Lucas Critique After the Crisis: a Historicization and Review of one Theory's Eminence

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Abstract

This paper re-examines the Lucas Critique (LC) in light of the 2008 financial crisis and recent scholarship. Inspired by the theoretical reassessments of the Lucas Critique by economists (Anwar Shaikh) and historians (Daniel T. Rodgers), this paper takes on two separate tasks: 1) to understand the historical context that gave rise to Robert Lucas' infamous 1976 paper now commonly called the 'Lucas Critique', and 2) to examine relevant literature (as it addresses issues of theory, policy, and statistical techniques) since the recent US financial crisis to find out if the Lucas Critique has been subject to greater scrutiny in the economics discipline. Using the SSRN database, this paper concludes that little has changed in the perception of the Lucas Critique since 2008; however, a large quantity of associations with the theory that diverge from the content of the paper itself makes clear the need for another project to contextualize the Lucas Critique since its publication (not simply up to its publication, which is performed here).

Introduction

In early December 1995, University of Chicago Professor Robert Emerson Lucas Jr. was awarded the Nobel Prize in Economic Sciences.[1] Besides maybe the John Bates Clark Medal,[2] no award honors an economist with such prestige in the popular imagination, likely due to its association with the other renowned Nobel prizes. Here at the event Professor Lars E.O. Svensson of the Royal Swedish Academy of Sciences introduced Robert E. Lucas with these words (translated from Swedish):

> Robert Lucas is the social scientist who has had the greatest influence on macroeconomic research since 1970. The main objective of macroeconomic research is to study fluctuations in total production, employment and inflation. Lucas's contributions have transformed macroeconomic analysis and deepened our

[1] Then officially called the 'Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel' and now officially called 'The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel'.
[2] Which is granted to an American economist under the age of forty who is "judged to have made the most significant contribution to economic thought and knowledge".

> understanding of economic policy. They have led to a more realistic appreciation of what economic policy can, and cannot, achieve. Lucas has also given us more reliable methods to evaluate the effects of changing economic policy.

Professor Svensson goes on to obscurely reference Lucas' infamous 1976 paper, "Econometric Policy Evaluation: A Critique" as evidence of Lucas' achievements. Today, this paper and Robert Lucas' theoretical claim-to-fame are mutually referred to as the 'Lucas Critique' (or LC). Fascinatingly, Robert Lucas did not set out to have the "greatest influence on macroeconomic research" per se. He set out to eliminate macroeconomics altogether.

This assumption leads to many fascinating questions. What is the significance of this goal? What was going on in the world when Robert Lucas wrote his now famous 1976 paper, which earned him his 'Nobel' prize? What was going on in his life? How has his reputation fared since the most recent financial crisis? These are the questions this paper aims to assess; this journey begins in a place known for its distinct refutation of Lucas' theories for many years: The New School for Social Research.

In the Spring of 2012, Anwar Shaikh issued advanced copies of select chapters of his upcoming book, thirteen years in the making. In it, major topics central to current methods in the economics discipline are taken to task, peeling apart their histories, implications, and relation to basic facts. In the third chapter, at the time entitled "Microfoundations and Method", Shaikh laid out some of the framework for this grand project; as grounds for this paper's literature review, contentions from this chapter are summarized below.

Shaikh starts off "Microfoundations and Methods" by stating that his previous chapter had demonstrated the presence of powerful long-term patterns in capitalist economies over space, time, and a wide range of cultures. He offers two questions in light of this knowledge: 1) how could such different societies produce similar results in this way?, and 2) what notions of equilibrium/adjustment processes/dynamics are appropriate for these discovered patterns?

To answer the first question he guides the reader to an important discussion on micro-processes versus macro-patterns. He then goes into some detail on their differences and implications, but ends up with two razor-sharp conclusions: 1) many roads lead to Rome ("a correspondence with the aggregate empirical facts does not privilege any particular vision of micro processes"), and 2) *homoeconomicus* is a particularly bad one.

