Commercial Electronic Mail Regulation," Congressional Testimony before the House Judiciary Committee, May 10, 2001.
Rethinking Electricity Deregulation: Does Open Access Have It Wired -- Or Tangled? Testimony of Clyde Wayne Crews Jr., Before the Subcommittee on Water and Power Resources, Committee on Resources, U.S. House of Representatives, 1334 Longworth House Office Building July 24, 1999.
The Regulatory Right-to-Know Act: Making Regulatory Disclosure Work: Testimony Before the Subcommittee on National Economic Growth, Natural Resources & Regulatory Affairs, Committee on Government Reform, U.S. House of Representatives, March 24, 1999.
Comment On the Agreement Between Internet Corporation for Assigned Names and Numbers and Network Solutions, by Clyde Wayne Crews Jr., Director of Competition and Regulation Policy, November 28, 1999.
Comments on the Draft Report to Congress on the Costs and Benefits of Federal Regulations, to the Office of Information and Regulatory Affairs, Office of Management and Budget, Submitted by Wayne Crews, September 1, 1997.
Testimony of Clyde Wayne Crews Jr. Before the Subcommittee on Water and Power Resources, Committee on Resources, U.S. House of Representatives. Privatization of the Power Marketing Administrations. May 18, 1995.
Comments of the Competitive Enterprise Institute In the matter of: Recovery of Stranded Costs by Public Utilities and Transmitting Utilities. (Docket No. RM94-7-001.) Delivered by Wayne Crews, August 4, 1995.

Reports
This Liberal Congress Went to Market? a Bipartisan Policy Agenda for the 110th Congress, January 10, 2007.
Giving Chase in Cyberspace, On Point, October 24, 2006
Ten Thousand Commandments: An Annual Snapshot of the Regulatory State, June 28, 2006
Preventing Identity Theft and Data Security Breaches: The Problem With Regulation, Issue Analysis, May 9, 2006
Communications without Commissions: Issue Analysis, October 18, 2005
Cybersecurity Finger-pointing: Regulation vs. Markets for Software Liability, Information Security, and Insurance, by Clyde Wayne Crews, Jr. Issue Analysis, May 31, 2005
Cybersecurity and Authentication Issue Analysis, November 8, 2004
"Birth of the Digital New Deal: An Inventory of High-Tech Pork-Barrel Spending," by Adam D. Thierer, Clyde Wayne Crews Jr. and Thomas Pearson, Policy Analysis no. 457, October 28, 2002.
"Human Bar Code: Monitoring Biometric Technologies in a Free Society," Policy Analysis no. 452, September 17, 2002.
"The Digital Dirty Dozen: The Most Destructive High-Tech Legislative Measures of the 107th Congress," by Clyde Wayne Crews Jr. and Adam D. Thierer, Policy Analysis no. 423, February 4, 2002.
"Why Canning "Spam" Is a Bad Idea," Policy Analysis no. 408, July 26, 2001.
"The Antitrust Terrible 10: Why the Most Reviled "Anti-competitive" Business Practices Can Benefit Consumers in the New Economy," Policy Analysis no. 405, June 28, 2001.
"Electric Avenues: Why "Open Access" Can't Compete," Policy Analysis no. 301, April 13, 1998.

Selected Articles
Media Ownership Rules vs. Separating Speech and State, April 30, 2007
Up In the Sky: A Bird, a Plane. No, It's the FCC!, April 19, 2007
EU takes a swipe at Microsoft, March 9, 2007
Can Congress Tell a Virtual World from the Real One?, February 1, 2007
The FCC's challenge: Separating speech and state, January 9, 2007
Time for a virtual games Declaration of Independence, December 14, 2006
Unleash the media, December 2, 2006
Gambling with freedom, November 9, 2006

