

Public Written Comments

Submitted to PCAST

July 9, 2014 - September 10, 2014

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The American Economy, Eldercare and Web-based Retail

From: "Adam Sobieski" [REDACTED]

Date: Thu, July 10, 2014 3:06 pm

To: pcast@ostp.gov <pcast@ostp.gov>

Office of Science and Technology Policy,
President's Council of Advisors on Science and Technology,

Greetings. I would like to indicate an idea that can be of use to economics and eldercare plans, models and proposals. Americans 65 and older could log onto retail websites, the websites of major retail organizations, for various retail deals and discounts. Such uses of web-based retail, and in bulk, pertinent to the purchasing power of retirees, could be of use to the economy and to offsetting costs and expenses for the elderly.

Kind regards,

Adam Sobieski

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PCAST and a new JASON/MIT report

From: "Lloyd Etheredge" [REDACTED]

Date: Sun, July 13, 2014 6:19 pm

To: [REDACTED]

Dear PCAST Co-Chairs John Holdren and Eric Lander and Vice Chairs William Press and Maxine Savitz, and Members:

In light of the several billion people whose lives are being injured by unreliable economic science, and the exciting systems engineering thinking by the JASON group that informed PCAST's May 29, 2014 Report, the enclosed letter suggests that you commission a parallel systems engineering study to build a rapid learning system for macroeconomics.

To get to this point, our new rapid learning/precision medicine healthcare system, with electronic health records growing biobanks, and global collaboration, has taken seven years and more than 20 Commission, study group, and foundation reports (from the initial symposium in Health Affairs until last week's special issue and overview at the National Press Club in Washington). . . . We need to get started re a rapid learning system for macroeconomics, and a JASON Report, from the new expertise of systems engineering, might do so brilliantly.

Lloyd Etheredge

Dr. Lloyd S. Etheredge - Project Director
Policy Sciences Center

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[The Policy Sciences Center, Inc. is a public foundation that develops and integrates knowledge and practice to advance human dignity. It was founded by Harold Lasswell, Myres McDougal, and their associates in 1948 in New Haven, CT. Further information about the Policy Sciences Center and its projects, Society, and journal is available at www.policysciences.org.]

THE POLICY SCIENCES CENTER, INC.

Project Director: DR. LLOYD ETHEREDGE

July 13, 2014

Drs. John Holdren, Eric Lander (Co-Chairs) and Maxine Savitz, and William Press (Vice-Chairs)
and Members

President's Council of Advisers on Science and Technology

Dear PCAST Co-Chairs, Vice Chairs, and Members:

PCAST has shown great respect for the expertise of systems engineering in your May 29, 2014 Report to the President, Better Health Care and Lower Costs: Accelerating Benefits Through Systems Engineering. PCAST can benefit the lives of several billion people, and it can improve economic science quickly, by commissioning a JASON/MITRE project (along the lines of their earlier project that your Report relies upon) to apply systems engineering and design a rapid learning system for macroeconomics.

I have brought to your attention the emerging agreement that there are missing variables in economic science, especially related to the recovery and growth process. However we do not have a national (or global) system that is designed for rapid learning about macroeconomics, to find missing variables, and to re-estimate coefficients in a living system, in a changing world and our unusual circumstances. Nor is the federal government and Executive branch (including OSTP, the National Economic Council, NSF, the Treasury Department, the Department of Commerce, the Council of Economic Advisers or the independent Federal Reserve Systems, etc.) designed, led, staffed, coordinated, or funded to rethink paradigms, organize new national and G-20 R&D data systems, nor apply insights of systems engineering to this urgent and historic scientific challenge. No single change (e.g., of an NSF Director), nor any change under the authority of any single Executive branch official, will get better results from inside the current national system.

PCAST should not permit the White House staff, even for a minute, to contemplate a "Best and Brightest" Defense - i.e., that the President, by appointing the former President of Harvard (Larry Summers) as a senior counselor and the former President of Yale (Richard Levin) as an earlier member of PCAST, is exercising due diligence. Without your leadership (or a public scandal) we will continue to see the same mismanagement that the Obama Administration produced for the Veterans Administration (across 5 ½ years) or healthcare.gov. They already know that the lives of several billion people are being injured by unreliable economic science.

The Policy Sciences Center Inc. is a public foundation.

The Center was founded in 1948 by Myres S. McDougal, Harold D. Lasswell, and George Dession. It may be contacted c/o Prof. Michael

URL: <http://www.policyscience.net>

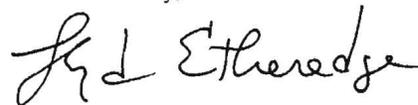
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I am confident that our nation's scientists can move very quickly to build a rapid learning system to improve economic science. I was a member of the MIT faculty for eight years: I beg you to let JASON's/MIT's independence and the brilliance of eminent scientists with new expertise in systems engineering explain to President Obama how to discover missing variables and give him a fresh and trustworthy perspective on what is possible

- As you know, America's GDP unexpectedly contracted at 3% in the first quarter of 2014. One hopeful sign is that the New York Times (below) is becoming more aggressive about scientific evidence.¹

I have worked for 30+ years to accelerate government learning and support the integrity and trustworthiness of scientific institutions. My perception is that - in the next step - John Holdren and the Obama Administration are in imminent danger of disclosures of unforgivable scientific negligence and incompetence.²

Yours truly,



Dr. Lloyd S. Etheredge, Project Director

Endnotes

1. The Limits of the Fed

By THE EDITORIAL BOARD. The New York Times. JUNE 17, 2014

The Federal Reserve is expected to conclude its two-day meeting on Wednesday afternoon with another \$10 billion scale-back of its monthly bond purchases. At that pace, the bond-buying program — an effort to stimulate the economy by lowering long-term interest rates — will be over by December at the latest.

Unfortunately, the slow and steady withdrawal of stimulus has not been accompanied by a slow and steady improvement in economic conditions. Rather, since the economy emerged from recession in mid-2009, growth has averaged a sluggish 2 percent or so — year in and year out.

That is not to fault the Fed for winding down the bond purchases. The point of the program is to propel growth, so if growth is not accelerating, the program has run its course. Besides, the Fed is not giving up. By all indications, it will not begin to raise the current near-zero short-term rates until at least the middle of next year.

In that light, the Fed's moves are less about confidence in the economy and more about the limits of its present tools to change conditions. When the Fed met in April, for example, the government's initial estimate of growth in the first quarter of 2014 was an anemic 0.1 percent, which the Fed attributed to the rough winter. Since then, the initial estimate has been revised

downward, to a contraction of 1 percent.

The final estimate, to be released at the end of June, is expected to be worse still. Even if growth rebounds as projected, overall economic performance for the year would still end up around 2 percent. That is not a cause for optimism.

Even signs of life that the Federal Reserve and its chairwoman, Janet Yellen, have identified as vital to a real recovery — modestly higher inflation and a stronger job market — are not as reassuring as they appear. For instance, inflation over the past year recently clocked in at 2.1 percent, a level the Fed aims for. But, at that rate, hourly and weekly pay for private-sector American workers has fallen over the past year, by 0.1 percent, after adjusting for inflation.

In a normal business cycle, low interest rates are usually enough to generate sufficient demand to boost economic growth to its historical average of roughly 3 percent. But there is nothing normal about the present cycle. The Fed has extracted about all the juice it can from low rates and continues to squeeze. It could also spur investment by tolerating higher inflation than its 2 percent target. But the basic problem — spurring demand on the part of consumers and borrowers — is outside its purview.

Only Congress can provide the extra dollars for that, but lawmakers have been unwilling or unable to take action, even just to provide basics like federal unemployment benefits or highway and bridge repair. Given that failure to act, it is a wonder the economy has managed to grow at 2 percent.

To assume that it will continue to do so or that it will fully recover without the government sector engaging in a meaningful way is to hope against evidence.

2. I brought to your attention, earlier, the outline of a three year project ([A Rapid Learning System for G-20 Macroeconomics: From Greenspan to Shiller and Big Data](#)) for rapid learning macroeconomics (online at www.policyscience.net at II. A.) It is the best solution that I can offer as an individual Principal Investigator. However our nation's scientists, across all relevant disciplines, ought to be moving more boldly and quickly.

Proposal

A Rapid Learning System for G-20 Macroeconomics:

From Greenspan to Shiller and Big Data

by

Lloyd S. Etheredge

March 6, 2014
(Draft)

Proposal

A Rapid Learning System for G-20 Macroeconomics: From Greenspan to Shiller and Big Data

by
Lloyd S. Etheredge¹

Abstract

There is a growing agreement that there are missing variables in economic science. Robert Shiller (2014) believes that needed progress can be achieved by creating, and then drawing upon, an inclusive behavioral science framework that “accounts for actual human behavior.”² Independently, Alan Greenspan has started to build this expansion. He draws upon a lifetime of experience, and reflections on the recent economic crisis and recovery, to recommend the behavioral variables that, with appropriate metrics, should be added to the world’s data systems and forecasting equations.³ The purpose of this project is to build upon Greenspan’s outline and Shiller’s vision and use them as a stimulus for expanded, multi-disciplinary, and inclusive R&D data systems that can be deployed internationally to create a rapid learning system for macroeconomics.^{4 5}

¹ Lloyd Etheredge is Director, Government Learning Project, at the Policy Sciences Center, Inc., a public foundation; URL: <http://www.policyscience.net>. Contact: [REDACTED]. This is a draft grant proposal. Comments welcome: Please do not circulate without permission.

³ Alan Greenspan, The Map and the Territory: Risk, Human Nature, and the Future of Forecasting (New York: The Penguin Press, 2013).

⁴ The columnist Robert Samuelson reported a disciplinary pessimism about finding new and better policy ideas in current models and data systems at the invitation-only IMF summit last year: Robert J. Samuelson, “The End of Macro Magic,” Washington Post, April 21, 2013. Concerning new variables, see also Lawrence Summers, “Lessons Can be Learned from Reinhart-Rogoff Error.” Washington Post, May 5, 2013: “In retrospect, it was folly to believe that with data on about 30 countries it was possible to estimate a threshold beyond which debt became dangerous. Even if such a threshold existed, why should it be the same in countries with

The project is timely. Global economic recovery is lagging and established models and data systems have not worked reliably. The addition of new variables (each, likely influenced by several pathways) raises the possibility of a new set of effective policy tools (for example, to restore confidence and accelerate economic recovery). There is exciting and creative thinking among economists that will be captured by the project (i.e., and these upgrade ideas can disappear unless they evolve into metrics and are included in new R&D data systems of the G-20). There are very few problems in the world that cannot be made better by a speedier return to economic health and adding another 1%/year to long-term GDP/capita growth. And in February 2014 the G-20 governments made a public commitment to better results. They promised to *“develop ambitious but realistic policies with the aim to lift our collective GDP by more than 2 percent above the trajectory implied by current policies over the coming five years.”*⁶ More inclusive economic models and data systems should help to improve economic science and get these results for the G-20 and other nations.

and without their own currency, with very different financial systems, cultures, degrees of openness and growth experiences?” Summers also recommends surrendering the comfortable dream of “returning to normal” and a world already charted by established equations and data systems: “the presumption that normal economic and policy conditions will return at some point cannot be maintained.” (“Economic Stagnation is Not Our Fate - Unless We Let It Be,” Washington Post, December 18, 2013). A consulting project for China, with leadership by the Nobelist Michael Spence, concludes that the ideas that must guide China’s next phase of growth “step outside well-known economic models” and require tasks of adding metrics and variables into formal models that are “very much on economist’s ‘to do’ list:” Jonathan Schleferfeb, “Nobel Winner’s Frank Advice to China’s Leadership.” The New York Times, February 17, 2014.

⁵ The commitment of the policy sciences tradition is to develop inclusive frameworks to guide democratic decision making. See Harold D. Lasswell and Abraham Kaplan, Power and Society: A Framework for Political Inquiry (1950) (New Brunswick, NJ: Transaction Publishers, 2013), reprint with an Introduction by Ronald Brunner; the behavioral sciences made impressive steps toward this goal, even several decades ago: Lloyd S. Etheredge, The Case of the Unreturned Cafeteria Trays (Washington, DC, 1976) and the “Map” (attached as an Appendix to this proposal) and *idem.*, “Wisdom in Public Policy” in Robert Sternberg and Jennifer Jordan (Eds.) A Handbook of Wisdom: Psychological Perspectives (New York: Cambridge University Press, 2005), pp. 257-328; William Ascher, Bringing in the Future: Strategies for Farsightedness and Sustainability in Developing Countries (Chicago: University of Chicago Press, 2009).

⁶ Jamie Smyth, “G20 Aims to Add \$2 Trillion to Global Economy,” Financial Times, February 23, 2014.

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I. Scientific Plan

A Project Director and an Advisory Group will identify specific topics to be addressed in three steps and invite leading researchers to participate in a planning group (N=12-14) for each step. The planning groups will be asked to do justice to the thinking of Greenspan and other theorists. To bring their own creativity to the task. And to assure that the new variables and metrics will, in the spirit of the Michelson-Morley experiment in physics, be politically fair and support the competitive evaluation of variables, pathways, and claims that are civically relevant.

The three steps will be:

- 1.) Greenspan's List of (known or suspected) missing variables and recommended metrics;
- 2.) Inclusive Social Science Lists to capture (known or suspected) missing variables and metrics from other theorists and researchers;
- 3.) Finding Unknown Variables and Organizing Rapid Learning Systems.

- Greenspan is a professional economist and a libertarian. [His mentor and lifelong friend was Ayn Rand (author of Atlas Shrugged, an entry pathway to these policy views for many college students.)] He has taken the unusual step of recommending rapid scientific evaluation of his new economic ideas and these (what others would call) ideological beliefs. He expects these new scientific equations will improve economic forecasts *and*, in the competition of ideas in the political marketplace, prove that libertarians are right.

The Project Director will prepare an initial outline of issues for each planning group, meet with each member for a discussion, prepare a draft paper for a 1 ½ day group meeting, and author a summary report of recommended variables and metrics and next steps from each group. Each of the three Reports will address:

- 1.) Recommended variables and metrics that are on the shelf and that can be deployed immediately;

- 2.) Recommended metrics that can become available soon, with additional work;
- 3.) Important areas where further R&D is needed before metrics can be recommended.

Here (for the three steps, and with three examples for each step) are new variables and clusters of metrics that will be addressed, with my initial commentary about how I believe the discussions of social science advisers will develop and refine the analysis.⁷

A. Greenspan's List

“We are driven by a whole array of propensities - most prominent, fear, euphoria, and herd behavior.”

- Alan Greenspan⁸

Greenspan recommends adding variables to provide a more inclusive account of human nature. Thinking internationally, he also recommends including cultural variables in the new equations because he believes that cultures exert (often) fixed causal forces on economic behavior.

⁷ Greenspan suggests “an apparently inbred upper limit to human IQ” may limit productivity growth in America and other advanced economies to 3%/year (pp. 165-166, 296). The phenomenon is worth investigating and forecasting, but I am skeptical about this explanation.

⁸ Also, a capacity for human rationality should be measured in the new equations: The new behavioral variables (fear, euphoria, and herd behavior) can be “broadly subject to reasoned confirmation,” *op. cit.*, p. 299. [Including different (and sometimes opposing) logics and mechanisms (like rationality) in different parts of the human brain may seem logically contradictory and unacceptable but an emerging view of human nature, informed by neuroscience, is comfortable with this theoretical upgrade.]

Greenspan adds that “much of animal spirits are heavily tempered by rational oversight. Markets, even in their most euphoric or fear-driven state, do not expect global stock market averages to double or triple overnight, or wheat prices to fall to five cents a barrel” *op. cit.*, p. 35.

1.) Motivation 1 - Fear, Confidence, “Animal Spirits”

“[T]he world economy is pregnant with multiple equilibria - self-fulfilling outcomes of pessimism or optimism.”

- Olivier Blanchard ⁹

a.) Fear. An early, simplified mathematics of economics assumed human motivation to be fixed and seeking maximum economic profit, and that knowledge of the world was limited to economic variables (e.g., the prices and other current behavior of markets). Greenspan begins by adding an instinct for survival, risk-aversion, and a hardwired, fast, and compelling response to fear: “fear induces a far greater response than euphoria.”¹⁰ [Thus the boom phase of economic crises build across several years while the financial collapses will be sudden panics as these primitive, “fast” brain mechanisms are activated.] ¹¹

b.) Restoring confidence has emerged as one of the high policy priorities for economic recovery. Greenspan’s wider model (discussed below, based on Keynes), includes the genetic endowment of human nature with natural “animal spirits” and a non-rational optimism about the

⁹ Dr. Olivier is Chief Economist at the International Monetary Fund and, for many years, was a member of the MIT Economics Department. Olivier Blanchard, “2011 in Review: Four Hard Truths.” Online at <http://blog-imfdirect.imf.org/2011/12/21/2011-in-review-four-hard-truths/>

¹⁰ *op. cit.*, p. 280.

¹¹ To psychologists, pain is a physical sensation with specific measurements. Thus, pain-avoidance can be different than risk-avoidance. [Greenspan probably means to include pain-avoidance in his theory: he discusses “the propensity of policy makers to seek the least politically painful solution to a problem . . . We see it everywhere.” (p. 224).] The distinction between pain and risk will sometimes be nit-picking, but it helps to distinguish which brain pathways actually might be involved, for whom. While a new breed of Wall Street financiers may instinctively wish to avoid pain, they might be thrilled by the excitement of high risk gambling.

future.¹² [Thus, human nature is on the side of economic health, which will return as soon as we can understand the fear mechanisms and reduce or remove the fear and restore confidence.]

What are the pathways and metrics to model the neuroscience of fear and confidence? The fast “fight/flight” panic mechanism appears, at this point, to be linked to other mechanisms that continue to suppress or inhibit animal spirits and economic confidence. The actual combinations will have different implications for optimal recovery policies.

For example: The conventional remedy of economic pump-priming imagines that 1.) economic reality must be changed and become reliably reassuring (e.g., by reducing interest rates to stimulate investment and by increased government (deficit) spending). As flows of income increase to individuals and businesses, and as they slowly and repeatedly test the waters, confidence gradually is restored, their own spending and/or hiring increases, and the recovery process becomes self-sustaining. Another possibility is 2.) calendar time may be required for healing and recovery, and this might also require outreach steps (recognizing the additional psychological mechanisms involved) for people who have been injured personally or become discouraged. Or 3.) if the fear was activated in the context of a perceived catastrophic failure of trust and/or betrayal by governments and financial institutions who had a moral obligation to be trustworthy, these institutions may be required to restore confidence in themselves and have not done so. [These psychological ideas are consequential: the Federal Reserve systems of the world can spend hundreds of billions of dollars believing that there is a Liquidity Trap and they must keep interest rates low. Yet they will waste the money if the current problem is a Confidence Trap linked to deficient trust in major institutions and guarantors, and a dispiriting anomie.]¹³

¹² Kahneman agrees with Greenspan and Keynes: “the optimistic bias may well be the most significant of the cognitive biases.” Quoted in Greenspan, *op. cit.*, p. 32.

¹³ Adding new and direct confidence metrics about governments and political systems is an innovation implied by Olivier Blanchard: “Markets have become more skeptical about the ability of governments to stabilize their public debt” in his “Strong Policy Action - The Essence of Restoring Global Economic Hope” blog, September 20, 2011. Online at <http://blog-imfdirect.imf.org/2011/09/20/strong-policy-action-the-essence-of-restoring-global-economic-hope/>

Alternatively, there may be 4.) a news-media perpetuation of fear and anger by (for profit) companies (like Fox News) or (with huge campaign contributions) by the Tea Party. [Once, three centrist television networks and sober, professional journalists (NBC, ABC, CBS) conveyed reality to, and constructed reality for, the American people.]¹⁴

A wider set of metrics may allow other confidence-restoring or -building variables, possible brain mechanisms, and policy options to come into focus. For example, leadership-induced confidence: 5.) Experiments by McClelland and Winter found that videos of dramatizing leaders, with speeches rich in achievement images (like President Kennedy), energized people for economic achievement. [Thus: new metrics may show that President Obama and a world of rationalist economists and prosaic politicians are contributing to the current slow rates of economic recovery by the uninspiring public drama that they create.]¹⁵ Or 6.) FDR used yet another set of (*de facto*) psychological theories of fear and brain mechanisms: Declaring that “the only thing we have to fear is fear itself,” he presented himself as a confident, cheerful, and even jaunty role model (in a scary and troubled time); and, by using his position as a leader, and new mass communications technology, to *name* emotions he may have created new brain pathways in his listeners that helped them to be self-starting in an internal world that began to bracket fear.¹⁶

c.) “Animal Spirits.” Greenspan’s (psychological, political, and economic) theory of

¹⁴ New capabilities for quantitative analysis of communication flows would provide an interesting cross-national set of metrics. See Robert Harris, The Fear Index (NY: Vintage, 2012). Reprint; Ithiel de Sola Pool, “Content Analysis and the Intelligence Function,” reprinted on Lloyd S. Etheredge (Ed.), Humane Politics and Methods of Inquiry: Selected Papers of Ithiel de Sola Pool, vol. 2 (New Brunswick, NJ: Transaction Publications, 2000), chapter 2.