Here, Shaikh provides important context, in which he offers information about the origins of this division, which was first set by J.M. Keynes (in *The General Theory*). This set him apart from the previous way economic theory was organized; before Keynes, it was the classical theory of price that dominated such concepts now subsumed under macroeconomics.

The perspective offered by Keynes conflicted with the view subsequently proffered by Robert Lucas in the 1976 paper “Econometric Policy Analysis: A Critique”, and by his later writings and talks. Shaikh here provides four central propositions of what we now know as ‘The Lucas Critique’ (or from here on—as a theoretical concept or as the paper—may be interchangeably referred to as the *LC*). These briefly are:

1) structure derives from individual decision rules of agents,

2) a change in the environment or policy also changes individual behavior and structure,

3) therefore models based on past patterns cannot predict effects of changes in environments because the structures will also change, and

4) “It follows that we need a theory of micro-behavior to predict how macro-outcomes respond to a change in environment”

Shaikh teases out the central conclusion of these propositions from a discussion Lucas had years after his famous paper when he stated that if done properly, “the term 'macroeconomic' will simply disappear from use and the modifier 'micro' will become superfluous. We will simply speak … of economic theory".

Shaikh goes on to outline the Neoclassical paradigm that was built on this theoretical cornerstone. He then walks the reader through a brief history of rationality as an idea from the Enlightenment to economists like Walras, Arrow-Debreu, and Lucas as well. This discussion connects Walras’ aim in establishing an alternative ‘perfect economy’ to Arrow’s ‘general equilibrium’, whose features are not ideal in the sense of social interaction or human complexity, but in that they “provide the foundation for the claim that the market is the ideal economic institutions and capitalism the ideal social form.”

Connecting Lucas’ theories to this long history of thought is an important project, first shown by looking at his graduate education, which was at the University of Chicago and highly influenced by Milton Friedman and his graduate ‘Price Theory’ course; a man who took staunch stances against practically all Keynesian thought (and even described his scholarly project as a "counter-revolution in monetary theory").[3] Lucas pit these traditions against one another in the 1976 paper that earned him the Nobel Prize; like all influential works, it was published at a time of profound social change. Such historical context has begun to be more thoroughly uncovered outside the economics discipline, particularly by Daniel T. Rodgers and a smattering of policy and business historians. Contributing to the project to contextualize the LC, as is done here (up to its publication), provides a firmer foundation to disentangle any potential idea from ideology, and reassess what technical merit it may have for the future.

Speaking of technical merit, since 2008, (and much like how the depressed 1970s changed the way people thought about the discipline) our recent Financial Crisis has provoked a call for change in the present, eminent theories of our discipline. Much to the relief of market participants, classic Keynesian methods were put into use to tame the potential market volatility and destruction. Little wonder given that the Keynesian revolution was born amid the Great Depression's unrest and that our 'Great Recession' had similar destructive potential. In short order, the profession was asked to answer for the crisis; why didn't the economic mainstream predict and prevent such a catastrophe? The responses, particularly from University of Chicago economists, were often dumbstruck and insufficient.[4]

Did all this mean that, for the first time in a generation, papers, models, and theories inspired by the Lucas Critique (LC) were on the way out? That their foundation, the Lucas Critique (LC) itself, was being questioned and criticized?

"No," said New School Professor Duncan Foley. "If anything," he stated at a panel on Heterodox Economics in 2011 at The New School, "it seems to me, one might say, that the Neoclassical mainstream of the profession has begun to 'circle the wagons' around their theories and privileges."

Research Question, Methodology, and Structure

This question, of the state of the Lucas Critique (LC) after the crisis, is the second of two key issues this paper aims to understand; has the LC (in its implications for theory, policy, and statistical technique) been reexamined and/or subjected to scholarly criticism since the

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[3] Friedman, Milton. "The Counter-Revolution in Monetary Theory", IEA Occasional Paper, no. 33. Institute of Economic Affairs. First published by the Institute of Economic Affairs, London, 1970. Available online at: [http://0055d26.netsolhost.com/friedman/pdfs/other_academia/IEA.1970.pdf]

[4] Cassidy, John. "Interview with Eugene Fama". The New Yorker Online: Rational Irrationality Blog. [http://www.newyorker.com/online/blogs/johncassidy/2010/01/interview-with-eugene-fama.html]

2008 Financial Crisis; and if so, to what extent? The first issue that this paper aims to address through historical methods is to ask: what was the wider context that birthed the LC? It is in researching both of these issues that a more holistic understanding of the LC's implications for future economic research can be fully vetted.