Statement Opposing the "Audio Flag" Provisions of the "Communications, Consumers' Choice, and Broadband Deployment Act" News Release, June 22, 2006
Data Mismanagement, June 8, 2006
Sunset the FCC, Washington Times, April 15, 2006
U.S. tech: Get to China, Washington Times, March 1, 2006
Too Smart For Our Own Good Washington Post, October 31, 2004
Antitrust: Sherman's March Across the Globe, EU Reporter, September 13, 2004
Wave of Regulations Will Follow Tsunami of Federal Spending, Investor's Business Daily, July 27, 2004
Can You Overhear Me Now?, Washington Times, July 7, 2004
Should the Government Fund Nanotechnology Research?, CQ Reporter, June 1, 2004
Google Gmail Jousting, Washington Times, May 11, 2004
"The World Wide Web (of Bureaucrats?)," by Clyde Wayne Crews Jr. and Adam D. Thierer, OpinionJournal.com, October 9, 2005
"Freedom to Choose Google's "Gmail"," Cato.org, May 1, 2004
"The Plot to Stop the Internet Telephone Revolution," by Adam Thierer and Clyde Wayne Crews Jr., TechKnowledge, February 9, 2004.
"Everybody Wants to Rule the Web," by Clyde Wayne Crews Jr. and Adam D. Thierer, Cato.org, December 17, 2003
"Wishful Anti-spam Thinking," Washington Times, December 7, 2003
"Google as a Public Utility? No Results in This Search for Monopoly," by Adam Thierer and Clyde Wayne Crews Jr., TechKnowledge, November 14, 2003.
"What Media Monopolies?," by Clyde Wayne Crews Jr. and Adam D. Thierer, Wall Street Journal, July 29, 2003
"A Defense of Media Monopoly," Communications Lawyer, vol. 23, no. 3, Fall 2003.
"Washington's Ten Thousand Commandments -- and What to Do About Them," Investor's Business Daily, July 8, 2003
"Protecting Privacy in the Database Nation," Detroit News, June 22, 2003
"Stop This Today!," National Review, June 13, 2003
"Ten Thousand Commandments: An Annual Snapshot of the Federal Regulatory State," Cato Paper, June 8, 2003.
"Washington's Big Little Pork Barrel: Nanotechnology," Cato.org, May 29, 2003
"The Big Media Boogyman," by Adam D. Thierer and Clyde Wayne Crews Jr., Cato.org, May 27, 2003
"When Molecules Fly," Techcentralstation.com, May 15, 2003
"Junk Legislation Can't Solve Junk E-Mail Dilemma," Atlanta Journal-Constitution, May 11, 2003
"Entitled to Entertainment? The Digital Media Consumers' Rights Act," by Clyde Wayne Crews Jr. and Adam Thierer, TechKnowledge, January 13, 2003.
"'Partial' Information Awareness," Techcentralstation.com, January 9, 2003
"The Poindexter Awareness Office: Turning the Tables on Mr. Supersnoop," Orange County Register, January 5, 2003
"Whatever Happened to Leaving the Internet Unregulated?," by Adam D. Thierer and Clyde Wayne Crews Jr., Cato.org, December 22, 2002
"Internet Libel Ruling: Talk About a Kangaroo Court," by Adam Thierer and Clyde Wayne Crews Jr., TechKnowledge, December 16, 2002.
"Libel on the Net: Who Decides?," by Clyde Wayne Crews Jr. and Adam D. Thierer, Orange County Register, December 15, 2002
"Total Information Awareness for the Ages," Cato.org, December 3, 2002
"The Pentagon's Total Information Awareness Project: Americans Under the Microscope?" TechKnowledge, November 26, 2002. This article originally appeared on National Review Online on November 25, 2002.
"The Chill from the Pentagon," Nationalreview.com, November 25, 2002
"EchoStar-DirecTV Merger Critics Propose Infrastructure Socialism in Outer Space," by Adam Thierer and Clyde Wayne Crews Jr., TechKnowledge, October 08, 2002.
"Human Bar Code," Cato.org, October 4, 2002
"How Far Can Hollywood Go to Protect Copyrights?" by Clyde Wayne Crews Jr. and Adam Thierer, A Cato Commentary, TechKnowledge, September 23, 2002.
"Regulatory Spending Escalation," Washington Times, September 3, 2002