¹⁵ David McClelland and David Winter, Motivating Economic Achievement: Accelerating Economic Development Through Psychological Training (New York: Free Press, 1969).

¹⁶ The G-20 appear to be using, at this point, 7.) a straightforward goal-setting theory of leadership and induced motivation. However the degree of repetition that is needed may be under-estimated. It may be necessary for leaders to communicate goals a hundred times more than they initially believe should be necessary

“animal spirits,” borrowed from Keynes, imagines that the success of the capitalist system is the expression of this restless and even joyful human energy and natural optimism (that is not derived from cold, rational calculations), typically channeled into activities with others. Keynes’ phrase was used of British students in boarding schools in late Victorian and Edwardian England: the “animal spirits” find natural expression in the freedom of the playing field and, sometimes, in an irreverent, youthful independence and instinct for challenging the rules that enjoined vigilance by headmasters.¹⁷

Greenspan’s theory is a strategic move on a political chessboard. The “animal spirits” of human beings - not the profit-seeking of economic robots programmed for maximum rationality - drive capitalism and economic growth.¹⁸ However these human “animal spirits” are suppressed by regulations and Greenspan’s scientific prediction is that the new equations will prove libertarian claims: If we want the capitalist package to work, we should limit government and its regulation and other interference. The *laissez-faire* freedom from regulation that is required for the animal spirits of capitalism to create a better future [and also for the growth of strong, healthy, self-starting entrepreneurs as they move from competition on the playing fields to the

¹⁷ For further discussion: George Akerlof and Robert Shiller, *Animal Spirits: How Human Psychology Drives the Economy, and Why it Matters for Global Capitalism* (Princeton, NJ: Princeton University Press, 2009) and Robert Shiller, “Animal Spirits Depend on Trust: The Proposed Stimulus Isn’t Enough to Restore Confidence,” *Wall Street Journal*, January 27, 2009.

¹⁸ As a side issue: Greenspan believes that *“To the extent that any human action is at least partially driven by ‘spirits,’ the material outcomes are less satisfactory in purely economic terms than they would be under the hypothetical presumption that animal spirits did not exist and that human beings’ economic behavior was wholly rational.”* Greenspan, *op. cit.*, p. 35. However computer simulations may show Greenspan’s view to be untrue: a sociobiology theory might predict that, while irrational over-confidence may increase death rates of individuals or many entrepreneurial firms, this trait could, when there is random variation and changing environments, facilitate adaptation and success of the species. In the study of emerging infectious diseases, for example, millions of individual virus particles may die in the continuing assaults on new antibiotics but, with random variation, the continuing assaults eventually include breakthroughs by resistant mutations and survival and new population growth for the species.

corporate offices - LE] also means that political systems should accept that cycles of boom and bust are an inevitable part of the global capitalist system.

Greenspan's political deductions mandate a careful attention to measurement. There is a distinction between subjectivity (how reality is perceived, interpreted and wired-up in the brain) and Greenspan's almost definitional theory that regulations restrict freedom. There will be abundant challenges for the scientific planning groups to sort out but (to make the points briefly): 1.) actually, the youthful athletic contests on the playing fields of Eton, with their genuine and energetic freedom and competition, also are exquisitely created and affected by rules and regulations, depend upon honest and competent referees and agreed-upon penalties, and the activities are sustained by a moral universe of respect, fairness, and sportsmanship, and norms that distinguish acceptable competitive strategies (e.g., of misdirection) from cheating. Thus, it is not obvious that indexes of financial or environmental regulations *necessarily* will show inhibiting brain/psychological impacts on businessmen that erode their economic motivation and lower the growth rate of GDP. [However, 2.) once the new subjectivity-recognizing metrics are created, Greenspan might be right. In part, the truth depends upon the subjectivity of capitalists - although complaining about government regulations is not compelling evidence that regulations actually do inhibit their economic motivation: some of the most regulated and supervised industries in the world (e.g., the pharmaceutical industry) are the most profitable and innovative.]¹⁹

¹⁹ Economists are accustomed to use the hard numbers of conventional economic data. This methodological point about including measures of subjectivity (more easily accepted in other social sciences) is one of the "four hard (*sic*) truths" to improve econometric forecasting recommended in 2011 by Blanchard: "*Perception molds reality.*" *op. cit.* A second-level measurement issue for a planning group, also flagged by Blanchard, is that perceptions can change: "[F]inancial investors are schizophrenic . . . they react positively to news of fiscal consolidation but then react negatively later. . ." *ibid.* A related measurement issue is the contextual principle in behavioral science - i.e., the effect of a variable can depend upon the context in which it occurs. Thus President Kennedy's tax cut may have produced an unusually strong effect on economic growth because it occurred in the frame of his achievement-oriented (N-Ach in the technical language of psychologists) rhetoric and leadership. If so, the Reagan-era

Also, *pace* Greenspan and Keynes, 3.) Social scientists might discover that actual economic motivation can be much greater than the baseline animal spirits of human nature. For example, motivation might be increased by (external) political leadership (see above) or by a non-rational manipulation that, via the visual cortex, activates long-term motivation with vivid images of vast, guaranteed profit. Greenspan's *laissez-faire* utopia of natural, animal spirits may actually achieve only a fraction of what psychologically astute G-20 policies (to design a fully incentivized global capitalist system) could empower capitalism to achieve in the future.²⁰

2.) Motivation 2 - The Herd Instinct

“Euphoria will always periodically produce extended bull markets that feed off

tax cuts would have produced a diminished effect because his Presidential rhetoric was low on N-Ach imagery. For a further discussion: Lloyd S. Etheredge, “President Reagan’s Counseling” in *Political Psychology*, 5:4 (1984), pp. 737-40, online at www.policyscience.net at II. C.

Political combat in the Ayn Rand tradition has used her Objectivist philosophy which (i.e., it is a somewhat closed system) can interpret other people’s differing perceptions as a “false consciousness.” Greenspan may not readily accept a political philosophy or economic policy based on people’s “unthinking” subjective experience of whether they are regulated.

²⁰ To secure the benefits of new technologies, the American government energized the national capitalist system and built a trans-continental railway system in the 19th century, very quickly, by offering government payments and bonuses (and vivid, high profits) of \$16,000, \$32,000 or \$48,000/mile and assuring land grants, to competing companies who started building westward, and another that started eastward from California.

Similarly, the actual “herd instincts” motivations of Wall Street portrayed in the Academy Award-winning *Inside Job* and *The Wolf of Wall Street* appear to have been fueled by vivid images of fabulous profits and cocaine-like drug addiction and pleasure centers in the brain. Greenspan’s partly exculpatory theory of human nature notwithstanding, only a very small percentage of self-selecting human beings may actually become involved in high-stakes gambling addictions.

herd behavior, followed by rapid fear-induced deflation of the consequent bubbles.”

- Alan Greenspan ²¹

“I see no way of removing periodic irrational exuberances without at the same time significantly diminishing the average rate of economic growth and standards of living.”²²

- Alan Greenspan ²³

Greenspan’s new “herd instinct” variable moves economic analysis beyond the mathematical assumption that the motivation of human beings is only to maximize selfish economic profits. The herd (“social”) instincts have their own aims, expressions and rewards (including contributing to the lives of others).²⁴ They are expressed in a nonprofit sector of the economy that is capable of astonishing gains in productivity and human benefit (e.g., MOOCs that can make a curriculum equal to the best in the world available to everyone on the planet, without charge) and, also, stunning and baffling inefficiency (e.g., the American health care system). The American media focus on the quarterly performance metrics of the for-profit economy but Greenspan’s conceptual and pro-metrics upgrade will engage a planning group to think about

²¹ *op. cit.*, p. 292.

²² Greenspan predicts that periodic irrational exuberances may grow worse as a result of social media, *op. cit.*, p. 25: “fear and euphoria . . . are contagious processes exaggerated by herding.” It is an important prediction, made possible by including the herd instinct set of variables, that should be evaluated for G-20 forecasting.

²³ *op. cit.*, p. 301.

²⁴ Greenspan includes a propensity to compete in games and for status (p. 26) and power (p. 34).

equivalent quarterly performance metrics for the nonprofit sector.²⁵

Adding a “herd instinct” variable also is a strategic move on a political chessboard. Here is the background: The term was introduced (with cross-species examples) by the social psychologist (and neurosurgeon) Wilfred Trotter in 1908.²⁶ It refers to many human phenomena, including altruism and compassion, standards of fairness, marriage and friendship, the nonprofit sector, all social and mass movement participation - including financial bubbles (and skewing risk-aversion judgments to the mean of a group) - and enlisting in wars, seeking status and power, conformity and followership, the quests for self-esteem, copycat behavior exploited by advertising and marketers, etc. During the 1930s and the Cold War, “herd instinct” became a pejorative term. Alan Greenspan, Ayn Rand, and many allies believed that the herd instinct dangerously drew political supporters to the seductions of collectivism, with the reality of a soul-crushing tyranny (and mistaken economic ideas) of America’s mortal enemy, Russia and a global

²⁵ I am not sure how far this initial project can go to develop metrics and forecasting equations for the nonprofit sector of the G-20 economies. However, the economics profession and society may benefit in several ways from Greenspan’s conceptual upgrade. Typically, doctrinaire economic analysts recommend improving nonprofit institutions by turning them into for-profit hospitals, for-profit public schools, universities with Profit Centers, outsourcing the work of government agencies to the private sector, etc. Greenspan’s “herd instinct” variable allows there to be legitimate, different, and important motive instincts that sustain the nonprofit sector and that can be used and organized for the common good. (A motivation to maximize economic profit is not required for efficiency: the management consultant Peter Drucker thought that the Girl Scouts of America, with their commitment to “help each girl reach her own highest potential,” was better run than Fortune 500 companies.) See also the variables affecting productivity in well-managed public sector and nonprofit institutions identified by the Baldrige awards, www.apqc.org. A discussion of conceptual implications of allowing different motives in models of human nature is Howard Margolis, Selfishness, Altruism and Rationality (Chicago, IL: University of Chicago Press, 1984).

²⁶ His later popular book influenced the application of scientific method to develop modern advertising and analyze the mass movements of the 1930s, accelerated by the new mass media technologies. W. Trotter, Instincts of the Herd in Peace and War (London: T. F. Unwin, 1916).

Communist movement. In Greenspan's tradition the "herd" (social) instincts also contribute to the well-intentioned, spiritually-eroding, collectivist welfare state (eroding the personality of 47% of Americans, according to the Republican-individualist Presidential candidate, Mitt Romney). The mass psychology of society and human imagination are zero-sum: even when governments enlarge their prominence and hold the high ground as benevolent planners of welfare states (and *de facto* regulators), they restrict and erode the open spaces and zones of freedom that are required for the full development of strong, healthy, self-starting individuals (who become entrepreneurs).²⁷

Again, these are moves on a political chessboard and two measurement cautions are in order: a.) Political, educational, social, spiritual, and psychological theorists since Plato's analogy of the Cave and Buddha's teaching of a path to Enlightenment have thought about issues of freedom, liberation, and growth. Many psychologists have researched causal ideas about the growth of healthy, strong, free, responsible, self-starting, enlightened individuals who can become the "entrepreneurs of their own lives" and ethical, civic and business leaders and organizers.²⁸ Thus, there are likely to be different pathways and coefficients and a package of societal metrics that need to be put on the table; b.) As I indicated above, the Honest Broker scientific refereeing of ideological political arguments requires the measuring of subjectivities: a society with a psychology of "entitlements" *might* be unhealthy, but the appropriate metrics for Sweden may show that "entitlements" are healthy when they are wired-up differently and express and strengthen mutual respect and democracy and provide resources for the genuine personal freedom to grow and prosper. Similarly, constructing a "dependency index" for macroeconomics

²⁷ I.e., rather than become victims, or pawns, or the drone employees of others, or people who look to governments and vote for a welfare state.

²⁸ Etheredge, "Wisdom . . . ," *op. cit.*. E.g., Lawrence Kohlberg, The Philosophy of Moral Development: Moral Stages and the Idea of Justice (San Francisco: Harper and Row, 1981); Jane Loevinger, Ego Development: Conceptions and Theories (San Francisco: Jossey Bass, 1976); see also David Winter, David McClelland, and Abigail Stewart, A New Case for the Liberal Arts (San Francisco: Jossey Bass, 1981).

(as some libertarian think tanks have proposed), equating (almost by definition) the public sources of individual income with an unhealthy, hierarchical, psychological relationship, begs an important measurement question; and c.) Once we see the numbers for a particular culture or subgroup, Greenspan and other libertarians may nevertheless be right.

3.) Culture

“A specific brand of culture - populism - has been particularly debilitating to economic progress. . . . Capitalism and socialism are specific about the conditions they deem necessary for the creation of wealth and rising standards of living. Populism [for example, in 20th and 21st century Latin America] is not. It is a shout of pain.”

“For those economies that seek maximum economic growth, it appears that abstinence and prudence are necessary (although not sufficient) virtues for prosperity.”

- Alan Greenspan ²⁹ ³⁰

²⁹ *op. cit.*, pp. 226-227.

³⁰ Abstinence and prudence are used by Greenspan as economic terms to refer to the percentage of income that is saved and invested for future returns, although there may be other behavioral (e.g., Puritan) correlates that he has in mind.

Concerning other variables, Greenspan writes: “Producing a fully detailed model is beyond the scope of this book. But such a model would include a number of variables reflecting those verities of human nature [or culture - LE] that reveal long-term economic stabilities. Among them are time preference (and interest rates), equity premiums, corporate earnings-price yields, and, since the 19th century, the private savings rate. They reflect the outer limits to fear and euphoria that define the dynamics of the business cycle. For forecasting purposes they can be assumed to continue trendless [unchanged - LE] in the future. . . . In addition there are those stabilities that are not inbred, such as the sum of social benefits and gross domestic savings as a percent of

“Innovative (thinking outside the box) entrepreneurship and prudence are largely, if not wholly, culturally-driven traits.”³¹

- Alan Greenspan ³²

Greenspan recommends cultural characteristics and metrics be included in the new era of 21st century economic forecasting models.³³ His relatively brief and topical discussion includes savings and investment rates (abstinence, forbearance and prudence), cultural differences in entrepreneurial risk-taking, and in the rule of law and corruption.³⁴ His primary examples are Euro-North countries v. Euro-South countries: Greenspan believes that “becoming more like Germany” (e.g., forbearance, prudence, a work ethic, a commitment to legal economic activity and paying taxes) is (in the abstract) the cultural solution to improve economic forecasts for Greece, Italy, Spain, and Portugal.³⁵

Since Greenspan’s book went to press there is growing agreement that national and cultural differences must be included in forecasting models. Although these still are, to a degree, a “black

GDP. Other forecast stabilities include the size of the workforce - those potentially in the workforce have already been born - and average hours worked.” p. 292.

³¹ China and Japan are cited as cultures that restrict innovation (p. 231).

³² *op. cit.*, p. 231.

³³ Adherence to the rule of law can be proxied by the share of illegal activity in GDP. Other national/cultural characteristics include social harmony and communications and a functional political system. (p. 231).

³⁴ Note that there are opposite elements in Greenspan’s model of economic growth - prudence (for savings) and risk-taking entrepreneurs.

³⁵ See also Lewis’s observations that include Ireland and Iceland (different peoples with different reasons) that took the cheap credit to the point of disaster: Michael Lewis, Boomerang: Travels in the New Third World (New York: W. W. Norton, 2011).

box,” the scientific failure to include them apparently has led to serious policy mistakes during the recent recovery, with (sometimes) opposite national effects of austerity from those that were forecast by economists.³⁶

- Again, Greenspan may be right in his list, but there are political implications to these equations and the social science package will need to be robust. For example, a.) Asian cultures with traditions of hierarchy, combined with obligations for moral, benevolent, responsible and competent leadership, may develop a group-based psychology that is a source of competitive economic strength. In Japan, a psychology of dependency within firms (a hated characteristic, in the terms of Ayn Rand or Governor Romney’s analysis of American economic performance) may be consistent with a highly competitive global automobile industry;³⁷ b.) Porter’s work on

³⁶ Howard Schneider, “An Amazing *Mea Culpa* from the IMF’s Chief Economist on Austerity” Washington Post, January 3, 2013 concerning a (still, somewhat mysterious) set of differences that imposed remarkable damage on the Greek recovery and that can change over time. For European recovery, pro-austerity recommendations were based on a forecast of a fiscal multiplier of 0.5 when the actual multiplier sometimes was 1.5, meaning that a dollar reduction in government expenditures actually produced a \$1.5 dollar reduction in GDP. Concerning other national/cultural variables that have emerged on the “to do” list to include in forecasting equations, see also Lawrence Summers, “Lessons Can be Learned from Reinhart-Rogoff Error.” Washington Post. May 5, 2013 (discussed at footnote 4 above): “. . . [W]hy should it be the same in countries with and without their own currency, with very different financial systems, cultures, degrees of openness and growth experiences?”

³⁷ Concerning dependency inside a benevolent hierarchy: The allegedly growing American trait cited by Governor Romney as dysfunctional and true of 47% of Americans in a “too generous” welfare state may, as part of a package, be a successful feature of Japanese culture and many of its economic organizations: see Frank Johnson, Dependency and Japanese Socialization: Psychoanalytic and Anthropological Investigations of *Amae* (New York: NYU Press, 1995). The possibilities of cross-cultural learning and of culturally appropriate public policies are explored in Nicolas Berggruen and Nathan Gardels, Intelligent Governance in the 21st Century: A Middle Way Between West and East (New York: Polity, 2012).

international competitiveness suggests a wider set of nation-state metrics.³⁸

There are many new cultural and sub-cultural groupings (e.g., c.) the economic behavior and causal dynamics of youth cultures) that might be the units of analysis, especially in countries with high and uncorrected rates of prolonged youth unemployment. Concerning the psychology of lower status individuals and their cultures: There may be d.) a Primate Subordination Syndrome that - even in objectively similar circumstances - reduces motivation, affects stress and endocrine levels and health, inhibits educational achievement, and is pervasively destructive of lower status primates.³⁹ The comparative neuroscience of lower status cultures may reveal a new universe of unrecognized causes (via the visual cortex and hierarchical imagination) of limitations in human economic potential. e.) The changing (post-deregulation) cultures (supported by changed recruitment and self-recruitment) of Wall Street and the financial world may be critical variables for economic forecasting.⁴⁰ f.) There are important (known) sub-cultural differences in

³⁸ Michael Porter, Competitive Advantage (New York: Free Press, 1985).

³⁹ Studies of the Primate Subordination Syndrome may clarify a parallel inhibiting factor in regulations - i.e., if they also are perceived as establishing a status and dominance hierarchy. Subjectivities are important in the measurement of the inhibition of economic motivation by status ranking: Sub-cultures may provide inoculating effects (e.g., strong religious identities with the vividly experienced assurance of love and respect from a Supreme Deity and social support) and perceptions of economic opportunity also may mitigate these effects. See Lloyd S. Etheredge, "Neuropsychology and Rapid Learning Systems About Social Problems," unpublished, January 2010 and October 25, 2012 (online at www.policyscience.net at II. A. For some of the emerging correlates of subjective inequality on health and economic and social participation and (possibly) social problems see Moises Velasquez-Manoff, "Status and Stress," The New York Times, July 27, 2013.