Toward the second goal (state of the LC, post-2008), a literature review was conducted from a sample of academic papers in three scholarly databases. These databases were self-selecting; one in particular (SSRN) matched the necessary criterion and provided enough results to get a nice sample on this paper's topic (the LC) since the financial crisis.

The structure of this paper follows this general format: sections III and IV completes our first major task by establishing the historical context that birthed the LC, from a grand and narrow view. Section V completes the second important task by assessing how the LC has fared (in three ways: theory, policy, and in statistical technique) since the 2008 financial crisis. The paper then is completed with a few parting words reflecting on its findings in section VI. Lastly one can find general appendices and sources.

General Context: A Great Shift in American Life

In 2007, Robert Lucas described his frame of reference for entering economics as a young student; he said in a podcast interview that, "as a history major [in the University of Chicago] I knew no economics; I was a pseudo-Marxist who thought economic forces were what made history go. And I still do!"[5] Most Marx scholars would cringe at this reduction of Marx's theory of history; however, most descriptions of the Lucas Critique (or LC) describe its key features without greater historical context or literal presentation. Therefore, here, this paper will place the LC in its historical context so that we might fully appreciate the greater task of reassessing the paper in light of the 2008 financial crisis.

With the hindsight of historical analysis, the period in which the LC was published, the late 1960s through the end of the 1970s, has become a period of remarkable significance for the United States; a paradigm shift can be seen from across a range of disciplines (including politics, economics, environmental sciences, histories of thought in each, and many others). It is a fascinating journey to reflect upon these changes, as diverse scholars have begun to do with earnestness.

To take a brief tour, first politically, this period is noted as the beginning of the great decline in labor union participation, as well as a rapid mobilization of business interests in the

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[5] Econ Talk Podcast. "Lucas on Growth, Poverty and Business Cycles", Interviewed by Russ Roberts. [http://www.econtalk.org/archives/2007/02/lucas_on_growth.html]

political process, seen within a wide range of metrics.[6] Socially the consequences of this disruptive period were viscerally experienced:[7] rapid urban decay, stark retraction of major features of the welfare state, a dramatic rise in: crime, violence, and imprisonment of minority populations (the “War on Drugs” was infamously ‘declared’ in 1971); as well as a de-coupling of productivity growth rates from real wages (and its resultant inequality).

This last feature (the growth in inequality) is particularly interesting as it bridges the discussion into the work of many (albeit popular) economists. Paul Krugman calls this separation the ‘Great Divergence’, whereas his ever-present, Austrian counterpart, Tyler Cowen, calls this moment in US history the ‘Great Stagnation’. The difference lies in their claim for the cause of this economic division (Krugman blames political factors and financialization whereas Cowen points out that this period is noted for the highest point in US fossil fuel production). The 1973 oil crisis and the rise of the so-called “euro-dollar” market play important roles in both of these perspectives, and others.[8]

Speaking of financialization, though not addressed until quite recently by the mainstream economic profession, both Marxist and Sociological literature have provided serious analysis of this trend, which is substantial.[9] This takes off, in particular, around the same time as serious financial deregulation started to take place: the repeal of Regulation Q, the dissolution of the Bretton Woods System, and the first major holes punched into Glass-Steagall (otherwise known as the legal separation of commercial and investment banking, or four sections from the Banking Act of 1933) to name a few.