"Compulsory Entertainment?," Techcentralstation.com, July 15, 2002
"No Regulation Without Representation," Cato.org, July 9, 2002
"Snoop, There It Is," Techcentralstation.com, June 18, 2002
"Should Washington Ban Internet Gambling?," Cato.org, June 13, 2002
"Ten Thousand Commandments: An Annual Snapshot of the Federal Regulatory State," Cato Paper, June 11, 2002.
"Government Can't Protect Kids from Porn -- But Parents Can," San Diego Union-Tribune, May 17, 2002
"Just Don't Do It: The Digital Opportunities Investment Trust (DO IT) Fund," by Clyde Wayne Crews Jr. and Adam D. Thierer, Cato.org, May 13, 2002
"Deregulator in Chief," (first appeared in TechnoPolitics), April 5, 2002.
"The EchoStar-DirecTV Merger: Antitrust Folly Reaches Outer Space," TechKnowledge, December 5, 2001.
"Cyber-Surveillance in the Wake of 9/11," by Adam D. Thierer and Clyde Wayne Crews Jr., Cato.org, October 19, 2001
"Anonymity in America: Does National Security Preclude It?," TechKnowledge, October 11, 2001.
"Cyber-Surveillance in the Wake of 9/11," TechKnowledge, September 18, 2001.
"Trespass in Cyberspace: Whose Ether Is It Anyway?," TechKnowledge, September 10, 2001.
"Musical Mandates: Must the Pop Music Industry Submit to Compulsory Licensing?," Cato.org, August 23, 2001
"When Rights Collide: Principles to Guide the Intellectual Property Debate," by Adam D. Thierer and Clyde Wayne Crews Jr., Cato.org, June 19, 2001
"Is the Internet Bad for Democracy?" TechKnowledge, August 31, 2001.
"Structural Separation of the Bells - An Idea Whose Time Has Passed," TechKnowledge, August 20, 2001.
"Musical Mandates: Must the Pop Music Industry Submit to Compulsory Licensing?," TechKnowledge, August 15, 2001.
"Ten Thousand Commandments," Techcentralstation.com, August 9, 2002
"When Rights Collide: Principles to Guide the Intellectual Property Debate," TechKnowledge, June 4, 2001.
"One Internet Is Not Enough," TechKnowledge, April 11, 2001.
"The Libertarian Vision for Telecom and High-Technology," TechKnowledge, April 3, 2001.
"Policymakers Should 'Opt Out' of Privacy Legislation," Techcentralstation.com, March 13, 2001 "Federal Regulators Not on AOL's BuddyList," Cato.org, January 12, 2001
"AOL-Time Warner: Not Big Enough for Tomorrow's Internet," Cato.org, January 5, 2001
"Ten Thousand Commandments: An Annual Policymaker's Snapshot of the Federal Regulatory State," Cato Paper, 2001.
"Land of Ten Thousand Commandments," TechnoPolitics.com (Summer 2001)
"When Rights Collide: Principles to Guide the Intellectual Property Debate," TechKnowledge (June 4, 2001)
"Unsolicited Commercial Electronic Mail Regulation," Congressional Testimony before the House Judiciary Committee (May 10, 2001)
"Ten Thousand Commandments: An Annual Policymaker's Snapshot of the Federal Regulatory State" (2001)
"One Internet Is Not Enough," TechKnowledge (April 11, 2001)
"The Libertarian Vision for Telecom and High-Technology," TechKnowledge (April 3, 2001)
"Pick Your Net," Forbes Magazine (April 2, 2001)
"Policymakers Should "Opt Out" of Privacy Legislation," Cato Daily Commentary (March 13, 2001)
"Federal Regulators Not on AOL's BuddyList," Cato Daily Commentary (January 12, 2001)
"AOL-Time Warner: Not Big Enough for Tomorrow's Internet," Cato Daily Commentary (January 5, 2001)
"Electric Avenues: Why 'Open Access' Can't Compete," Cato Institute Policy Analysis no. 301 (April 13, 1998)
"Open Access to Electricity? What a Shocking Idea," Wall Street Journal, August 27, 1998.
"Not Big Enough for Tomorrow's Internet," Washington Times, Sunday, January 23, 2000.
"Electric Utilities are Not Natural Monopolies," Wall Street Journal, 1997.
"Here's a Winning Issue, Mr. Dole," (with Karen Kerrigan) Wall Street Journal, March 7, 1996.
"Behind the Breakup Curve on Microsoft," Washington Times, May 22, 2000.

"Get Your Own Network" in Executive's Corner, Electric Light and Power Magazine, July 1999.
"Micro-Managing Bill Gates," Washington Times, March 2, 1998.
"An Instant Message to AOL's Competitors," CEI UpDate, August 30, 2000.
"Antitrust Not on Internet Time: Microsoft Remedies Discount Serious Competitive Threats," CEI OnPoint by Wayne Crews, March 28, 2000. (featured on Microsoft's Freedom to Innovate Network Homepage, April 2000)
"Network Effects: Does Luck of Talent Rule the High-Technology Market?" CEI On Point, February 27, 1998.
"In The Eyes Of The Justice Department, Protecting Your Own Internet Privacy Is Cause For Alarm," C:\SPIN by Wayne Crews, and Sam Kazman, 2/4/00
Let's Have More Moratoria, C:\SPIN, 2/3/00.
"The Open-Source Code Commode," C:\SPIN, 12/12/98.
"Gorging on Regulations," Washington Times, April 26, 2000.
"Hello! You've Gotten Acquired!," C:\SPIN, 11.23.98.
"Regulatory Budget Check," CEI UpDate, 4.00.
"The Other Federal Budget" for UpDate, 2000.
"So, What Will This Unfunded Mandate Cost Me?," OnPoint by W. Crews, Feb. 8.
"Computers and Competition: A Primer for Congress" OnPoint, July 22, 1998.
"Electricity Deregulation: Wired or Tangled in the 106th Congress's Committees?" CEI OnPoint No. 45, July 22, 1999.
"The Simple ABCs of Regulatory Reform," OnPoint by W. Crews, March 18, 1999.
"Deficit Spending End Run," Washington Times, March 17, 2000.
"The Consumer Cost of Regulations," Consumers' Research, March 1998.
Jump, Jive an' Reform Regulation: How Washington Can Take a Swing at Regulatory Reform , February 2000.
"Promise and Peril: Implementing a Regulatory Budget," Policy Sciences, Vol. 31, No. 4,
"Electric Utility Reform: The Free Market Alternative to Mandatory Open Access," Electricity Journal, Volume 10, Number 10, December 1997.