⁴⁰ Tom Wolfe, The Bonfire of the Vanities (New York: Picador, 2008), reprint. The new "Masters of the Universe" status psychology may view members of Congress and political leaders (by judging their annual salaries) as (at best) hired middle management. The global political manipulation and exploitation of tax laws and regulations reflect a subjective change. In the 1960s most American businessmen felt poorly informed about the world beyond the water's edge

the motivation for economic achievement, and problems of structural discrimination and limited economic opportunities for different groups, that effect economic performance. (Euro-South and other cultures that discriminate against women or that limit access to good schools and higher education for their youth (to cite obvious examples) may inhibit their own economic growth).⁴¹

B.) Inclusive Social Science Lists

In Step 2 a planning group will reach out to include known (or suspected) R&D variables and metrics from other economists and disciplines. These ideas, like Greenspan's, are at risk of disappearing unless they evolve into metrics and their contribution can be evaluated by inclusion in R&D data systems.⁴² At this point, we can measure almost any variable once we agree what they are.

4.) Behavioral Economics and Neuroscience

Researchers in behavioral economics often complain (rightly) that they are constrained to use small N experimental studies and do not yet have national data systems to allow the relevance of

and were hesitant to become involved in political lobbying: Raymond Bauer, Ithiel de Sola Pool, and Lewis Dexter, American Business and Public Policy: The Politics of Foreign Trade (New York: Atherton, 1963). For the historic evolution of accounting and legal departments (from "just pay what we owe") into major profit centers with global strategic plans and lobbying see, for example, David Kocieniewski, "GE's Strategies Let It Avoid Taxes Altogether," The New York Times, March 24, 2011.

⁴¹ Max Weber, The Protestant Ethic and the Spirit of Capitalism (New York: Penguin Classic, 2002) reprint; David McClelland, Human Motivation (New York: Cambridge University Press, 1988), Charles Murray, Human Accomplishment (New York: Harper Collins, 2009), and the work of Dean Keith Simonton.

⁴² For a range of emerging diagnoses about missing variables see the IMF Rethinking Macro Policy II: First Steps and Early Lessons conference of April 2013, with papers online: <http://www.imf.org/external/np/seminars/eng/2013/macro2/>

their discoveries to be evaluated. This planning project will be their chance.^{43 44 45}

Among other theorists, David Brooks has started to map a universe of fresh thinking about social and economic policy based on neuroscience discoveries. There is a new Society for Neuroeconomics (neuroeconomics.org) and emerging doctoral programs in neuroeconomics, and neurobiology and social science, whose members might suggest metrics for panel studies with genetics and brain data.⁴⁶ Full genomic mapping has fallen to \$1,000 per individual and is heading toward \$100 per individual: already genetic data (with some behavioral, social, and environmental data and electronic health records) are available in research databases (e.g., N=500,000 for the www.rpgeh.kaiser.org project).

An exciting challenge for this fourth task is to evaluate the possibility of genetic diversity in

⁴³ Daniel Kahneman, Thinking, Fast and Slow (New York: Farrar, Straus, and Giroux, 2011). The growth of behavioral economics with support from the Sloan and Russell Sage Foundations is addressed in Floris Heukelom, Behavioral Economics: A History (New York: Cambridge University Press, 2014).

⁴⁴ This step also will include metrics to explain and forecast innovation rates. Greenspan believes that it is the role of the financial sector to assemble and channel needed funds. However, a wider list of metrics is needed: innovation systems are much wider than a financial system. See Robert D. Atkinson and Stephen J. Ezell, Innovation Economics: The Race for Global Advantage (New Haven: Yale University Press, 2012).

⁴⁵ Olivier Blanchard posits a new behavioral variable: “adjustment fatigue . . . which is leading to maybe less reforms than would be desirable.” Transcript of a Press Briefing World Economic Outlook, October 8, 2013. International Monetary Fund, online.

⁴⁶ Concerning new funding, metrics and data systems: James Gorman, “The Brain’s Inner Language,” The New York Times, February 24, 2014. Investments include the EU’s decade-long \$1 billion Human Brain Project and the Obama Administration’s \$100 million startup.

the most important aspects of human nature relevant to economic behavior.⁴⁷ Only a very small number of people participate in creating financial booms and catastrophes and they may be atypical.

5.) Human and Social Capital

At the beginning of the 21st century most of the world has decided that market capitalism is the best engine for the future. There is a powerful and reciprocal relationship between the human and social capital of a society and the performance and outcomes (intended and unintended) of the economic system.

a.) Education. Especially in an emerging age of information technology and skills, investments in human beings are probably the most powerful contributions to economic growth. An exciting cluster of measurements can help to understand new, transformative opportunities for MOOCs and global education. We can bring a curriculum, equal to the best in the world, to the desktops of everybody in the world, virtually without charge. There is much experimentation to be done, and many additional investments required to turn online resources into a truly powerful education.⁴⁸ The second planning group will be asked to address the question: What should we measure?

STEM education has been proposed as a global metric, but one of the best areas for R&D research may be the psychological package of attainments that allows individuals to flourish as

⁴⁷ Greenspan believes that human nature is homogenous with respect to the major characteristics affecting economic behavior and performance. However high IQ is an exception: higher IQ increases capacities for abstraction and forethought, self-control, and delayed gratification, and thereby supports successful entrepreneurship and capitalism.

⁴⁸ U.S. President's Council of Advisers on Science and Technology (PCAST), Memorandum to President Obama concerning economic mobility, higher education, and MOOCs. December 2013. Online at www.whitehouse.gov.

“entrepreneurs” in their own lives and in the freer and more individualist societies implied by the system of market capitalism.^{49 50} A neuroscience snapshot of this larger “future-imagining-and-realization” or “taking responsibility for projects” cluster might include developing: 1.) capacities to be self-starting; and 2.) to create clear goals in which there is a genuine personal stake and that call forth commitment; 3.) to relate to aspects of realities as socially- and personally- created and changeable; 4.) learning how to identify or create alternatives; and 5.) how to decide upon and develop plans of action, assemble resources and enroll people and support (sometimes, including coaching); 6.) new brain mechanisms linking together abstraction, foresight and self-management (to achieve goals); 7.) a growing capacity to persevere (for short periods in doing elementary school assignments to several years when writing a Ph. D. thesis or book, and, then, even decades; 8.) growing cognitive capacities to manage integrated complexity and live and work with uncertainties and open-ended lines of thinking; 9.) capacities to persevere through a possible roller coaster of emotions along a path; 10.) to be self-reflective and able to think honestly and with integrity about what is working or not working; 11.) to be responsible about outcomes and breakdowns; and 12.) bring self-initiated projects to completion at a level of excellence.

In many areas of the world, formal educational systems (K-12 and college- even formal business schools) are not focused on doing the best job that they can to support this cluster and the future health that they imply for the world’s economic systems. STEM education may support this growth, but it is a narrow idea and, in the wrong hands, any content-specific curriculum and testing program can become the use of authority and peer pressure to motivate

⁴⁹ This educational cluster also will work for nonprofit institutions. The achievement/competitive drive for market capitalism is a separate psychological dimension: see McClelland and Winter, *op. cit.*

⁵⁰ The sociology of the G-20 education system and its relationship to G-20 economics involves a much wider set of issues. Mass production technologies may only have required mass production classrooms, with the goal of producing socialized students who were certified as willing to sit at desks for long periods and perform tasks assigned by authority, to reasonable standards, even if these were boring. Unless there are the right G-20 measurements, STEM education also can develop in this model.

behavior and produce diligent and mechanistic equation-solving or memorization. In truth, thoughtful measurement will be required from a planning group because the “being the entrepreneur and organizer of your own future” cluster might grow in many ways and from different sources: learning how to write academic papers and plan research, how to go step by step in your head to solve an algebra or geometry problem, practicing and achieving excellence in a competitive sport or playing the cello, or being a leader in student government, or (perhaps) an evolution of MOOCs, capstone projects, and new ways of teaching.⁵¹

b.) Moral breakdowns of institutions (including moral betrayal) may slow economic recovery, even if the issues are not discussed in public. David Brooks writes: “Moreover, it is harder to accept that psychological factors like uncertainty and anxiety really are a mirage . . . It has been harder to dismiss morality as a phantom concern, too. Maybe in a nation of [economic] robots the government can run a policy that offends the morality of the citizenry, but not in a nation of human beings.”⁵²

c.) The possibility that we are destroying social capital (without being fully aware of the

⁵¹ Comparative metrics for the performance of educational systems may be revealing: Greenspan’s (Euro-South) cultural critique of Italy, Greece, Spain and Portugal suggests that serious limitations of their authority-oriented and conventional K-12 educational systems also may exist. Public policy research in the US has found that first-rate schools (and graduation from high school) works. Good K-12 schools is emerging as one of the best societal investments for the economic and personal success of individuals. See Ron Haskins and Isabel Sawhill, Creating an Opportunity Society (Washington, DC: Brookings, 2009).

⁵² David Brooks, “The Two Cultures,” The New York Times, November 15, 2010. Online. See also Robert Fogel’s AEA Presidential Address “Catching Up with the Economy,” American Economic Review, 89:1 March, 1999), pp. 1-21 about “commodities that lack material form” and his The Fourth Great Awakening and the Future of Egalitarianism (Chicago: University of Chicago Press, 2000). Anomie in the former Soviet Union (a case that Greenspan does not discuss) is a striking example of perceived moral breakdowns that illustrates their devastating effects on many aspects of life.

process) is raised by Charles Murray and other writers.⁵³ 1.) High divorce rates and single parent families may (especially without compensating investments) be a bad idea for children with long term costs to themselves and to society. 2.) There may be a vital degree of now-eroding social capital, and trust, that depend upon the experience of people that good values and hard work and social responsibility are appreciated and rewarded. Politicians across the US political spectrum now run for office and address a perception that “playing by the rules” is not working in America. 3.) In Europe, astonishing and uncorrected rates of youth unemployment are accompanied by a politically dangerous and demoralizing public discussion of “a lost generation” that ultimately may not accept its fate.⁵⁴ 4.) The expectation (and reality) of social mobility may be part of social capital: variables associated with social mobility, across regions in the US and abroad, are likely to be revealing of partial blockage in causal pathways for economic health.⁵⁵ 5.) The Spence *et al.* consultation process addressing Chinese economic growth predicts that greater inequality in society is corrosive and becomes dysfunctional: inequality creates different interests and erodes a political process; it also fuels political combat and redirects energies that could be used more productively.⁵⁶

- d.) The Psychological Economy. The broader agenda for the planning group will be to

⁵³ Charles Murray, Coming Apart: The State of White America, 1960-2010. (New York: Crown Forum, 2012).

⁵⁴ For forecasting equations illustrating potential destabilizing effects of prolonged high unemployment for different groups, see Alan de Bromhead *et al.*, “Right-wing Political Extremism in the Great Depression.” Unpublished working paper online at www.voxeu.org.

⁵⁵ See the geographic variations in social mobility within the US and new variables identified by Raj Chetty and his associates: <http://www.equality-of-opportunity.org/>

⁵⁶ Edwin Lim, Ian Porter, Paul Romer, and Michael Spence, “Medium and Long Term Development and Transformation of the Chinese Economy: A Synthesis Report.” March 2011 (online at www.cairncrossfund.org): “If not addressed such disparities risk fueling greater social conflict and instability,” p. 69. See also their lesson for new models: “social policymaking must be tightly integrated with economic policymaking,” *op. cit.*, p. 71.

advance the sensitive and respectful measurement of the “psychological economy” - which I define (following Fogel) as all aspects of the economy - its input and functioning, and its “commodity” outputs and effects - that lack a material form. Coming from the metrics and the limited concerns of national income accounting (and independent and dependent variables defined by accountants and the tax code) and the physical realities of nation-state, steel plant economies, these new metrics will help us to grasp a changing world of complex, sometimes interdependent, systems and subsystems whose outputs shape the quality of our lives and the material-form economy.⁵⁷ One of the leading edge questions (likely to be flagged as “important, but needing further research before metrics can be recommended”) is a refined understanding of the social recognition and status economy and the production systems that societies link to what Greenspan calls the “herd’ (social) instincts. Competition for recognition and status can be as important as competition for economic rewards. And institutions and societies create status scarcities and competitions that function as motivators. (Arguably, one of the most important reforms that Margaret Thatcher brought to the UK was to make it socially acceptable for higher status people to become successful entrepreneurs.)

6.) Political Variables

“Shadow banking is a form of financial intermediation whose funding is not supported by the traditional banking safety nets . . . the shadow banking system remained slightly more than half the size of the regular banking system throughout the 2002 to 2011 period . . . In the United States alone, shadow banking constituted \$23 trillion in assets at the end of 2011, by far the largest constituent of the global network of

⁵⁷ See, *inter alia*, Lasswell and Kaplan, *op. cit.*; Robert E. Lane’s pioneering The Market Experience (New York: Cambridge University Press, 1991) and The Loss of Happiness in Market Democracies (New Haven: Yale University Press, 2001); Robert Putnam, Bowling Alone: The Collapse and Revival of American Community (New York: Simon and Schuster, 2001); Fogel, “Catching Up” and The Fourth . . ., *op. cit.*

nonbank credit intermediaries.”

-Alan Greenspan ⁵⁸

“Institutional flaws are best prevented, because they are hard to fix. Once an institutional structure is in place, people quickly acquire a vested interest in its preservation. The flawed structure then becomes surprisingly resistant to reform, as the US health-care system clearly demonstrates.”

- Lim, Porter, Romer and Spence ⁵⁹

“Our highest priority going forward is to fix our broken political system.”

- Alan Greenspan ⁶⁰

Every societal goal has a production function: most desired outcomes can be produced several ways and by different mixes of inputs. In turn, politically, each input mix may allocate new economic income, status, power and control differently, to different beneficiaries and constituencies. To improve scientific knowledge and (with a genuine Honest Broker intent) to build political support, step six also will seek input from a full range of think tanks, activists, and others to expand upon Greenspan’s list.

Greenspan has a wide range of personal observations about dysfunctional political systems, ranging from a theory that an *angst* caused by American political schism and conflict is reducing long-term business investments and slowing recovery, to genuine puzzlement about why Washington leaders cannot sit down (as they did in earlier days) for drinks after hours and reach

⁵⁸ *op. cit.*, pp. 40-41.

⁵⁹ Edwin Lim, Ian Porter, Paul Romer, and Michael Spence, “Medium and Long Term Development and Transformation of the Chinese Economy: A Synthesis Report.” March 2011 (online at www.cairncrossfund.org), p. 71. Discussed in footnote 4.

⁶⁰ *op. cit.*, p. 302.

compromises.⁶¹ This initial project cannot do full justice to the range of these conceptual, theoretic, and measurement issues, which have extensive literatures in several social science disciplines. However, several key political system issues can be reviewed by the second planning group.

a.) Is “Human Nature” a Political Misdirection?

Social scientists will instinctively ask whether Greenspan’s (“it’s human nature!”) ideas are a political misdirection and *mea culpa* that focus attention away from the real (political) variables that should be included in the world’s macroeconomic prediction equations. Yes, the Tulip Mania of the 1630s and many of the financial bubbles and panics of history may have been produced by primitive emotions and people who stumbled through history to a catastrophe and did not understand the eventual behavior of the system and their fate.⁶² However, the world’s “shadow” banking systems [whose size is indicated by Greenspan in the quotation at the beginning of this section] and their international lobbying expenditures and political largesse did not arise by accident.⁶³ And the first edition of Kindleberger’s Manias, Panics, and Crashes: A History of Financial Crises (now in its sixth edition) was published in 1978.⁶⁴ Of course Kindleberger did not intend to write a handbook, but subgroups in generations of financial analysts, by now, may have gone to school on the amounts of money that they can make if they

⁶¹ Greenspan has a list of observations about how the American political system (and the Latin American political systems, and the Chinese political system, and the Euro-South political systems, etc.) are dysfunctional. Some of the problems might benefit from a greater degree of agreement in economic science: Greenspan may be right that Latin American Populism is a “shout of pain” and can be shown to lack a coherent and effective economic theory.

⁶² However see CW and AJKD, “Was Tulipmania Irrational?” The Economist, October 13, 2013.

⁶³ See also Sebastian Mallaby, More Money Than God: Hedge Funds and the Making of a New Elite (New York: Penguin Press, 2011).

⁶⁴ (New York: Basic Books, 1978).

activate asset bubbles, and then manipulate the irrationalities and deceive the trust of others and, thus, outsmart the system. In the recent crisis, brilliant hedge fund managers hyped asset bubbles, falsified or obscured credit ratings, and also bought insurance (e.g., through AIG) to cover themselves when the asset bubbles finally burst. *Pace* Greenspan, perhaps the instincts that society has to blame, or worry about, are not homogenous endowments of animal spirits or shared herd (social) instincts of people drawn into the irrational exuberance of competitive games, but brilliantly rational, realistic, strategic (gratification-deferring) predators at the atypical upper tail of statistical distributions? In a phrase of the psychologist William James, “the beaked and taloned predators,” with an absence of social instincts?

b.) Politics can be the continuation of economic competition by another name. The news media can draw audiences by creating a drama that implies, ultimately, that governments are in charge of societies. However some businessmen do not live inside this media-created drama. The possibility that some wealthy entrepreneurs might relate to national government and politics as dependent variables (to be manipulated and managed) is a possibility that may be especially important to explore for G-20 nations since assertive (and, ultimately, poorly regulated) actors in a subset of G-20 countries may collude and act across national boundaries. There is indirect evidence to suggest that growing asymmetries of brainpower and concentrations of wealth are deployed against (penetrated) political systems to induce deregulation and achieve other benefits. Specifically, the world had, from the late 1970s through 2003 (according to IMF data) 117 crises of banking systems in 93 countries in which much or all of the capital of the system was exhausted. In Martin Wolf’s assessment of these cases, the banking industries developed strategies of privatizing their gains during the upside of financial bubbles, then secured government bailouts from taxpayers as losses during the crisis phase became large enough to wipe-out remaining bank equity and destroy the economy. In 27 of the earlier crises, taxpayers were stuck with added public debt equal to, or greater than, 10% of GDP, often much more. When similar, highly strategic people continue to win [“privatize the gains”], with a similar *modus operandi*, the better, new forecasting models might be based on the classic dynamics of predator-prey

ecosystems described by the Lotka-Volterra equations.⁶⁵ If this theory proves to be correct, and the G-20 nations want to improve economic forecasting, the best question suggested by upgraded social science forecasting could be: “What are *they* [the alpha predators] planning next?” And every chief of state might ask that the best (public) economic forecasting models be accompanied by secret reports and forecasts from his intelligence agencies based on massive penetration of the national and global financial sectors and especially the “shadow” sector.

By contrast with Greenspan, it is interesting to consider the perspective of David Stockman, a former OMB Director for President Reagan who later made a fortune on Wall Street. In Stockman’s view, the major players always are trying to outsmart each other - and the same instincts are directed against governments as on the economic playing fields; in his analysis, few governments, including the American government, can play in this new game and win.⁶⁶

C. Finding Unknown Variables and Organizing Rapid Learning Systems

“We are confronted with . . . ‘unknown unknowns’ . . . ”

- Olivier Blanchard⁶⁷

The third planning step will develop methods to find unknown variables and causal relationships and organize rapid learning systems.

⁶⁵ Martin Wolf, Fixing Global Finance (Baltimore, MD: Johns Hopkins University Press, 2008), pp. 32-33. Lloyd S. Etheredge, “Predator-Prey Models: Forecasting a Global Financial System with Asymmetries of Brainpower and Money,” Memorandum # 17 for the Fischhoff (NRC) Committee on Behavioral and Social Science Research to Improve Intelligence Analysis for National Security. Online at www.policyscience.net at II. D.

⁶⁶ David Stockman, The Great Deformation: The Corruption of Capitalism in America (New York: Public Affairs, 2013).

⁶⁷ David Wessel, “Olivier Blanchard’s Five Lessons for Economists from the Financial Crisis,” Wall Street Journal, April 1, 2013.

The model for Step 3 will be the new rapid learning systems of international biomedical research that use “Everything Included,” large N, curated databases partly underwritten at public expense. Until recently, cancers were classified by their site of occurrence (e.g., breast cancer, lung cancer). Now, with “Everything Included” databases (100,000++ variables per patient, and tens of millions of patients and their genetic information and electronic health records being linked in international networks), new machine learning algorithms have established themselves as a disruptive, breakthrough technology. They brilliantly help human researchers to replace old paradigms more quickly than traditional systems of single investigator awards. An investigator is not limited to imagine (ahead of time) the specific hypothesis to be tested and, then, fated to discover unknown variables only by accident.

With this powerful investment in new scientific technology, the biomedical world is changing. It now appears that there may be 10 or more different types of cancer that appear in the breast or the lung (etc.), each with its own complex causal pathway (linked to the genetics of the specific individual). Each type has its own universe of newly emerging treatment possibilities and the exciting future that humanity is facing is a new *precision* medicine also tied to genetic and other unique characteristics of each patient.⁶⁸

Discovering unknown variables and relationships is becoming an automated science. This could be G-20 macroeconomics!

For this third planning group I think that the challenges to develop “Everything Included” research strategies are: What constitutes Everything? (For example, when you include psychology and neuroscience and when the social sciences do not yet have the equivalent of the periodic table and the human genome?) How fast do we want to learn? And what G-20 priorities to recommend? It is an open-ended question, and the powerful machine-learning Big Data, paradigm-busting methods may be sensitive to initial omissions of variables or error rates in

⁶⁸ B. Vogelstein *et al.*, “Cancer Genome Landscapes,” *Science*, March 29, 2013, pp. 1546 - 1558, attached to this proposal.

metrics.

7.) Big Data and Private Sector Partnerships

The seventh planning project will map how the startup of “Everything Included” R&D economic data systems can be linked together in international partnerships with the private sector. A useful initial global project might be data mining and rapid, cumulative learning concerning consumer/household behavior and marketing.⁶⁹ Just as 11,000 individual Walmart store managers in 27 countries are currently expected to run three to five experiments each week, so a R&D consortium of interested global corporations could be linked with leading business schools in rapid learning systems.

For example, it might be easy for these partnerships to organize large N, randomized cross-cultural experiments of advertising and marketing for all demographic groups and all nations and cultures.⁷⁰ Companies like Mastercard or Google would have incentives to contribute data to an initial R&D data system, since discoveries of how their data can be combined with other data make the business case for why their future data should be purchased to improve economic models and forecasting, worldwide.⁷¹

⁶⁹ See Liran Einav and Jonathan Levin, “The Data Revolution and Economic Analysis.” Unpublished manuscript, May 1, 2013 prepared for the NBER Innovation Policy and the Economy conference.

⁷⁰ Concerning steep cost reductions by designing collaborative global rapid learning systems, see Michael S. Lauer and Ralph D’Agostino, “The Randomized Registry Trial - The Next Disruptive Technology in Clinical Practice?” The New England Journal of Medicine, October 24, 2013, pp. 1579 - 1581.

⁷¹ Academic social science might benefit from this project. American social psychologists typically have used their undergraduates as experimental subjects, and there are sparse discussions in standard textbooks about how human beings in other cultures might behave differently than American undergraduates in the late 20th and early 21st centuries. A discovery by American

8.) New Methods

“How reliable are these tools? . . . They work but they don’t work great. People and institutions find ways around them.”

- Olivier Blanchard ⁷²

The third planning group also will consider recommendations for faster and better learning cycles in the US and G-20 nations. For example:

a.) Data collection and analysis should be faster and supplemented by new methods to estimate coefficients. Traditional forecasting uses quarterly time series data and regression equations, but this clearly is too slow and unable to detect changing coefficients in a timely fashion. A new universe of real-time sampling and monitoring will be useful: Walmart has global data on sales, by store and product, online within 24 hours and the global banking system clears most of the transactions of the world economy within several days. Soon, it could be possible to monitor economic behavior and track the effects of economic policies in real time.

b.) To work through, and master, the integrated complexity that economic science must face requires new methods for modeling and display. These are large, living, complex and (sometimes) adaptive systems composed of large, living, complex and (sometimes) adaptive subsystems that may be loosely or tightly coupled or even partly inconsistent with each other. The biomed-

Express [informal communication] that social media effects (e.g., knowledge of a friend’s purchase) have 3- to 5- times greater impact to influence purchasing decisions of Egyptian teenagers (compared to American teenagers) may stimulate thinking for a wider universe of new and informative discoveries about cross-cultural social psychology.

⁷² Wessel, *op. cit.*. Blanchard’s five lessons emphasize the need for analytic tools with much more “plumbing” detail: “We do macro on the assumption that we can look at aggregates in some way and then just have them interact in simple models. I still think that’s the way to go, but [experience] shows the limits of that approach. When it comes to the financial system, it’s very clear that the details of the plumbing matter.”

cal world has been evolving new and sophisticated computer simulation models of the human body (beginning at the molecular level) - with extensions to medical practice decisions, public health and government policy - that will be worth evaluating for their applications to macroeconomics and G-20 forecasting.⁷³

c.) Cross-walking past economic policy mistakes and forecasting errors in G-20 countries may be useful: A new, meta-learning strategy in biomedical research is to analyze the eventual discovery of lethal side-effects of approved drugs and to calculate how much larger new rapid-learning data systems should become if we want to catch such types of mistakes in the future in three months, or six months, or two years (etc.).⁷⁴

d.) Panel studies are another useful innovation, especially to achieve the “Everything Included” vision for R&D. [Traditionally, economists have correlated independent and dependent variables (defined by accountants or tax laws) and told (without an independent examination of the mechanisms) a rational choice, profit-maximizing story to explain the links. Now, with alternative explanations and pathways, panel studies can, using multiple methods, provide much more information, and in depth, to compare different theories.] Especially with compensation, many people might be willing participants. In addition to formal guarantees of privacy, the panel membership could be limited to several years and, thereby, reduce concerns about broader invasions of privacy. There are multiple groups of actors in economies, and a diverse range of these panels are likely to be recommended by the planning group.

⁷³ For example David Eddy’s Archimedes Project originally developed for Kaiser Permanente: <http://archimedesmodel.com/> . The model and its mathematical methods recently have been acquired for international medical practice, pharmaceutical research, and public health advising by STG, a global venture capital company.

⁷⁴ See Larry Norton’s overview of the wider rapid learning system for cancer, https://www.ecri.org/Video/2013_TA_Conf/4-Session-1-Norton.mov. See Blanchard (2011) *op. cit.*

e.) Computer-assisted content analysis (discussed in footnote 14) may help to understand public moods and the emotional component of recovery processes.

f.) Empirically-defined variables (rather than accounting-defined variables) might be useful experiments. Greenspan's forecasting ideas place great weight on the (alleged) very high rate of consumption (and low savings) in American households, but most families may view many of their expenditures differently, as investments contributing long-term benefits to their lives and the lives of their children.

g.) To libertarians, except for the contributions of a minimal government (e.g., national defense), most public sector expenditures can be just political shell games and "theft" (transfer payments). Greenspan does not use this term: However a current lack of analysis methods skews his analysis into a story of how the financial sector, securing private savings, plays the leading role in the economy by assembling and allocating funds for the new investments that increase productivity and the possibility of higher standards of living. Yet all sectors (including governments) actually make investments. The broader measurement challenge for forecasting equations is to measure what investments are good investments, not who makes them. Whether society is "investing enough" cannot be calculated, as Greenspan does, by the percentage of the average household income that is saved: the public sector investments (paid through taxes or deficits) also must be measured and evaluated.

h.) Weighted scenarios and game-theoretic methods (even war games) may be useful to forecast the emerging national and global financial systems with asymmetries of wealth and brainpower. In testimony to draft laws and regulations, some economists already systematically analyze loopholes and vulnerabilities and forecast how these will be exploited.⁷⁵

⁷⁵ Charles Calomiris and Alan Meltzer, "How Dodd-Frank Doubles-Down on "Too Big to Fail," *Wall Street Journal*, February 12, 2014. See also Sheila Blair's answer to the questions: "Can regulators ever be as nimble as the regulatees?" and "Given the cat and mouse game between regulators and regulatees, do we have to live with regulatory uncertainty?" In her "Everything the IMF Wanted to Know About Monetary Regulation and Wasn't Afraid to Ask"

9.) Rapid Learning Systems

“With a century and half of clear, detailed information on crisis after crisis, the burning question is not How did this happen? but How did we ignore that long history, and think that we had solved the problems with the business cycle?”

- Joseph Stiglitz ⁷⁶

An evolving design of a global rapid learning system for macroeconomics needs a self-reflective theory of itself - and metrics. The practical realities of the system, and the speed of its learning cycles in the G-20 (and beyond), will depend upon the evolving design of a complex (sometimes) adaptive system composed of complex (sometimes adaptive) subsystems. Once, the focus of philosophers was to discover how a single individual could become wise: Today, we recognize wider problems, especially in democratic systems: How, in Stiglitz’s terms (in the quotation above) do we get *other* people (and systems) to listen and to remember?⁷⁷

Creating a rapid learning system also will depend upon recognizing that it is in the self-interest of each G-20 nation, in a world of globalizing economies, that other nations (and private sector decision makers) adopt realistic and evidence-based policies and that everybody prospers. Upon a news media that support the system. And upon funding, honesty and reliability, and institutional homes, and much else. What are the variables to measure, the theories to test, who are the allies, where is the funding, what are the disruptive technologies to deploy?

online at <http://www.imf.org/external/np/seminars/eng/2013/macro2/pdf/sb.pdf>

⁷⁶ Joseph Stiglitz, “The Lessons of the North Atlantic Crisis for Economic Theory and Policy,” <http://blog-imfdirect.imf.org/2013/05/03/the-lessons-of-the-north-atlantic-crisis-for-economic-theory-and-policy/>

⁷⁷ See also Etheredge, “Wisdom . . .” *op. cit.*; Ascher, *op. cit.*

II. Work Plan – May 1, 2014 – June 30, 2017

The project will organize an Advisory Committee to develop initial plans. Next, it will complete three steps in three years (each step taking about a year, with three areas of focus). Each step will have a planning group (N=12-14 members, with a degree of overlap) and will produce a Report.

Each planning group will produce a report (i.e., the grant will deliver three Reports) to the sponsors with recommendations of variables and metrics to produce a state-of-the-art international rapid learning system for macroeconomics. Each of the three Reports will address: 1.) Recommended variables and metrics that are on the shelf and that can be deployed immediately; 2.) Recommended metrics that can become available soon, with additional work; 3.) Important areas where further R&D is needed before metrics can be recommended.⁷⁸

The budget supports a full time Principal Investigator with part-time assistance and expenses. Expenses include honoraria and travel for Advisory Committee and planning group members, initial discussions between the PI and each working group member, and a 1 ½ day meeting of each planning group.

The Advisory Committee (five members) will be the joint responsibility of the PI and [the home institution for the project]. The project is envisioned as part of a long term research program at [the home institution] devoted to achieving a rapid learning (international) system for macroeconomics. [The home institution] may seek additional funds for Fellowships, research to analyze new data, and additional, concurrent conferences and lecture series.

⁷⁸ This initial project will focus on macroeconomics of the G-20 system. Additional data systems and better forecasting equations may benefit all countries.

III. Budget and Budget Narrative (to be added)

IV. Attachments

Bert Vogelstein *et al.*, "Cancer Genome Landscapes," Science, March 29, 2013, pp. 1546 - 1558.

Lloyd S. Etheredge, The Case of the Unreturned Cafeteria Trays (Washington, DC: American Political Science Association, 1976).

Lloyd S. Etheredge, Brief Biography and Curriculum Vitae.

Innovation strategy 3: An accelerated learning system for economic science

From: "Lloyd Etheredge" [REDACTED]

Date: Tue, August 5, 2014 1:36 pm

To: [REDACTED]

Cc: pcast@ostp.gov

Dear Jason Miller and Tom Kalil:

In further response to your request for new strategies to accelerate scientific innovation and economic prosperity, I enclose a proposal to develop a rapid learning system for macroeconomics. There is a growing recognition that there are missing variables in economic science, and the forecasting models do not work as well, across the G-20, as we would like. We do not have a national R&D system that is designed, led, or funded for these challenges and Big Data opportunities: The enclosed proposal illustrates what one social scientist, as a Principal Investigator, could do in 3 years.

However, in addition, we also can draw upon lessons from the rapid learning system for physical health to move more boldly, and quickly, for economic health. Appendices are online at www.policyscience.net at I. A. We ought to move quickly to organize behavioral economics working groups at the G-20 meeting: everybody needs comparative data because coefficients in US models that are interpreted as rational choice may include components of culture and psychology with other pathways relevant to policy, just as there are proving to be multiple pathways that affect how we classify medical conditions and treatment options.

Lloyd Etheredge
Dr. Lloyd S. Etheredge - Project Director
Policy Sciences Center

[REDACTED]
[REDACTED]
URL: www.policyscience.net; [REDACTED]

Please reply to: lloyd.etheredge@policyscience.net
[The Policy Sciences Center, Inc. is a public foundation that develops and integrates knowledge and practice to advance human dignity. It was founded by Harold Lasswell, Myres McDougal, and their associates in 1948 in New Haven, CT. Further information about the Policy Sciences Center and its projects, Society, and journal is available at www.policysciences.org.]

THE POLICY SCIENCES CENTER, INC.

Project Director: DR. LLOYD ETHEREDGE

May 27, 2014

Hon. Bill Clinton, Founder
Bill, Hillary and Chelsea Clinton Foundation

Dear President Clinton:

I write, from the policy sciences tradition at Yale, to ask if you would create a **Clinton Global Economy Commission?**

a.) The Global Economy Commission's work can accelerate progress toward the Clinton Foundation's current goals for economic development, global health, and education and other opportunities for women and girls.

b.) We need to rethink economics as a top global priority. The economic recovery is too slow, the guidance of economic science has become unreliable, and there are good ideas for rapid learning.

c.) We need credible political messages to create hope and confidence (especially for the international youth generation). The forecast of the intelligence community is that forces are building under the surface. A derailing politics of anger, replaying the politics of the 1930s with leadership from the political Right, may grow in Europe and elsewhere as a generation of unemployed young people, and others, perceive that they are being written off and Establishments remain limited by unreliable economic science.

Here, in three areas, are examples of how, with your leadership, a Global Economy Commission can bring the pieces together.

1.) **Rethinking Economics.** We have bet the world's future on the performance of a global economic system and there are very few problems in any nation that cannot be made better by a 1% - 2% increase in the growth of GDP/capita above the pre-crisis baseline. However, the lives of several billion people are being injured, and our futures are being mortgaged, by unreliable scientific theories in a world that has changed since early economic science was created. The tradition of using a few aggregate numbers and relating them in simple equations (with stories about rational choices) has reached a point of diminishing returns. There is a growing agreement that there are many missing variables in economic

The Policy Sciences Center Inc. is a public foundation.

The Center was founded in 1948 by Myres S. McDougal, Harold D. Lasswell, and George Dession. It may be contacted c/o Prof. Michael

URL: <http://www.policyscience.net>

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science. At the same time, there are good ideas to use scientific method for rapid learning, including successful examples of Big Data and rapid learning systems developed by biomedical researchers for breast cancer and other forms of cancer.

I enclose a draft plan of what I, and the policy sciences tradition, could help you and the Commission to build (**A Rapid Learning System for G-20 Macroeconomics: From Greenspan to Shiller and Big Data**).¹ Rapid learning includes a historic opportunity to build fresh thinking and evidence to move beyond partisan gridlock and ideology-based beliefs. For example: Alan Greenspan is willing to suspend Republican mistrust of social scientists and supports new measures and scientific testing of Republican ideas. New measures from neuroscience can test these and newer ideas, including a potentially transformative theory for human rights and economic and societal progress, the Primate Subordination Syndrome.

One high priority area for your Commission's study ought to be how to restore, and sustain, confidence by different economic actors. Social scientists (pp. 4-5 of the proposal) have begun to map seven lines of investigation. (You might wish to provide leadership for this R&D Grand Strategy: One of the accomplishments of your Administration was to restore and sustain confidence for economic growth.)

2.) **Investing in People**. The Clinton Global Economy Commission could study and recommend a new economic paradigm, **Investing in People**. You could recommend a warm welcome to youth generations in all countries, and a shared global commitment to provide them (using MOOCs and other new technologies) with access to a curriculum equal to the best in the world and opportunities for good jobs in growing economies. The Commission can send a worldwide political message to young people.

The educational pieces can come together quickly: I enclose a letter to Richard Levin, former President of Yale, in his capacity as President of Coursera, outlining a package of emerging ideas for a **Fast Track** option to add post-secondary education capacities for 360 million students, including women and minorities. As you did in Arkansas, a similar global commitment can be extended for K-12 education, with online curriculum materials equal to the best in the world.

- As part of a new **Investing in People** global economic paradigm, the Commission could produce a **Fast Track** plan for a **global public health/health professions and medical school curriculum** that quickly builds capacities for health in all countries and good jobs in a growing health sector. I discuss this priority in the letter to Richard Levin: The study and strategic plans will extend Secretary Clinton's initiatives to invest in the health of everyone on the planet - including the health of women, children, minorities.

3.) **Reliable Global Finance**. We need a statesmanlike study of the requirements for a reliable system of global finance. The global economy needs a system that can link good business opportuni-

ties, in every country, with investors. However we also need to understand how this powerful and growing sector can operate, worldwide, without damage: a.) How to safeguard against exploitation and boom and bust crises and government regulatory systems that are captured or, in cat-and-mouse games, always lag behind?; b.) We need the wisdom to redesign incentives and assure that systems of taxes, complex accounting, and political influence do not divert the world's brainpower and energy into making money by creating and exploiting accounting differences and tax loopholes, or super-fast trading and gambling, and other diversions from real economic growth; c.) The Commission may wish to study options for international cooperation in wealth taxation (to assure that the wealthy pay a fair share).

Ambassador Holbrooke once said that, in negotiating the Dayton Accords, he designed seating arrangements so that a leader, whom he thought would be tempted to cheat, would sit across from you at dinner: "After sitting across from President Clinton, and talking to him for several minutes, he would know that he could never get away with cheating, and the deal will hold." The same lesson applies to a reliable system for global finance: if you bring together the thinkers and guide the process, people know that you are tough enough that the Commission's work can be trusted.

Next Steps

My thinking is that, while Working Groups and White Papers can get underway with their own timetables and agendas, the Commission should aim to complete its work in three years. The study process can create agendas and build support for the next American Administration and other governments.

If you are interested, I would like to meet with you in New York (or Washington) to discuss your potential leadership and exchange ideas about organization, membership, and fund-raising for the Clinton Global Economy Commission. I would hope to play a key role in the Commission's work. My strength is creative thinking and social science: My current work includes missing psychological variables and a rapid learning system design (enclosed), a dimension that will require three years and a preliminary outline for a G-20 R&D data system for the November summit in Australia. Re MOOCs and planning the global public health/medical school curriculum: the technologies and Fast Track ideas would make possible a planning meeting by Ambassador Goosby this fall. The coalition of partners for the new **Invest in People** framework can start quickly, reach young people in all countries, and dramatically transform global education within three years.

Sincerely,



Dr. Lloyd S. Etheredge, Director
Government Learning Project

cc: Ambassador Eric Goosby, Robert Rubin

Enclosures:

- Letter from Frances Cairncross, Rector - Exeter College, Oxford
- LSE, Letter to Richard Levin re Fast Track global education plans and a Berkeley conference.
- LSE, "A Rapid Learning System for G-20 Macroeconomics: From Greenspan to Shiller and Big Data."
- Selected data and articles re prolonged youth unemployment and political confrontation/instability and the growth of global demand (1 million+) for online public health education.

Endnotes

1. I enclose a letter from Frances Cairncross, Rector of Exeter College, Oxford, supporting the timeliness of a bold and openminded rethinking of economic science. The Cairncross Economic Research Foundation has helped to underwrite the education of many of China's top economists; it also has organized visionary, high-level studies for the Chinese government, including the remarkable project headed by Nobelist Michael Spence (cited in the paper) concerning the "to do" list of economists for innovative thinking and theories that will be required for China, and many other nations, in the years ahead.



Verizon Message Center

Tuesday, Apr 29 at 4:16 PM

From: Frances Cairncross

To:

Subject: Rapid Learning System

Dear Dr Etheredge,

I am mortified to have left you for so long with no acknowledgement of your proposal, sent to me six weeks ago. My only excuse is that we have been celebrating, pretty much non-stop, our 700th birthday here at Exeter College. Your envelope arrived just as we set off for Hong Kong for the Asian round of jollity; today, we hosted our Honorary Fellow, the Queen of Spain, which is almost the last event in a packed calendar.

I will watch with interest the progress of this ambitious project. As you say in your paper, the enterprise is timely. The recovery has been sluggish. The hardest thing to forecast, of course, is always the immediate past. But we clearly need some ambitious and open-minded thinking. Anyone who can come up with so many theories about the return of cafeteria trays (let me know if you find one that really works...) is the right person to pursue this task.

With warm good wishes

Frances Cairncross

--

Frances Cairncross, CBE, FRSE
Rector
Exeter College
Oxford OX1 3DP

Phone:

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Proposal

A Rapid Learning System for G-20 Macroeconomics:

From Greenspan to Shiller and Big Data

by

Lloyd S. Etheredge

March 6, 2014
(Draft)

Proposal

A Rapid Learning System for G-20 Macroeconomics: From Greenspan to Shiller and Big Data

by
Lloyd S. Etheredge¹

Abstract

There is a growing agreement that there are missing variables in economic science. Robert Shiller (2014) believes that needed progress can be achieved by creating, and then drawing upon, an inclusive behavioral science framework that “accounts for actual human behavior.”² Independently, Alan Greenspan has started to build this expansion. He draws upon a lifetime of experience, and reflections on the recent economic crisis and recovery, to recommend the behavioral variables that, with appropriate metrics, should be added to the world’s data systems and forecasting equations.³ The purpose of this project is to build upon Greenspan’s outline and Shiller’s vision and use them as a stimulus for expanded, multi-disciplinary, and inclusive R&D data systems that can be deployed internationally to create a rapid learning system for macroeconomics.^{4 5}

¹ Lloyd Etheredge is Director, Government Learning Project, at the Policy Sciences Center, Inc., a public foundation; URL: <http://www.policyscience.net>. Contact: [REDACTED]

[REDACTED] This is a draft grant proposal. Comments welcome: Please do not circulate without permission.

² Robert Shiller, “The Rationality Debate: Simmering in Stockholm,” The New York Times, January 14, 2014.

³ Alan Greenspan, The Map and the Territory: Risk, Human Nature, and the Future of Forecasting (New York: The Penguin Press, 2013).

⁴ The columnist Robert Samuelson reported a disciplinary pessimism about finding new and better policy ideas in current models and data systems at the invitation-only IMF summit last year: Robert J. Samuelson, “The End of Macro Magic,” Washington Post, April 21, 2013. Concerning new variables, see also Lawrence Summers, “Lessons Can be Learned from Reinhart-Rogoff Error.” Washington Post. May 5, 2013: “In retrospect, it was folly to believe that with data on about 30 countries it was possible to estimate a threshold beyond which debt became dangerous. Even if such a threshold existed, why should it be the same in countries with

The project is timely. Global economic recovery is lagging and established models and data systems have not worked reliably. The addition of new variables (each, likely influenced by several pathways) raises the possibility of a new set of effective policy tools (for example, to restore confidence and accelerate economic recovery). There is exciting and creative thinking among economists that will be captured by the project (i.e., and these upgrade ideas can disappear unless they evolve into metrics and are included in new R&D data systems of the G-20). There are very few problems in the world that cannot be made better by a speedier return to economic health and adding another 1%/year to long-term GDP/capita growth. And in February 2014 the G-20 governments made a public commitment to better results. They promised to *“develop ambitious but realistic policies with the aim to lift our collective GDP by more than 2 percent above the trajectory implied by current policies over the coming five years.”*⁶ More inclusive economic models and data systems should help to improve economic science and get these results for the G-20 and other nations.

and without their own currency, with very different financial systems, cultures, degrees of openness and growth experiences?” Summers also recommends surrendering the comfortable dream of “returning to normal” and a world already charted by established equations and data systems: “the presumption that normal economic and policy conditions will return at some point cannot be maintained.” (“Economic Stagnation is Not Our Fate - Unless We Let It Be,” Washington Post, December 18, 2013). A consulting project for China, with leadership by the Nobelist Michael Spence, concludes that the ideas that must guide China’s next phase of growth “step outside well-known economic models” and require tasks of adding metrics and variables into formal models that are “very much on economist’s ‘to do’ list:” Jonathan Schleferfeb, “Nobel Winner’s Frank Advice to China’s Leadership.” The New York Times, February 17, 2014.

⁵ The commitment of the policy sciences tradition is to develop inclusive frameworks to guide democratic decision making. See Harold D. Lasswell and Abraham Kaplan, Power and Society: A Framework for Political Inquiry (1950) (New Brunswick, NJ: Transaction Publishers, 2013), reprint with an Introduction by Ronald Brunner; the behavioral sciences made impressive steps toward this goal, even several decades ago: Lloyd S. Etheredge, The Case of the Unreturned Cafeteria Trays (Washington, DC, 1976) and the “Map” (attached as an Appendix to this proposal) and *idem.*, “Wisdom in Public Policy” in Robert Sternberg and Jennifer Jordan (Eds.) A Handbook of Wisdom: Psychological Perspectives (New York: Cambridge University Press, 2005), pp. 257-328; William Ascher, Bringing in the Future: Strategies for Farsightedness and Sustainability in Developing Countries (Chicago: University of Chicago Press, 2009).

⁶ Jamie Smyth, “G20 Aims to Add \$2 Trillion to Global Economy,” Financial Times, February 23, 2014.

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- Lloyd S. Etheredge, Brief Biography and <i>Curriculum Vitae</i>	

I. Scientific Plan

A Project Director and an Advisory Group will identify specific topics to be addressed in three steps and invite leading researchers to participate in a planning group (N=12-14) for each step. The planning groups will be asked to do justice to the thinking of Greenspan and other theorists. To bring their own creativity to the task. And to assure that the new variables and metrics will, in the spirit of the Michelson-Morley experiment in physics, be politically fair and support the competitive evaluation of variables, pathways, and claims that are civically relevant.

The three steps will be:

- 1.) Greenspan's List of (known or suspected) missing variables and recommended metrics;
- 2.) Inclusive Social Science Lists to capture (known or suspected) missing variables and metrics from other theorists and researchers;
- 3.) Finding Unknown Variables and Organizing Rapid Learning Systems.

- Greenspan is a professional economist and a libertarian. [His mentor and lifelong friend was Ayn Rand (author of Atlas Shrugged, an entry pathway to these policy views for many college students.)] He has taken the unusual step of recommending rapid scientific evaluation of his new economic ideas and these (what others would call) ideological beliefs. He expects these new scientific equations will improve economic forecasts *and*, in the competition of ideas in the political marketplace, prove that libertarians are right.

The Project Director will prepare an initial outline of issues for each planning group, meet with each member for a discussion, prepare a draft paper for a 1 ½ day group meeting, and author a summary report of recommended variables and metrics and next steps from each group. Each of the three Reports will address:

- 1.) Recommended variables and metrics that are on the shelf and that can be deployed immediately;

- 2.) Recommended metrics that can become available soon, with additional work;
- 3.) Important areas where further R&D is needed before metrics can be recommended.

Here (for the three steps, and with three examples for each step) are new variables and clusters of metrics that will be addressed, with my initial commentary about how I believe the discussions of social science advisers will develop and refine the analysis.⁷

A. Greenspan's List

“We are driven by a whole array of propensities - most prominent, fear, euphoria, and herd behavior.”

- Alan Greenspan⁸

Greenspan recommends adding variables to provide a more inclusive account of human nature. Thinking internationally, he also recommends including cultural variables in the new equations because he believes that cultures exert (often) fixed causal forces on economic behavior.

⁷ Greenspan suggests “an apparently inbred upper limit to human IQ” may limit productivity growth in America and other advanced economies to 3%/year (pp. 165-166, 296). The phenomenon is worth investigating and forecasting, but I am skeptical about this explanation.

⁸ Also, a capacity for human rationality should be measured in the new equations: The new behavioral variables (fear, euphoria, and herd behavior) can be “broadly subject to reasoned confirmation,” *op. cit.*, p. 299. [Including different (and sometimes opposing) logics and mechanisms (like rationality) in different parts of the human brain may seem logically contradictory and unacceptable but an emerging view of human nature, informed by neuroscience, is comfortable with this theoretical upgrade.]

Greenspan adds that “much of animal spirits are heavily tempered by rational oversight. Markets, even in their most euphoric or fear-driven state, do not expect global stock market averages to double or triple overnight, or wheat prices to fall to five cents a barrel” *op. cit.*, p. 35.

1.) Motivation 1 - Fear, Confidence, “Animal Spirits”

“[T]he world economy is pregnant with multiple equilibria - self-fulfilling outcomes of pessimism or optimism.”

- Olivier Blanchard ⁹

a.) Fear. An early, simplified mathematics of economics assumed human motivation to be fixed and seeking maximum economic profit, and that knowledge of the world was limited to economic variables (e.g., the prices and other current behavior of markets). Greenspan begins by adding an instinct for survival, risk-aversion, and a hardwired, fast, and compelling response to fear: “fear induces a far greater response than euphoria.”¹⁰ [Thus the boom phase of economic crises build across several years while the financial collapses will be sudden panics as these primitive, “fast” brain mechanisms are activated.] ¹¹

b.) Restoring confidence has emerged as one of the high policy priorities for economic recovery. Greenspan’s wider model (discussed below, based on Keynes), includes the genetic endowment of human nature with natural “animal spirits” and a non-rational optimism about the

⁹ Dr. Olivier is Chief Economist at the International Monetary Fund and, for many years, was a member of the MIT Economics Department. Olivier Blanchard, “2011 in Review: Four Hard Truths.” Online at <http://blog-imfdirect.imf.org/2011/12/21/2011-in-review-four-hard-truths/>

¹⁰ *op. cit.*, p. 280.

¹¹ To psychologists, pain is a physical sensation with specific measurements. Thus, pain-avoidance can be different than risk-avoidance. [Greenspan probably means to include pain-avoidance in his theory: he discusses “the propensity of policy makers to seek the least politically painful solution to a problem . . . We see it everywhere.” (p. 224).] The distinction between pain and risk will sometimes be nit-picking, but it helps to distinguish which brain pathways actually might be involved, for whom. While a new breed of Wall Street financiers may instinctively wish to avoid pain, they might be thrilled by the excitement of high risk gambling.

future.¹² [Thus, human nature is on the side of economic health, which will return as soon as we can understand the fear mechanisms and reduce or remove the fear and restore confidence.]

What are the pathways and metrics to model the neuroscience of fear and confidence? The fast “fight/flight” panic mechanism appears, at this point, to be linked to other mechanisms that continue to suppress or inhibit animal spirits and economic confidence. The actual combinations will have different implications for optimal recovery policies.

For example: The conventional remedy of economic pump-priming imagines that 1.) economic reality must be changed and become reliably reassuring (e.g., by reducing interest rates to stimulate investment and by increased government (deficit) spending). As flows of income increase to individuals and businesses, and as they slowly and repeatedly test the waters, confidence gradually is restored, their own spending and/or hiring increases, and the recovery process becomes self-sustaining. Another possibility is 2.) calendar time may be required for healing and recovery, and this might also require outreach steps (recognizing the additional psychological mechanisms involved) for people who have been injured personally or become discouraged. Or 3.) if the fear was activated in the context of a perceived catastrophic failure of trust and/or betrayal by governments and financial institutions who had a moral obligation to be trustworthy, these institutions may be required to restore confidence in themselves and have not done so. [These psychological ideas are consequential: the Federal Reserve systems of the world can spend hundreds of billions of dollars believing that there is a Liquidity Trap and they must keep interest rates low. Yet they will waste the money if the current problem is a Confidence Trap linked to deficient trust in major institutions and guarantors, and a dispiriting anomie.]¹³

¹² Kahneman agrees with Greenspan and Keynes: “the optimistic bias may well be the most significant of the cognitive biases.” Quoted in Greenspan, *op. cit.*, p. 32.

¹³ Adding new and direct confidence metrics about governments and political systems is an innovation implied by Olivier Blanchard: “Markets have become more skeptical about the ability of governments to stabilize their public debt” in his “Strong Policy Action - The Essence of Restoring Global Economic Hope” blog, September 20, 2011. Online at <http://blog-imfdirect.imf.org/2011/09/20/strong-policy-action-the-essence-of-restoring-global-economic-hope/>

Alternatively, there may be 4.) a news-media perpetuation of fear and anger by (for profit) companies (like Fox News) or (with huge campaign contributions) by the Tea Party. [Once, three centrist television networks and sober, professional journalists (NBC, ABC, CBS) conveyed reality to, and constructed reality for, the American people.]¹⁴

A wider set of metrics may allow other confidence-restoring or -building variables, possible brain mechanisms, and policy options to come into focus. For example, leadership-induced confidence: 5.) Experiments by McClelland and Winter found that videos of dramatizing leaders, with speeches rich in achievement images (like President Kennedy), energized people for economic achievement. [Thus: new metrics may show that President Obama and a world of rationalist economists and prosaic politicians are contributing to the current slow rates of economic recovery by the uninspiring public drama that they create.]¹⁵ Or 6.) FDR used yet another set of (*de facto*) psychological theories of fear and brain mechanisms: Declaring that “the only thing we have to fear is fear itself,” he presented himself as a confident, cheerful, and even jaunty role model (in a scary and troubled time); and, by using his position as a leader, and new mass communications technology, to *name* emotions he may have created new brain pathways in his listeners that helped them to be self-starting in an internal world that began to bracket fear.¹⁶

c.) “Animal Spirits.” Greenspan’s (psychological, political, and economic) theory of

¹⁴ New capabilities for quantitative analysis of communication flows would provide an interesting cross-national set of metrics. See Robert Harris, The Fear Index (NY: Vintage, 2012). Reprint; Ithiel de Sola Pool, “Content Analysis and the Intelligence Function,” reprinted on Lloyd S. Etheredge (Ed.), Humane Politics and Methods of Inquiry: Selected Papers of Ithiel de Sola Pool, vol. 2 (New Brunswick, NJ: Transaction Publications, 2000), chapter 2.

¹⁵ David McClelland and David Winter, Motivating Economic Achievement: Accelerating Economic Development Through Psychological Training (New York: Free Press, 1969).

¹⁶ The G-20 appear to be using, at this point, 7.) a straightforward goal-setting theory of leadership and induced motivation. However the degree of repetition that is needed may be under-estimated. It may be necessary for leaders to communicate goals a hundred times more than they initially believe should be necessary

“animal spirits,” borrowed from Keynes, imagines that the success of the capitalist system is the expression of this restless and even joyful human energy and natural optimism (that is not derived from cold, rational calculations), typically channeled into activities with others. Keynes’ phrase was used of British students in boarding schools in late Victorian and Edwardian England: the “animal spirits” find natural expression in the freedom of the playing field and, sometimes, in an irreverent, youthful independence and instinct for challenging the rules that enjoined vigilance by headmasters.¹⁷

Greenspan’s theory is a strategic move on a political chessboard. The “animal spirits” of human beings - not the profit-seeking of economic robots programmed for maximum rationality - drive capitalism and economic growth.¹⁸ However these human “animal spirits” are suppressed by regulations and Greenspan’s scientific prediction is that the new equations will prove libertarian claims: If we want the capitalist package to work, we should limit government and its regulation and other interference. The *laissez-faire* freedom from regulation that is required for the animal spirits of capitalism to create a better future [and also for the growth of strong, healthy, self-starting entrepreneurs as they move from competition on the playing fields to the

¹⁷ For further discussion: George Akerlof and Robert Shiller, *Animal Spirits: How Human Psychology Drives the Economy, and Why it Matters for Global Capitalism* (Princeton, NJ: Princeton University Press, 2009) and Robert Shiller, “Animal Spirits Depend on Trust: The Proposed Stimulus Isn’t Enough to Restore Confidence,” *Wall Street Journal*, January 27, 2009.

¹⁸ As a side issue: Greenspan believes that *“To the extent that any human action is at least partially driven by ‘spirits,’ the material outcomes are less satisfactory in purely economic terms than they would be under the hypothetical presumption that animal spirits did not exist and that human beings’ economic behavior was wholly rational.”* Greenspan, *op. cit.*, p. 35. However computer simulations may show Greenspan’s view to be untrue: a sociobiology theory might predict that, while irrational over-confidence may increase death rates of individuals or many entrepreneurial firms, this trait could, when there is random variation and changing environments, facilitate adaptation and success of the species. In the study of emerging infectious diseases, for example, millions of individual virus particles may die in the continuing assaults on new antibiotics but, with random variation, the continuing assaults eventually include breakthroughs by resistant mutations and survival and new population growth for the species.

corporate offices - LE] also means that political systems should accept that cycles of boom and bust are an inevitable part of the global capitalist system.

Greenspan's political deductions mandate a careful attention to measurement. There is a distinction between subjectivity (how reality is perceived, interpreted and wired-up in the brain) and Greenspan's almost definitional theory that regulations restrict freedom. There will be abundant challenges for the scientific planning groups to sort out but (to make the points briefly): 1.) actually, the youthful athletic contests on the playing fields of Eton, with their genuine and energetic freedom and competition, also are exquisitely created and affected by rules and regulations, depend upon honest and competent referees and agreed-upon penalties, and the activities are sustained by a moral universe of respect, fairness, and sportsmanship, and norms that distinguish acceptable competitive strategies (e.g., of misdirection) from cheating. Thus, it is not obvious that indexes of financial or environmental regulations *necessarily* will show inhibiting brain/psychological impacts on businessmen that erode their economic motivation and lower the growth rate of GDP. [However, 2.) once the new subjectivity-recognizing metrics are created, Greenspan might be right. In part, the truth depends upon the subjectivity of capitalists - although complaining about government regulations is not compelling evidence that regulations actually do inhibit their economic motivation: some of the most regulated and supervised industries in the world (e.g., the pharmaceutical industry) are the most profitable and innovative.]¹⁹

¹⁹ Economists are accustomed to use the hard numbers of conventional economic data. This methodological point about including measures of subjectivity (more easily accepted in other social sciences) is one of the "four hard (*sic*) truths" to improve econometric forecasting recommended in 2011 by Blanchard: "*Perception molds reality.*" *op. cit.* A second-level measurement issue for a planning group, also flagged by Blanchard, is that perceptions can change: "[F]inancial investors are schizophrenic . . . they react positively to news of fiscal consolidation but then react negatively later. . ." *ibid.* A related measurement issue is the contextual principle in behavioral science - i.e., the effect of a variable can depend upon the context in which it occurs. Thus President Kennedy's tax cut may have produced an unusually strong effect on economic growth because it occurred in the frame of his achievement-oriented (N-Ach in the technical language of psychologists) rhetoric and leadership. If so, the Reagan-era

Also, *pace* Greenspan and Keynes, 3.) Social scientists might discover that actual economic motivation can be much greater than the baseline animal spirits of human nature. For example, motivation might be increased by (external) political leadership (see above) or by a non-rational manipulation that, via the visual cortex, activates long-term motivation with vivid images of vast, guaranteed profit. Greenspan's *laissez-faire* utopia of natural, animal spirits may actually achieve only a fraction of what psychologically astute G-20 policies (to design a fully incentivized global capitalist system) could empower capitalism to achieve in the future.²⁰

2.) Motivation 2 - The Herd Instinct

“Euphoria will always periodically produce extended bull markets that feed off

tax cuts would have produced a diminished effect because his Presidential rhetoric was low on N-Ach imagery. For a further discussion: Lloyd S. Etheredge, “President Reagan’s Counseling” in *Political Psychology*, 5:4 (1984), pp. 737-40, online at www.policyscience.net at II. C.

Political combat in the Ayn Rand tradition has used her Objectivist philosophy which (i.e., it is a somewhat closed system) can interpret other people’s differing perceptions as a “false consciousness.” Greenspan may not readily accept a political philosophy or economic policy based on people’s “unthinking” subjective experience of whether they are regulated.

²⁰ To secure the benefits of new technologies, the American government energized the national capitalist system and built a trans-continental railway system in the 19th century, very quickly, by offering government payments and bonuses (and vivid, high profits) of \$16,000, \$32,000 or \$48,000/mile and assuring land grants, to competing companies who started building westward, and another that started eastward from California.

Similarly, the actual “herd instincts” motivations of Wall Street portrayed in the Academy Award-winning *Inside Job* and *The Wolf of Wall Street* appear to have been fueled by vivid images of fabulous profits and cocaine-like drug addiction and pleasure centers in the brain. Greenspan’s partly exculpatory theory of human nature notwithstanding, only a very small percentage of self-selecting human beings may actually become involved in high-stakes gambling addictions.

herd behavior, followed by rapid fear-induced deflation of the consequent bubbles.”

- Alan Greenspan ²¹

“I see no way of removing periodic irrational exuberances without at the same time significantly diminishing the average rate of economic growth and standards of living.”²²

- Alan Greenspan ²³

Greenspan’s new “herd instinct” variable moves economic analysis beyond the mathematical assumption that the motivation of human beings is only to maximize selfish economic profits. The herd (“social”) instincts have their own aims, expressions and rewards (including contributing to the lives of others).²⁴ They are expressed in a nonprofit sector of the economy that is capable of astonishing gains in productivity and human benefit (e.g., MOOCs that can make a curriculum equal to the best in the world available to everyone on the planet, without charge) and, also, stunning and baffling inefficiency (e.g., the American health care system). The American media focus on the quarterly performance metrics of the for-profit economy but Greenspan’s conceptual and pro-metrics upgrade will engage a planning group to think about

²¹ *op. cit.*, p. 292.

²² Greenspan predicts that periodic irrational exuberances may grow worse as a result of social media, *op. cit.*, p. 25: “fear and euphoria . . . are contagious processes exaggerated by herding.” It is an important prediction, made possible by including the herd instinct set of variables, that should be evaluated for G-20 forecasting.

²³ *op. cit.*, p. 301.

²⁴ Greenspan includes a propensity to compete in games and for status (p. 26) and power (p. 34).

equivalent quarterly performance metrics for the nonprofit sector.²⁵

Adding a “herd instinct” variable also is a strategic move on a political chessboard. Here is the background: The term was introduced (with cross-species examples) by the social psychologist (and neurosurgeon) Wilfred Trotter in 1908.²⁶ It refers to many human phenomena, including altruism and compassion, standards of fairness, marriage and friendship, the nonprofit sector, all social and mass movement participation - including financial bubbles (and skewing risk-aversion judgments to the mean of a group) - and enlisting in wars, seeking status and power, conformity and followership, the quests for self-esteem, copycat behavior exploited by advertising and marketers, etc. During the 1930s and the Cold War, “herd instinct” became a pejorative term. Alan Greenspan, Ayn Rand, and many allies believed that the herd instinct dangerously drew political supporters to the seductions of collectivism, with the reality of a soul-crushing tyranny (and mistaken economic ideas) of America’s mortal enemy, Russia and a global

²⁵ I am not sure how far this initial project can go to develop metrics and forecasting equations for the nonprofit sector of the G-20 economies. However, the economics profession and society may benefit in several ways from Greenspan’s conceptual upgrade. Typically, doctrinaire economic analysts recommend improving nonprofit institutions by turning them into for-profit hospitals, for-profit public schools, universities with Profit Centers, outsourcing the work of government agencies to the private sector, etc. Greenspan’s “herd instinct” variable allows there to be legitimate, different, and important motive instincts that sustain the nonprofit sector and that can be used and organized for the common good. (A motivation to maximize economic profit is not required for efficiency: the management consultant Peter Drucker thought that the Girl Scouts of America, with their commitment to “help each girl reach her own highest potential,” was better run than Fortune 500 companies.) See also the variables affecting productivity in well-managed public sector and nonprofit institutions identified by the Baldrige awards, www.apqc.org. A discussion of conceptual implications of allowing different motives in models of human nature is Howard Margolis, Selfishness, Altruism and Rationality (Chicago, IL: University of Chicago Press, 1984).

²⁶ His later popular book influenced the application of scientific method to develop modern advertising and analyze the mass movements of the 1930s, accelerated by the new mass media technologies. W. Trotter, Instincts of the Herd in Peace and War (London: T. F. Unwin, 1916).

Communist movement. In Greenspan's tradition the "herd" (social) instincts also contribute to the well-intentioned, spiritually-eroding, collectivist welfare state (eroding the personality of 47% of Americans, according to the Republican-individualist Presidential candidate, Mitt Romney). The mass psychology of society and human imagination are zero-sum: even when governments enlarge their prominence and hold the high ground as benevolent planners of welfare states (and *de facto* regulators), they restrict and erode the open spaces and zones of freedom that are required for the full development of strong, healthy, self-starting individuals (who become entrepreneurs).²⁷

Again, these are moves on a political chessboard and two measurement cautions are in order: a.) Political, educational, social, spiritual, and psychological theorists since Plato's analogy of the Cave and Buddha's teaching of a path to Enlightenment have thought about issues of freedom, liberation, and growth. Many psychologists have researched causal ideas about the growth of healthy, strong, free, responsible, self-starting, enlightened individuals who can become the "entrepreneurs of their own lives" and ethical, civic and business leaders and organizers.²⁸ Thus, there are likely to be different pathways and coefficients and a package of societal metrics that need to be put on the table; b.) As I indicated above, the Honest Broker scientific refereeing of ideological political arguments requires the measuring of subjectivities: a society with a psychology of "entitlements" *might* be unhealthy, but the appropriate metrics for Sweden may show that "entitlements" are healthy when they are wired-up differently and express and strengthen mutual respect and democracy and provide resources for the genuine personal freedom to grow and prosper. Similarly, constructing a "dependency index" for macroeconomics

²⁷ I.e., rather than become victims, or pawns, or the drone employees of others, or people who look to governments and vote for a welfare state.

²⁸ Etheredge, "Wisdom . . . ," *op. cit.*. E.g., Lawrence Kohlberg, The Philosophy of Moral Development: Moral Stages and the Idea of Justice (San Francisco: Harper and Row, 1981); Jane Loevinger, Ego Development: Conceptions and Theories (San Francisco: Jossey Bass, 1976); see also David Winter, David McClelland, and Abigail Stewart, A New Case for the Liberal Arts (San Francisco: Jossey Bass, 1981).

(as some libertarian think tanks have proposed), equating (almost by definition) the public sources of individual income with an unhealthy, hierarchical, psychological relationship, begs an important measurement question; and c.) Once we see the numbers for a particular culture or subgroup, Greenspan and other libertarians may nevertheless be right.

3.) Culture

“A specific brand of culture - populism - has been particularly debilitating to economic progress. . . . Capitalism and socialism are specific about the conditions they deem necessary for the creation of wealth and rising standards of living. Populism [for example, in 20th and 21st century Latin America] is not. It is a shout of pain.”

“For those economies that seek maximum economic growth, it appears that abstinence and prudence are necessary (although not sufficient) virtues for prosperity.”

- Alan Greenspan ²⁹ ³⁰

²⁹ *op. cit.*, pp. 226-227.

³⁰ Abstinence and prudence are used by Greenspan as economic terms to refer to the percentage of income that is saved and invested for future returns, although there may be other behavioral (e.g., Puritan) correlates that he has in mind.

Concerning other variables, Greenspan writes: “Producing a fully detailed model is beyond the scope of this book. But such a model would include a number of variables reflecting those verities of human nature [or culture - LE] that reveal long-term economic stabilities. Among them are time preference (and interest rates), equity premiums, corporate earnings-price yields, and, since the 19th century, the private savings rate. They reflect the outer limits to fear and euphoria that define the dynamics of the business cycle. For forecasting purposes they can be assumed to continue trendless [unchanged - LE] in the future. . . . In addition there are those stabilities that are not inbred, such as the sum of social benefits and gross domestic savings as a percent of

“Innovative (thinking outside the box) entrepreneurship and prudence are largely, if not wholly, culturally-driven traits.”³¹

- Alan Greenspan ³²

Greenspan recommends cultural characteristics and metrics be included in the new era of 21st century economic forecasting models.³³ His relatively brief and topical discussion includes savings and investment rates (abstinence, forbearance and prudence), cultural differences in entrepreneurial risk-taking, and in the rule of law and corruption.³⁴ His primary examples are Euro-North countries v. Euro-South countries: Greenspan believes that “becoming more like Germany” (e.g., forbearance, prudence, a work ethic, a commitment to legal economic activity and paying taxes) is (in the abstract) the cultural solution to improve economic forecasts for Greece, Italy, Spain, and Portugal.³⁵

Since Greenspan’s book went to press there is growing agreement that national and cultural differences must be included in forecasting models. Although these still are, to a degree, a “black

GDP. Other forecast stabilities include the size of the workforce - those potentially in the workforce have already been born - and average hours worked.” p. 292.

³¹ China and Japan are cited as cultures that restrict innovation (p. 231).

³² *op. cit.*, p. 231.

³³ Adherence to the rule of law can be proxied by the share of illegal activity in GDP. Other national/cultural characteristics include social harmony and communications and a functional political system. (p. 231).

³⁴ Note that there are opposite elements in Greenspan’s model of economic growth - prudence (for savings) and risk-taking entrepreneurs.

³⁵ See also Lewis’s observations that include Ireland and Iceland (different peoples with different reasons) that took the cheap credit to the point of disaster: Michael Lewis, Boomerang: Travels in the New Third World (New York: W. W. Norton, 2011).

box,” the scientific failure to include them apparently has led to serious policy mistakes during the recent recovery, with (sometimes) opposite national effects of austerity from those that were forecast by economists.³⁶

- Again, Greenspan may be right in his list, but there are political implications to these equations and the social science package will need to be robust. For example, a.) Asian cultures with traditions of hierarchy, combined with obligations for moral, benevolent, responsible and competent leadership, may develop a group-based psychology that is a source of competitive economic strength. In Japan, a psychology of dependency within firms (a hated characteristic, in the terms of Ayn Rand or Governor Romney’s analysis of American economic performance) may be consistent with a highly competitive global automobile industry;³⁷ b.) Porter’s work on

³⁶ Howard Schneider, “An Amazing *Mea Culpa* from the IMF’s Chief Economist on Austerity” Washington Post, January 3, 2013 concerning a (still, somewhat mysterious) set of differences that imposed remarkable damage on the Greek recovery and that can change over time. For European recovery, pro-austerity recommendations were based on a forecast of a fiscal multiplier of 0.5 when the actual multiplier sometimes was 1.5, meaning that a dollar reduction in government expenditures actually produced a \$1.5 dollar reduction in GDP. Concerning other national/cultural variables that have emerged on the “to do” list to include in forecasting equations, see also Lawrence Summers, “Lessons Can be Learned from Reinhart-Rogoff Error.” Washington Post. May 5, 2013 (discussed at footnote 4 above): “. . . [W]hy should it be the same in countries with and without their own currency, with very different financial systems, cultures, degrees of openness and growth experiences?”

³⁷ Concerning dependency inside a benevolent hierarchy: The allegedly growing American trait cited by Governor Romney as dysfunctional and true of 47% of Americans in a “too generous” welfare state may, as part of a package, be a successful feature of Japanese culture and many of its economic organizations: see Frank Johnson, Dependency and Japanese Socialization: Psychoanalytic and Anthropological Investigations of *Amae* (New York: NYU Press, 1995). The possibilities of cross-cultural learning and of culturally appropriate public policies are explored in Nicolas Berggruen and Nathan Gardels, Intelligent Governance in the 21st Century: A Middle Way Between West and East (New York: Polity, 2012).

international competitiveness suggests a wider set of nation-state metrics.³⁸

There are many new cultural and sub-cultural groupings (e.g., c.) the economic behavior and causal dynamics of youth cultures) that might be the units of analysis, especially in countries with high and uncorrected rates of prolonged youth unemployment. Concerning the psychology of lower status individuals and their cultures: There may be d.) a Primate Subordination Syndrome that - even in objectively similar circumstances - reduces motivation, affects stress and endocrine levels and health, inhibits educational achievement, and is pervasively destructive of lower status primates.³⁹ The comparative neuroscience of lower status cultures may reveal a new universe of unrecognized causes (via the visual cortex and hierarchical imagination) of limitations in human economic potential. e.) The changing (post-deregulation) cultures (supported by changed recruitment and self-recruitment) of Wall Street and the financial world may be critical variables for economic forecasting.⁴⁰ f.) There are important (known) sub-cultural differences in

³⁸ Michael Porter, Competitive Advantage (New York: Free Press, 1985).

³⁹ Studies of the Primate Subordination Syndrome may clarify a parallel inhibiting factor in regulations - i.e., if they also are perceived as establishing a status and dominance hierarchy. Subjectivities are important in the measurement of the inhibition of economic motivation by status ranking: Sub-cultures may provide inoculating effects (e.g., strong religious identities with the vividly experienced assurance of love and respect from a Supreme Deity and social support) and perceptions of economic opportunity also may mitigate these effects. See Lloyd S. Etheredge, "Neuropsychology and Rapid Learning Systems About Social Problems," unpublished, January 2010 and October 25, 2012 (online at www.policyscience.net at II. A. For some of the emerging correlates of subjective inequality on health and economic and social participation and (possibly) social problems see Moises Velasquez-Manoff, "Status and Stress," The New York Times, July 27, 2013.

⁴⁰ Tom Wolfe, The Bonfire of the Vanities (New York: Picador, 2008), reprint. The new "Masters of the Universe" status psychology may view members of Congress and political leaders (by judging their annual salaries) as (at best) hired middle management. The global political manipulation and exploitation of tax laws and regulations reflect a subjective change. In the 1960s most American businessmen felt poorly informed about the world beyond the water's edge

the motivation for economic achievement, and problems of structural discrimination and limited economic opportunities for different groups, that effect economic performance. (Euro-South and other cultures that discriminate against women or that limit access to good schools and higher education for their youth (to cite obvious examples) may inhibit their own economic growth).⁴¹

B.) Inclusive Social Science Lists

In Step 2 a planning group will reach out to include known (or suspected) R&D variables and metrics from other economists and disciplines. These ideas, like Greenspan's, are at risk of disappearing unless they evolve into metrics and their contribution can be evaluated by inclusion in R&D data systems.⁴² At this point, we can measure almost any variable once we agree what they are.

4.) Behavioral Economics and Neuroscience

Researchers in behavioral economics often complain (rightly) that they are constrained to use small N experimental studies and do not yet have national data systems to allow the relevance of

and were hesitant to become involved in political lobbying: Raymond Bauer, Ithiel de Sola Pool, and Lewis Dexter, American Business and Public Policy: The Politics of Foreign Trade (New York: Atherton, 1963). For the historic evolution of accounting and legal departments (from "just pay what we owe") into major profit centers with global strategic plans and lobbying see, for example, David Kocieniewski, "GE's Strategies Let It Avoid Taxes Altogether," The New York Times, March 24, 2011.

⁴¹ Max Weber, The Protestant Ethic and the Spirit of Capitalism (New York: Penguin Classic, 2002) reprint; David McClelland, Human Motivation (New York: Cambridge University Press, 1988), Charles Murray, Human Accomplishment (New York: Harper Collins, 2009), and the work of Dean Keith Simonton.

⁴² For a range of emerging diagnoses about missing variables see the IMF Rethinking Macro Policy II: First Steps and Early Lessons conference of April 2013, with papers online: <http://www.imf.org/external/np/seminars/eng/2013/macro2/>

their discoveries to be evaluated. This planning project will be their chance.^{43 44 45}

Among other theorists, David Brooks has started to map a universe of fresh thinking about social and economic policy based on neuroscience discoveries. There is a new Society for Neuroeconomics (neuroeconomics.org) and emerging doctoral programs in neuroeconomics, and neurobiology and social science, whose members might suggest metrics for panel studies with genetics and brain data.⁴⁶ Full genomic mapping has fallen to \$1,000 per individual and is heading toward \$100 per individual: already genetic data (with some behavioral, social, and environmental data and electronic health records) are available in research databases (e.g., N=500,000 for the www.rpgeh.kaiser.org project).

An exciting challenge for this fourth task is to evaluate the possibility of genetic diversity in

⁴³ Daniel Kahneman, Thinking, Fast and Slow (New York: Farrar, Straus, and Giroux, 2011). The growth of behavioral economics with support from the Sloan and Russell Sage Foundations is addressed in Floris Heukelom, Behavioral Economics: A History (New York: Cambridge University Press, 2014).

⁴⁴ This step also will include metrics to explain and forecast innovation rates. Greenspan believes that it is the role of the financial sector to assemble and channel needed funds. However, a wider list of metrics is needed: innovation systems are much wider than a financial system. See Robert D. Atkinson and Stephen J. Ezell, Innovation Economics: The Race for Global Advantage (New Haven: Yale University Press, 2012).

⁴⁵ Olivier Blanchard posits a new behavioral variable: “adjustment fatigue . . . which is leading to maybe less reforms than would be desirable.” Transcript of a Press Briefing World Economic Outlook, October 8, 2013. International Monetary Fund, online.

⁴⁶ Concerning new funding, metrics and data systems: James Gorman, “The Brain’s Inner Language,” The New York Times, February 24, 2014. Investments include the EU’s decade-long \$1 billion Human Brain Project and the Obama Administration’s \$100 million startup.

the most important aspects of human nature relevant to economic behavior.⁴⁷ Only a very small number of people participate in creating financial booms and catastrophes and they may be atypical.

5.) Human and Social Capital

At the beginning of the 21st century most of the world has decided that market capitalism is the best engine for the future. There is a powerful and reciprocal relationship between the human and social capital of a society and the performance and outcomes (intended and unintended) of the economic system.

a.) Education. Especially in an emerging age of information technology and skills, investments in human beings are probably the most powerful contributions to economic growth. An exciting cluster of measurements can help to understand new, transformative opportunities for MOOCs and global education. We can bring a curriculum, equal to the best in the world, to the desktops of everybody in the world, virtually without charge. There is much experimentation to be done, and many additional investments required to turn online resources into a truly powerful education.⁴⁸ The second planning group will be asked to address the question: What should we measure?

STEM education has been proposed as a global metric, but one of the best areas for R&D research may be the psychological package of attainments that allows individuals to flourish as

⁴⁷ Greenspan believes that human nature is homogenous with respect to the major characteristics affecting economic behavior and performance. However high IQ is an exception: higher IQ increases capacities for abstraction and forethought, self-control, and delayed gratification, and thereby supports successful entrepreneurship and capitalism.

⁴⁸ U.S. President's Council of Advisers on Science and Technology (PCAST), Memorandum to President Obama concerning economic mobility, higher education, and MOOCs. December 2013. Online at www.whitehouse.gov.

“entrepreneurs” in their own lives and in the freer and more individualist societies implied by the system of market capitalism.^{49 50} A neuroscience snapshot of this larger “future-imagining-and-realization” or “taking responsibility for projects” cluster might include developing: 1.) capacities to be self-starting; and 2.) to create clear goals in which there is a genuine personal stake and that call forth commitment; 3.) to relate to aspects of realities as socially- and personally- created and changeable; 4.) learning how to identify or create alternatives; and 5.) how to decide upon and develop plans of action, assemble resources and enroll people and support (sometimes, including coaching); 6.) new brain mechanisms linking together abstraction, foresight and self-management (to achieve goals); 7.) a growing capacity to persevere (for short periods in doing elementary school assignments to several years when writing a Ph. D. thesis or book, and, then, even decades; 8.) growing cognitive capacities to manage integrated complexity and live and work with uncertainties and open-ended lines of thinking; 9.) capacities to persevere through a possible roller coaster of emotions along a path; 10.) to be self-reflective and able to think honestly and with integrity about what is working or not working; 11.) to be responsible about outcomes and breakdowns; and 12.) bring self-initiated projects to completion at a level of excellence.

In many areas of the world, formal educational systems (K-12 and college- even formal business schools) are not focused on doing the best job that they can to support this cluster and the future health that they imply for the world’s economic systems. STEM education may support this growth, but it is a narrow idea and, in the wrong hands, any content-specific curriculum and testing program can become the use of authority and peer pressure to motivate

⁴⁹ This educational cluster also will work for nonprofit institutions. The achievement/competitive drive for market capitalism is a separate psychological dimension: see McClelland and Winter, *op. cit.*

⁵⁰ The sociology of the G-20 education system and its relationship to G-20 economics involves a much wider set of issues. Mass production technologies may only have required mass production classrooms, with the goal of producing socialized students who were certified as willing to sit at desks for long periods and perform tasks assigned by authority, to reasonable standards, even if these were boring. Unless there are the right G-20 measurements, STEM education also can develop in this model.

behavior and produce diligent and mechanistic equation-solving or memorization. In truth, thoughtful measurement will be required from a planning group because the “being the entrepreneur and organizer of your own future” cluster might grow in many ways and from different sources: learning how to write academic papers and plan research, how to go step by step in your head to solve an algebra or geometry problem, practicing and achieving excellence in a competitive sport or playing the cello, or being a leader in student government, or (perhaps) an evolution of MOOCs, capstone projects, and new ways of teaching.⁵¹

b.) Moral breakdowns of institutions (including moral betrayal) may slow economic recovery, even if the issues are not discussed in public. David Brooks writes: “Moreover, it is harder to accept that psychological factors like uncertainty and anxiety really are a mirage . . . It has been harder to dismiss morality as a phantom concern, too. Maybe in a nation of [economic] robots the government can run a policy that offends the morality of the citizenry, but not in a nation of human beings.”⁵²

c.) The possibility that we are destroying social capital (without being fully aware of the

⁵¹ Comparative metrics for the performance of educational systems may be revealing: Greenspan’s (Euro-South) cultural critique of Italy, Greece, Spain and Portugal suggests that serious limitations of their authority-oriented and conventional K-12 educational systems also may exist. Public policy research in the US has found that first-rate schools (and graduation from high school) works. Good K-12 schools is emerging as one of the best societal investments for the economic and personal success of individuals. See Ron Haskins and Isabel Sawhill, Creating an Opportunity Society (Washington, DC: Brookings, 2009).

⁵² David Brooks, “The Two Cultures,” The New York Times, November 15, 2010. Online. See also Robert Fogel’s AEA Presidential Address “Catching Up with the Economy,” American Economic Review, 89:1 March, 1999), pp. 1-21 about “commodities that lack material form” and his The Fourth Great Awakening and the Future of Egalitarianism (Chicago: University of Chicago Press, 2000). Anomie in the former Soviet Union (a case that Greenspan does not discuss) is a striking example of perceived moral breakdowns that illustrates their devastating effects on many aspects of life.

process) is raised by Charles Murray and other writers.⁵³ 1.) High divorce rates and single parent families may (especially without compensating investments) be a bad idea for children with long term costs to themselves and to society. 2.) There may be a vital degree of now-eroding social capital, and trust, that depend upon the experience of people that good values and hard work and social responsibility are appreciated and rewarded. Politicians across the US political spectrum now run for office and address a perception that “playing by the rules” is not working in America. 3.) In Europe, astonishing and uncorrected rates of youth unemployment are accompanied by a politically dangerous and demoralizing public discussion of “a lost generation” that ultimately may not accept its fate.⁵⁴ 4.) The expectation (and reality) of social mobility may be part of social capital: variables associated with social mobility, across regions in the US and abroad, are likely to be revealing of partial blockage in causal pathways for economic health.⁵⁵ 5.) The Spence *et al.* consultation process addressing Chinese economic growth predicts that greater inequality in society is corrosive and becomes dysfunctional: inequality creates different interests and erodes a political process; it also fuels political combat and redirects energies that could be used more productively.⁵⁶

- d.) The Psychological Economy. The broader agenda for the planning group will be to

⁵³ Charles Murray, Coming Apart: The State of White America, 1960-2010. (New York: Crown Forum, 2012).

⁵⁴ For forecasting equations illustrating potential destabilizing effects of prolonged high unemployment for different groups, see Alan de Bromhead *et al.*, “Right-wing Political Extremism in the Great Depression.” Unpublished working paper online at www.voxeu.org.

⁵⁵ See the geographic variations in social mobility within the US and new variables identified by Raj Chetty and his associates: <http://www.equality-of-opportunity.org/>

⁵⁶ Edwin Lim, Ian Porter, Paul Romer, and Michael Spence, “Medium and Long Term Development and Transformation of the Chinese Economy: A Synthesis Report.” March 2011 (online at www.cairncrossfund.org): “If not addressed such disparities risk fueling greater social conflict and instability,” p. 69. See also their lesson for new models: “social policymaking must be tightly integrated with economic policymaking,” *op. cit.*, p. 71.

advance the sensitive and respectful measurement of the “psychological economy” - which I define (following Fogel) as all aspects of the economy - its input and functioning, and its “commodity” outputs and effects - that lack a material form. Coming from the metrics and the limited concerns of national income accounting (and independent and dependent variables defined by accountants and the tax code) and the physical realities of nation-state, steel plant economies, these new metrics will help us to grasp a changing world of complex, sometimes interdependent, systems and subsystems whose outputs shape the quality of our lives and the material-form economy.⁵⁷ One of the leading edge questions (likely to be flagged as “important, but needing further research before metrics can be recommended”) is a refined understanding of the social recognition and status economy and the production systems that societies link to what Greenspan calls the “herd” (social) instincts. Competition for recognition and status can be as important as competition for economic rewards. And institutions and societies create status scarcities and competitions that function as motivators. (Arguably, one of the most important reforms that Margaret Thatcher brought to the UK was to make it socially acceptable for higher status people to become successful entrepreneurs.)

6.) Political Variables

“Shadow banking is a form of financial intermediation whose funding is not supported by the traditional banking safety nets . . . the shadow banking system remained slightly more than half the size of the regular banking system throughout the 2002 to 2011 period . . . In the United States alone, shadow banking constituted \$23 trillion in assets at the end of 2011, by far the largest constituent of the global network of

⁵⁷ See, *inter alia*, Lasswell and Kaplan, *op. cit.*; Robert E. Lane’s pioneering The Market Experience (New York: Cambridge University Press, 1991) and The Loss of Happiness in Market Democracies (New Haven: Yale University Press, 2001); Robert Putnam, Bowling Alone: The Collapse and Revival of American Community (New York: Simon and Schuster, 2001); Fogel, “Catching Up” and The Fourth . . ., *op. cit.*

nonbank credit intermediaries.”

-Alan Greenspan ⁵⁸

“Institutional flaws are best prevented, because they are hard to fix. Once an institutional structure is in place, people quickly acquire a vested interest in its preservation. The flawed structure then becomes surprisingly resistant to reform, as the US health-care system clearly demonstrates.”

- Lim, Porter, Romer and Spence ⁵⁹

“Our highest priority going forward is to fix our broken political system.”

- Alan Greenspan ⁶⁰

Every societal goal has a production function: most desired outcomes can be produced several ways and by different mixes of inputs. In turn, politically, each input mix may allocate new economic income, status, power and control differently, to different beneficiaries and constituencies. To improve scientific knowledge and (with a genuine Honest Broker intent) to build political support, step six also will seek input from a full range of think tanks, activists, and others to expand upon Greenspan’s list.

Greenspan has a wide range of personal observations about dysfunctional political systems, ranging from a theory that an *angst* caused by American political schism and conflict is reducing long-term business investments and slowing recovery, to genuine puzzlement about why Washington leaders cannot sit down (as they did in earlier days) for drinks after hours and reach

⁵⁸ *op. cit.*, pp. 40-41.

⁵⁹ Edwin Lim, Ian Porter, Paul Romer, and Michael Spence, “Medium and Long Term Development and Transformation of the Chinese Economy: A Synthesis Report.” March 2011 (online at www.cairncrossfund.org), p. 71. Discussed in footnote 4.

⁶⁰ *op. cit.*, p. 302.

compromises.⁶¹ This initial project cannot do full justice to the range of these conceptual, theoretic, and measurement issues, which have extensive literatures in several social science disciplines. However, several key political system issues can be reviewed by the second planning group.

a.) Is “Human Nature” a Political Misdirection?

Social scientists will instinctively ask whether Greenspan’s (“it’s human nature!”) ideas are a political misdirection and *mea culpa* that focus attention away from the real (political) variables that should be included in the world’s macroeconomic prediction equations. Yes, the Tulip Mania of the 1630s and many of the financial bubbles and panics of history may have been produced by primitive emotions and people who stumbled through history to a catastrophe and did not understand the eventual behavior of the system and their fate.⁶² However, the world’s “shadow” banking systems [whose size is indicated by Greenspan in the quotation at the beginning of this section] and their international lobbying expenditures and political largesse did not arise by accident.⁶³ And the first edition of Kindleberger’s Manias, Panics, and Crashes: A History of Financial Crises (now in its sixth edition) was published in 1978.⁶⁴ Of course Kindleberger did not intend to write a handbook, but subgroups in generations of financial analysts, by now, may have gone to school on the amounts of money that they can make if they

⁶¹ Greenspan has a list of observations about how the American political system (and the Latin American political systems, and the Chinese political system, and the Euro-South political systems, etc.) are dysfunctional. Some of the problems might benefit from a greater degree of agreement in economic science: Greenspan may be right that Latin American Populism is a “shout of pain” and can be shown to lack a coherent and effective economic theory.

⁶² However see CW and AJKD, “Was Tulipmania Irrational?” The Economist, October 13, 2013.

⁶³ See also Sebastian Mallaby, More Money Than God: Hedge Funds and the Making of a New Elite (New York: Penguin Press, 2011).

⁶⁴ (New York: Basic Books, 1978).

activate asset bubbles, and then manipulate the irrationalities and deceive the trust of others and, thus, outsmart the system. In the recent crisis, brilliant hedge fund managers hyped asset bubbles, falsified or obscured credit ratings, and also bought insurance (e.g., through AIG) to cover themselves when the asset bubbles finally burst. *Pace* Greenspan, perhaps the instincts that society has to blame, or worry about, are not homogenous endowments of animal spirits or shared herd (social) instincts of people drawn into the irrational exuberance of competitive games, but brilliantly rational, realistic, strategic (gratification-deferring) predators at the atypical upper tail of statistical distributions? In a phrase of the psychologist William James, “the beaked and taloned predators,” with an absence of social instincts?

b.) Politics can be the continuation of economic competition by another name. The news media can draw audiences by creating a drama that implies, ultimately, that governments are in charge of societies. However some businessmen do not live inside this media-created drama. The possibility that some wealthy entrepreneurs might relate to national government and politics as dependent variables (to be manipulated and managed) is a possibility that may be especially important to explore for G-20 nations since assertive (and, ultimately, poorly regulated) actors in a subset of G-20 countries may collude and act across national boundaries. There is indirect evidence to suggest that growing asymmetries of brainpower and concentrations of wealth are deployed against (penetrated) political systems to induce deregulation and achieve other benefits. Specifically, the world had, from the late 1970s through 2003 (according to IMF data) 117 crises of banking systems in 93 countries in which much or all of the capital of the system was exhausted. In Martin Wolf’s assessment of these cases, the banking industries developed strategies of privatizing their gains during the upside of financial bubbles, then secured government bailouts from taxpayers as losses during the crisis phase became large enough to wipe-out remaining bank equity and destroy the economy. In 27 of the earlier crises, taxpayers were stuck with added public debt equal to, or greater than, 10% of GDP, often much more. When similar, highly strategic people continue to win [“privatize the gains”], with a similar *modus operandi*, the better, new forecasting models might be based on the classic dynamics of predator-prey

ecosystems described by the Lotka-Volterra equations.⁶⁵ If this theory proves to be correct, and the G-20 nations want to improve economic forecasting, the best question suggested by upgraded social science forecasting could be: “What are *they* [the alpha predators] planning next?” And every chief of state might ask that the best (public) economic forecasting models be accompanied by secret reports and forecasts from his intelligence agencies based on massive penetration of the national and global financial sectors and especially the “shadow” sector.

By contrast with Greenspan, it is interesting to consider the perspective of David Stockman, a former OMB Director for President Reagan who later made a fortune on Wall Street. In Stockman’s view, the major players always are trying to outsmart each other - and the same instincts are directed against governments as on the economic playing fields; in his analysis, few governments, including the American government, can play in this new game and win.⁶⁶

C. Finding Unknown Variables and Organizing Rapid Learning Systems

“We are confronted with . . . ‘unknown unknowns’ . . . ”

- Olivier Blanchard⁶⁷

The third planning step will develop methods to find unknown variables and causal relationships and organize rapid learning systems.

⁶⁵ Martin Wolf, Fixing Global Finance (Baltimore, MD: Johns Hopkins University Press, 2008), pp. 32-33. Lloyd S. Etheredge, “Predator-Prey Models: Forecasting a Global Financial System with Asymmetries of Brainpower and Money,” Memorandum # 17 for the Fischhoff (NRC) Committee on Behavioral and Social Science Research to Improve Intelligence Analysis for National Security. Online at www.policyscience.net at II. D.

⁶⁶ David Stockman, The Great Deformation: The Corruption of Capitalism in America (New York: Public Affairs, 2013).

⁶⁷ David Wessel, “Olivier Blanchard’s Five Lessons for Economists from the Financial Crisis,” Wall Street Journal, April 1, 2013.

The model for Step 3 will be the new rapid learning systems of international biomedical research that use “Everything Included,” large N, curated databases partly underwritten at public expense. Until recently, cancers were classified by their site of occurrence (e.g., breast cancer, lung cancer). Now, with “Everything Included” databases (100,000++ variables per patient, and tens of millions of patients and their genetic information and electronic health records being linked in international networks), new machine learning algorithms have established themselves as a disruptive, breakthrough technology. They brilliantly help human researchers to replace old paradigms more quickly than traditional systems of single investigator awards. An investigator is not limited to imagine (ahead of time) the specific hypothesis to be tested and, then, fated to discover unknown variables only by accident.

With this powerful investment in new scientific technology, the biomedical world is changing. It now appears that there may be 10 or more different types of cancer that appear in the breast or the lung (etc.), each with its own complex causal pathway (linked to the genetics of the specific individual). Each type has its own universe of newly emerging treatment possibilities and the exciting future that humanity is facing is a new *precision* medicine also tied to genetic and other unique characteristics of each patient.⁶⁸

Discovering unknown variables and relationships is becoming an automated science. This could be G-20 macroeconomics!

For this third planning group I think that the challenges to develop “Everything Included” research strategies are: What constitutes Everything? (For example, when you include psychology and neuroscience and when the social sciences do not yet have the equivalent of the periodic table and the human genome?) How fast do we want to learn? And what G-20 priorities to recommend? It is an open-ended question, and the powerful machine-learning Big Data, paradigm-busting methods may be sensitive to initial omissions of variables or error rates in

⁶⁸ B. Vogelstein *et al.*, “Cancer Genome Landscapes,” *Science*, March 29, 2013, pp. 1546 - 1558, attached to this proposal.

metrics.

7.) Big Data and Private Sector Partnerships

The seventh planning project will map how the startup of “Everything Included” R&D economic data systems can be linked together in international partnerships with the private sector. A useful initial global project might be data mining and rapid, cumulative learning concerning consumer/household behavior and marketing.⁶⁹ Just as 11,000 individual Walmart store managers in 27 countries are currently expected to run three to five experiments each week, so a R&D consortium of interested global corporations could be linked with leading business schools in rapid learning systems.

For example, it might be easy for these partnerships to organize large N, randomized cross-cultural experiments of advertising and marketing for all demographic groups and all nations and cultures.⁷⁰ Companies like Mastercard or Google would have incentives to contribute data to an initial R&D data system, since discoveries of how their data can be combined with other data make the business case for why their future data should be purchased to improve economic models and forecasting, worldwide.⁷¹

⁶⁹ See Liran Einav and Jonathan Levin, “The Data Revolution and Economic Analysis.” Unpublished manuscript, May 1, 2013 prepared for the NBER Innovation Policy and the Economy conference.

⁷⁰ Concerning steep cost reductions by designing collaborative global rapid learning systems, see Michael S. Lauer and Ralph D’Agostino, “The Randomized Registry Trial - The Next Disruptive Technology in Clinical Practice?” The New England Journal of Medicine, October 24, 2013, pp. 1579 - 1581.

⁷¹ Academic social science might benefit from this project. American social psychologists typically have used their undergraduates as experimental subjects, and there are sparse discussions in standard textbooks about how human beings in other cultures might behave differently than American undergraduates in the late 20th and early 21st centuries. A discovery by American

8.) New Methods

“How reliable are these tools? . . . They work but they don’t work great. People and institutions find ways around them.”

- Olivier Blanchard ⁷²

The third planning group also will consider recommendations for faster and better learning cycles in the US and G-20 nations. For example:

a.) Data collection and analysis should be faster and supplemented by new methods to estimate coefficients. Traditional forecasting uses quarterly time series data and regression equations, but this clearly is too slow and unable to detect changing coefficients in a timely fashion. A new universe of real-time sampling and monitoring will be useful: Walmart has global data on sales, by store and product, online within 24 hours and the global banking system clears most of the transactions of the world economy within several days. Soon, it could be possible to monitor economic behavior and track the effects of economic policies in real time.

b.) To work through, and master, the integrated complexity that economic science must face requires new methods for modeling and display. These are large, living, complex and (sometimes) adaptive systems composed of large, living, complex and (sometimes) adaptive subsystems that may be loosely or tightly coupled or even partly inconsistent with each other. The biomed-

Express [informal communication] that social media effects (e.g., knowledge of a friend’s purchase) have 3- to 5- times greater impact to influence purchasing decisions of Egyptian teenagers (compared to American teenagers) may stimulate thinking for a wider universe of new and informative discoveries about cross-cultural social psychology.

⁷² Wessel, *op. cit.*. Blanchard’s five lessons emphasize the need for analytic tools with much more “plumbing” detail: “We do macro on the assumption that we can look at aggregates in some way and then just have them interact in simple models. I still think that’s the way to go, but [experience] shows the limits of that approach. When it comes to the financial system, it’s very clear that the details of the plumbing matter.”

cal world has been evolving new and sophisticated computer simulation models of the human body (beginning at the molecular level) - with extensions to medical practice decisions, public health and government policy - that will be worth evaluating for their applications to macroeconomics and G-20 forecasting.⁷³

c.) Cross-walking past economic policy mistakes and forecasting errors in G-20 countries may be useful: A new, meta-learning strategy in biomedical research is to analyze the eventual discovery of lethal side-effects of approved drugs and to calculate how much larger new rapid-learning data systems should become if we want to catch such types of mistakes in the future in three months, or six months, or two years (etc.).⁷⁴

d.) Panel studies are another useful innovation, especially to achieve the “Everything Included” vision for R&D. [Traditionally, economists have correlated independent and dependent variables (defined by accountants or tax laws) and told (without an independent examination of the mechanisms) a rational choice, profit-maximizing story to explain the links. Now, with alternative explanations and pathways, panel studies can, using multiple methods, provide much more information, and in depth, to compare different theories.] Especially with compensation, many people might be willing participants. In addition to formal guarantees of privacy, the panel membership could be limited to several years and, thereby, reduce concerns about broader invasions of privacy. There are multiple groups of actors in economies, and a diverse range of these panels are likely to be recommended by the planning group.

⁷³ For example David Eddy’s Archimedes Project originally developed for Kaiser Permanente: <http://archimedesmodel.com/> . The model and its mathematical methods recently have been acquired for international medical practice, pharmaceutical research, and public health advising by STG, a global venture capital company.

⁷⁴ See Larry Norton’s overview of the wider rapid learning system for cancer, https://www.ecri.org/Video/2013_TA_Conf/4-Session-1-Norton.mov. See Blanchard (2011) *op. cit.*

e.) Computer-assisted content analysis (discussed in footnote 14) may help to understand public moods and the emotional component of recovery processes.

f.) Empirically-defined variables (rather than accounting-defined variables) might be useful experiments. Greenspan's forecasting ideas place great weight on the (alleged) very high rate of consumption (and low savings) in American households, but most families may view many of their expenditures differently, as investments contributing long-term benefits to their lives and the lives of their children.

g.) To libertarians, except for the contributions of a minimal government (e.g., national defense), most public sector expenditures can be just political shell games and "theft" (transfer payments). Greenspan does not use this term: However a current lack of analysis methods skews his analysis into a story of how the financial sector, securing private savings, plays the leading role in the economy by assembling and allocating funds for the new investments that increase productivity and the possibility of higher standards of living. Yet all sectors (including governments) actually make investments. The broader measurement challenge for forecasting equations is to measure what investments are good investments, not who makes them. Whether society is "investing enough" cannot be calculated, as Greenspan does, by the percentage of the average household income that is saved: the public sector investments (paid through taxes or deficits) also must be measured and evaluated.

h.) Weighted scenarios and game-theoretic methods (even war games) may be useful to forecast the emerging national and global financial systems with asymmetries of wealth and brainpower. In testimony to draft laws and regulations, some economists already systematically analyze loopholes and vulnerabilities and forecast how these will be exploited.⁷⁵

⁷⁵ Charles Calomiris and Alan Meltzer, "How Dodd-Frank Doubles-Down on "Too Big to Fail," *Wall Street Journal*, February 12, 2014. See also Sheila Blair's answer to the questions: "Can regulators ever be as nimble as the regulatees?" and "Given the cat and mouse game between regulators and regulatees, do we have to live with regulatory uncertainty?" In her "Everything the IMF Wanted to Know About Monetary Regulation and Wasn't Afraid to Ask"

9.) Rapid Learning Systems

“With a century and half of clear, detailed information on crisis after crisis, the burning question is not How did this happen? but How did we ignore that long history, and think that we had solved the problems with the business cycle?”

- Joseph Stiglitz ⁷⁶

An evolving design of a global rapid learning system for macroeconomics needs a self-reflective theory of itself - and metrics. The practical realities of the system, and the speed of its learning cycles in the G-20 (and beyond), will depend upon the evolving design of a complex (sometimes) adaptive system composed of complex (sometimes adaptive) subsystems. Once, the focus of philosophers was to discover how a single individual could become wise: Today, we recognize wider problems, especially in democratic systems: How, in Stiglitz’s terms (in the quotation above) do we get *other* people (and systems) to listen and to remember?⁷⁷

Creating a rapid learning system also will depend upon recognizing that it is in the self-interest of each G-20 nation, in a world of globalizing economies, that other nations (and private sector decision makers) adopt realistic and evidence-based policies and that everybody prospers. Upon a news media that support the system. And upon funding, honesty and reliability, and institutional homes, and much else. What are the variables to measure, the theories to test, who are the allies, where is the funding, what are the disruptive technologies to deploy?

online at <http://www.imf.org/external/np/seminars/eng/2013/macro2/pdf/sb.pdf>

⁷⁶ Joseph Stiglitz, “The Lessons of the North Atlantic Crisis for Economic Theory and Policy,” <http://blog-imfdirect.imf.org/2013/05/03/the-lessons-of-the-north-atlantic-crisis-for-economic-theory-and-policy/>

⁷⁷ See also Etheredge, “Wisdom . . .” *op. cit.*; Ascher, *op. cit.*

II. Work Plan – May 1, 2014 – June 30, 2017

The project will organize an Advisory Committee to develop initial plans. Next, it will complete three steps in three years (each step taking about a year, with three areas of focus). Each step will have a planning group (N=12-14 members, with a degree of overlap) and will produce a Report.

Each planning group will produce a report (i.e., the grant will deliver three Reports) to the sponsors with recommendations of variables and metrics to produce a state-of-the-art international rapid learning system for macroeconomics. Each of the three Reports will address: 1.) Recommended variables and metrics that are on the shelf and that can be deployed immediately; 2.) Recommended metrics that can become available soon, with additional work; 3.) Important areas where further R&D is needed before metrics can be recommended.⁷⁸

The budget supports a full time Principal Investigator with part-time assistance and expenses. Expenses include honoraria and travel for Advisory Committee and planning group members, initial discussions between the PI and each working group member, and a 1 ½ day meeting of each planning group.

The Advisory Committee (five members) will be the joint responsibility of the PI and [the home institution for the project]. The project is envisioned as part of a long term research program at [the home institution] devoted to achieving a rapid learning (international) system for macroeconomics. [The home institution] may seek additional funds for Fellowships, research to analyze new data, and additional, concurrent conferences and lecture series.

⁷⁸ This initial project will focus on macroeconomics of the G-20 system. Additional data systems and better forecasting equations may benefit all countries.

III. Budget and Budget Narrative (to be added)

IV. Attachments

Bert Vogelstein *et al.*, "Cancer Genome Landscapes," Science, March 29, 2013, pp. 1546 - 1558.

Lloyd S. Etheredge, The Case of the Unreturned Cafeteria Trays (Washington, DC: American Political Science Association, 1976).

Lloyd S. Etheredge, Brief Biography and Curriculum Vitae.

Digital Textbooks and Educational Data Mining

From: "Adam Sobieski" [REDACTED]
Date: Thu, August 7, 2014 6:23 pm
To: pcast@ostp.gov <pcast@ostp.gov>

Office of Science and Technology Policy,
President's Council of Advisors on Science and Technology,
(<http://lists.w3.org/Archives/Public/www-tag/2014Aug/0006.html>)

In the United States, legislation and legal precedents are on the side of protecting student data (e.g. COPPA, <http://www.coppa.org/coppa.htm>, <http://www.ftc.gov/enforcement/rules/rulemaking-regulatory-reform-proceedings/childrens-online-privacy-protection-rule>). Accordingly, there is interest in providing EDM features to students, teachers and school systems without requiring the storage of student data on government or industry servers and without the harvesting of students' data.

Towards protecting student data and facilitating sound public policy, research is underway into utilizing numerical techniques, computer algebra systems, on databases (<http://lists.w3.org/Archives/Public/www-math/2014May/0008.html>). Similarly, approaches to facilitate students' collaborative socialization, group studying activities, for students are being explored.

As technology advances, the complexity and sophistication of the data, models and uses of the data and models to advantage the students, teachers and school systems will increase. There are, for instance, educational data from uses of textbooks, data from interactions with dialogue systems, data from users' interactions with intelligent tutoring systems and data from users' interactions with other educational software.

Towards specification processes, providing advanced features with student data privacy, we can, in addition to recommending research funding directions, explore the topics pertaining to education technology in this mailing list or a W3C Working Group or Community Group. The research into the broader set of deliverables possible with local storage and local computation pertains to informing policy. Regarding digital textbook personalization, deliverables can be provided without harvesting students' data.

Interprocess communication between software, including Web browsers on popular mobile computing platforms, is topical to providing other advanced features for digital textbooks, interoperating applications, including applications interoperating with digital textbooks, providing students and teachers with features.

Combinations of document markup, ontology, semantic vocabulary and JavaScript API, as well as component object models describing API that browser software interoperate with, can facilitate locally-stored data, including from multiple applications, multiple digital textbooks and educational software, processed locally to provide features for digital textbooks and applications as per students' settings.

Kind regards,

Adam Sobieski

Election Science and Technology

From: "Adam Sobieski" [REDACTED]

Date: Thu, August 7, 2014 6:32 pm

To: pcast@ostp.gov <pcast@ostp.gov>

Office of Science and Technology Policy,
President's Council of Advisors on Science and Technology,

(<http://lists.w3.org/Archives/Public/public-opengov/2014Aug/0000.html>)

An interesting technology discussion topic occurred recently, pertinent to the number of and granularity of voting topics, elections and issues, on ballots. The discussion topic was the number and granularity of voting topics on ballots, a multidisciplinary topic pertaining to psychology, sociology, anthropology, psephology, demography, psychometrics, ergonomics, linguistics and questionnaire construction.

Why do various districts vote on the numbers of topics that they do and topics at the granularity that they do? How can technology, i.e. notes and decision support software, facilitate more well-informed, convenient and ergonomic voting, opinion polls, surveys and questionnaires with more numerous and granular topics at the neighborhood, city, county, state and federal levels?

Two technological ideas include: (1) mobile apps, pubsub, dynamic queries and syndication, (2) histograms and infographics showing, during campaign seasons, the number of journalism articles per neighborhood, city, county, state and federal voting topic.

Kind regards,

Adam Sobieski

Education Technology, Local Schoolboards and United States Science and Technology Policy

From: "Adam Sobieski" [REDACTED]
Date: Tue, August 12, 2014 10:18 am
To: pcast@ostp.gov <pcast@ostp.gov>

Office of Science and Technology Policy,
President's Council of Advisors on Science and Technology,

The topics: *schools of the future, classrooms of the future, textbooks of the future, educational mobile apps of the future, school libraries of the future, libraries of the future, cities of the future, elections of the future*, overlapping with law and policy topics, might be of interest to organizations such as OSTP and PCAST.

I consider topics including technological interoperability pertaining to students' mobile computers, mobile apps, with public school libraries, advancing technology to provide features which empower communities, in particular communities with local schoolboards. The topics address concerns about students in public schools, without clear alternatives provided to their school districts, instructed to utilize difficult to regulate, distant from communities, distant from elected schoolboards, multinational search engines or social networking websites, websites which collect or harvest user data, catering to marketing industry clientele.

I find the technologies of educational data mining to be quite interesting, optimizing educational systems utilizing scientific methodologies. I opine that numerous specific deliverables can be provided while also providing students data privacy protections. It was recently indicated that digital textbook personalization, for instance, is possible without harvesting student data; that is, digital textbook software can personalize content to individual students with student data, student models, stored locally on students' mobile computers.

Americans would be interested in content, articles, reports, on the topics of local digital textbook selection, how digital textbook authoring teams can directly send their textbooks to schoolboards for consideration, as well as discussions about other legal topics pertaining to: *schools of the future, classrooms of the future, textbooks of the future, educational mobile apps of the future, school libraries of the future, libraries of the future, cities of the future, elections of the future*.

Kind regards,

Adam Sobieski

<http://phoster.com/>
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<http://www.w3.org/community/argumentation/>
<http://www.w3.org/community/collaboration/>

Dr. Holdren's short video on forest fires.

From: "Harley Canine" [REDACTED]

Date: Fri, August 8, 2014 11:37 pm

To: pcast@ostp.gov

To whom it may concern,

My name is Kevin Stevens, and I am from Eagan, (a suburb of St. Paul) MN. I was scrolling through my Facebook page tonight, and I came across a video put out by Dr. John P. Holdren, the President's Science Advisor.

In his video, which you can watch here....., www.youtube.com/watch?v=hDsNq-rVpIE... you can clearly see that he has a one-sided viewpoint of the subjects of both climate change, and forest fires.

At one point in the video, you can hear him even say, that besides being costly, etc, that forest fires are, "Generally harmful to ecosystems."

In what world exactly are forest fires "generally harmful to ecosystems"? It's not the natural world, that's for sure. One needs to look no further than Wikipedia to find out about the benefits of controlled or prescribed burns, or even regularly occurring natural fires. A quote right from that site is, " **Controlled or prescribed burning**, also known as **hazard reduction burning** (HRB) or **swaling**, is a technique sometimes used in [forest management](#), [farming](#), [prairie restoration](#) or [greenhouse gas](#) abatement. [Fire](#) is a natural part of both forest and grassland [ecology](#), and controlled fire can be a tool for [foresters](#). Hazard reduction or controlled burning is conducted during the cooler months to reduce fuel buildup and decrease the likelihood of serious hotter fires.^[1] Controlled burning stimulates the [germination](#) of some desirable forest [trees](#), thus renewing the forest. Some [cones](#), such as those of [Lodgepole Pine](#) and [Sequoia](#), are [serotinous](#), meaning they require heat from fire to open cones to disperse seeds."

That is right from wikipedia.org/wiki/Controlled_burn.

As you can see, it is not even hard for me as a lay-person, to seriously dispute some of the claims that Dr. Holdren makes about climate change and forest fires. In just a couple mouse clicks, I learn that actually, no, forest fires are not "generally harmful to ecosystems", rather, they are not only beneficial, but also necessary for new growth to occur.

The main problem with the dramatic increase in the size, number, and intensity of forest fires over the last decade has little or nothing to do with climate change. What I just talked about and quoted above is a direct tie-in to my next point. I may not be a scientist, but, with a little help in the research area, I can easily find numerous facts on what I am about to talk about.

What do I say is directly responsible for the large increase in the size, number, and intensity of forest fires? Our very own EPA, that's who. In 1998, the Clean Air Act was passed. if you delve deeply into the regulations set forth in this brilliant piece of work, you will find some very counter-intuitive regulations when it comes to the prevention of future wildfires. This is the issue, as always, when you have people in Government, who know little to nothing about the cause and effect of a given

problem, making laws concerning that problem.

Right on www.epa.gov/agriculture/tburn.html, you will see, under the heading of "Prescribed Burning" a list of factors to consider when thinking about doing a controlled burn.

- Carefully plan burning to adhere to weather, time of year, and fuel conditions that will help achieve the desired results and minimize impacts on water quality.
- Intense prescribed fire for site preparation should not be conducted in the streamside management areas.
- Avoid conditions requiring extensive blading of firelines by heavy equipment.
- Revegetate firelines with adapted herbaceous species.
- Avoid burning on steep slopes with high erosion hazard areas or highly erodible soils.
- Construct firelines in a manner that minimizes erosion and sedimentation and prevents runoff from directly entering watercourses.

This information was taken right from the site listed above.

Now, while this looks all well and good on paper, and can make a politician look like they really care about the environment to their constituents, it really is actually the reason for the large increase in the size, number, and intensity of wildfires over the last decade.

Why? Easy, here's what happens. When you don't allow prescribed burning, ie, you put so many restrictions on when/why/how/where, the burning can occur, it causes the continuous buildup of leaves, pine needles, pine cones, dead grass, etc....in other words, FUEL, for wildfires.

One of the points in the regulations states, "Avoid burning on steep slopes with high erosion hazard areas or highly erodible soils." Well.....as I stated, that sounds all well and good, but, where exactly do wildfires burn, WHEN they burn? Could it possibly be on steep slopes? Could that be part of the reason they are so hard to control? Maybe because the slopes are so steep, the firefighters can't get close enough to the fire to control it, whereas, if they would have been allowed to do regular controlled burns, the fire would not have much fuel, and would burn itself out in a much more timely and less destructive manner.

I have seen videos and pictures shown by firefighters as to what happens during a scheduled, controlled burn. You can clearly see that the fire raced along the ground, burned up all the fuel on and near the ground, and barely even singed the leaves or needles of any branches of the trees beyond 10-15 feet high. It moves through the forest so quickly, it burns itself out before getting hot enough, and high enough to start burning the green trees. You don't have to be a scientist to know how hard it is to get "green" wood to burn.

It's not rocket science folks. In fact, it's barely science. It's common sense. Climate change has little, or more likely, nothing to do with the increase in the size, number, and intensity of forest fires. Forest fires are a very natural, and regularly occurring event. They NEED to happen. They just need to be allowed to happen regularly, and not be interfered with by human law. Nature's law will always trump our laws. If you ban the burning of small forest fires, controlled forest fires, prescribed burns, etc, for a lengthy period of time, eventually, nature will take over and burn it for you. And when it does, it will be an enormous, uncontrollable wildfire.

Please consider these facts. Please stop with the ridiculous claims of everything being linked to climate change. Before just jumping to that conclusion, please consider your own regulations and legislation, and what effects they may be having, that is usually the simpler answer, and pretty much always, the simple answer is the correct answer.

Personally, I think that the views of Dr. John Holdren are very irresponsible, and politically motivated, and that should not happen when it comes to our environment.

Thank you for your time,

Kevin S.

Education Technology

From: "Adam Sobieski" [REDACTED]

Date: Mon, August 25, 2014 5:52 pm

To: pcast@ostp.gov <pcast@ostp.gov>

Office of Science and Technology Policy,
President's Council on Science and Technology,

Executive Summary

Educational technology can be delivered, utilizing peer-to-peer (P2P) database computing, P2P statistical computing, providing educational data mining (EDM) features while providing students storage of their data on their mobile computers, facilitating data privacy.

Educational technology can interoperate with software at schools' libraries, public schools or universities, to provide local configurability, e.g. to local school districts or local schoolboards. Such software, at public school libraries, can provide, in a configurable manner, the content, from a large number of materials, that digital characters (e.g. <http://ict.usc.edu/prototypes/digital-ira/>), dialogue systems, utilize, including in response to students' questions, as students do schoolwork with educational technology utilizing featureful, interoperable, digital textbooks selected by state or local schoolboards.

Letter to the White House

Topical to peer-to-peer (P2P) educational technology systems is that each student's data can be stored on their mobile computer. The local storage of data, of student models, is possible, while simultaneously providing educational data mining (EDM) features, technological advantages, to students, teachers, administrators and school systems. Many architectural models are possible with the premises of: (1) student data privacy, students' data on students' mobile computers, (2) interoperability with school library technologies. An architectural concept is described with tablets as natural language user interfaces, dialogue systems or digital characters, to semantic services, content services, provided by school libraries.

With familiarity of users' contexts, users' tasks, users' documents, e.g. textbooks, software can better semantically interpret the instantaneous utterances of users. Similarly, natural language generation can better, more featurefully, articulate language to users utilizing such data. Systems processing sensor data, e.g. students' prosody, nonverbal cues or affect, can process such sensor data or derived data locally on students' mobile computers. The view presented is that users' data is reasonably stored on users' computers. Data from multiple software applications, e.g. event streams, can be processed to provide modeling-related features for multiple software applications.

Interestingly, components on students' tablets, in addition to teachers' software, can utilize real-time data, including EDM data, from distributed P2P processing. Per-tablet machine learning heuristics, for example, can be enhanced by harnessing classroom P2P computing, obtaining course-specific

contextual data. Students' mobile computers can, as per P2P computing, process EDM data for students, teachers, administrators or school systems, while students' data, including increasingly sophisticated student models, are stored on students' devices. Pertinent to student data privacy topics, both the present as well as the future(s) of student modeling are important to consider; increasingly advanced modeling components accumulating data, through at least K-12, from uses of software applications, Web browsing, digital textbook uses, per course, through years of students' learning.

We can envision library system technologies which stream content for natural language generation components on mobile computers, library system technologies which can also predict, prepare, content that students' might request. Students would tend to be simultaneously exploring topics pertaining to or related to topics in textbooks or curriculum, for instance. School library systems could utilize data from materials including students' textbooks, course syllabi and course websites.

We can envision content on the sides of students' screens, hyperlinks to materials or into digital textbooks, concurrent to digital tutors' utterances as digital tutors, dialogue systems or digital characters, present topics to students or answer students' questions. Such content could be described as the provenance of the semantic content processed into utterances or as recommended content related to uttered topics; there could be modes for such content areas on students' screens. Semantic data streamed from school libraries, articulated into natural language utilizing data on students' mobile computers, could have provenances including from the processed content of numerous materials and resources.

Library technologies can provide services, semantic content services, configurable knowledgebases, interoperating with dialogue systems or digital characters, digital tutoring technologies, on students' mobile computers.

The storage of students' various data, including student models, other than upon their mobile computers is not necessary to provide students, teachers, administrators or schools systems with EDM features.

To estimate when students' mobile computing hardware will be ready to compute advanced dialogue systems (see also: <http://phoster.com/2013/11/computational-linguistics-and-graphics-card-hardware/>) concurrent to students' tasks, scientists can utilize data including graphics card manufacturers' roadmaps, where such projections include advancements including stacked DRAM. Technical topics include mobile computing batteries, graphics chips' processing throughputs, graphics chips' electrical efficiencies as well as the number of such chips in mobile computers. At CES 2014, Digital Ira was presented on a mobile device.

I have indicated that advantages of EDM are possible without any storage, collection, harvesting, processing, productization or utilization of students' data by third parties. I have indicated advancements to databases (<http://lists.w3.org/Archives/Public/www-math/2014May/0008.html>). I have indicated advancements to digital textbooks (<http://www.w3.org/community/argumentation/2014/08/12/document-personalization-and-user-data-privacy-client-side-document-processing-utilizing-locally-stored-user-data-and-user-models/>). Distributed computation, decentralized computation, P2P computation, utilizing students' mobile computers, including in public school settings, increases the number of EDM features which

can be provided to students, teachers, administrators or school systems, while students' data, including increasingly sophisticated student models, can be stored locally on their mobile computers, protecting students' data privacy.

Kind regards,

Adam Sobieski

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