Public policy scholars and business historians too have developed a convincing set of perspectives on this great transition. To quote Iwan Morgan at length,

> To date, scholarly analysis of the late twentieth-century emergence of a conservative American political economy in place of the liberal one initiated by the New Deal has predominantly focused on the fiscal and deregulatory elements of the Reagan administration’s antistatist agenda. However, there is increasing recognition among historians and social scientists that the

[6] Hacker, Jacob S., and Paul Pierson. Winner-take-all politics: how Washington made the rich richer-and turned its back on the middle class. New York: Simon & Schuster, 2010. Print.
[7] Katz, Michael B. The price of citizenship: redefining the American welfare state. Philadelphia: University of Pennsylvania Press, 2008. Print.
[8] Madrick, Jeffrey G. Age of greed: the triumph of finance and the decline of America, 1970 to the present. New York: Alfred A. Knopf, 2011. Print.
[9] Krippner, Greta R. Capitalizing on crisis: the political origins of the rise of finance. Cambridge, Mass: Harvard University Press, 2012. Print.

> Volcker Fed played a critical role with regard to both the rightward turn of economic policy and the broader structural changes in the economy in this period. To some analysts, its draconian anti-inflation strategy completed the process whereby finance grew more significant and manufacturing underwent relative decline in the more open, increasingly internationalized economy of the 1970s. For others, its success in stabilizing the value of money was the prerequisite for the so-called financialization of the economy whereby business profits grew more dependent on the provision of capital than on production of commodities in the 1980s and beyond.[10]

Morgan adeptly discusses the economic undercurrents which led to such dramatic actions by political and economic elites as well.

> Unleashed by the Vietnam War's overstimulation of the 1960s full-employment economy, inflation worsened exponentially in the subsequent decade as a result of oil-price shocks, global rises in commodity and food prices, the falling value of the dollar after termination of fixed exchange rates, and declining productivity.

All of these features, from changes in our laws and cities to social relations and international exchange systems, meld into larger historical forces; they provide a rich tapestry of the crumbling of America's institutions and way of life. From this distance, such a phenomenon has been described aptly by Daniel T. Rodgers by the title of his recent book *Age of Fracture*. Central to this complete dislocation of American life is a profound shift in ideas; from "earlier notions of history and society that stressed solidity, collective institutions, and social circumstances [...] to a more individualized human nature that emphasized choice, agency, performance, and desire."[11] Central to Rodgers' analysis is the startling shift that has taken place in economic theory; something he credits to a 1976 paper by Robert Lucas.

Specific Context: The Lucas Critique in History

On the historically-micro scale, one may examine the life and times of the LC's author:

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[10] Iwan Morgan. "Monetary Metamorphosis: The Volcker Fed and Inflation." Journal of Policy History 24.4 (2012): 545-571.

[11] I have noted elsewhere that there are certain material features lacking from Rodgers' analysis; notable is his exclusion of the rise of the 'public relations' industry or the rapid monopolization of US media conglomerates—both at rates that almost defy belief'; available upon request.

Robert Lucas. Robert Emerson Lucas was born in 1937 and raised by parents who he describes as Roosevelt democrats (amidst Republican extended family). Lucas came into the world in central Washington (in Yakima), but his family moved into Seattle when their ice creamery went under during the 1937 economic downturn. Yakima was a historic railroad town with radical racial divisions—a site of key significance in the Chicano labor movement—sitting in the heart of Washington's Yakima Valley, the source of much of America's beer hops.[12] Seattle on the other hand was deeply industrial; a city whose fortunes were often intertwined with the level of military activity overseas, producing large quantities of planes and ships.

Lucas attended public schools in Seattle and, since he received a scholarship, was able to go out of state for his secondary education to attend the University of Chicago. This decision prevented him from some expectation that he would become an engineer, akin to the work of his father (the school did not have an engineering program).[13] He migrated into history for his BA, then went to Berkeley for graduate training and transferred into economics, but had to go back to Chicago for funding purposes, where he eventually completed graduate training. Here he was taught price theory by Milton Friedman while Friedman was in his prime. At some point, Lucas experienced a political transformation: from the New Deal Democrat background of his family to a Chicago school-style, anti-government libertarian.[14]

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[12] Rosales Castañeda, O. "UFWOC Yakima Valley Hop Strikes,1971", Seattle Civil Rights and Labor History Project. Available at: [http://depts.washington.edu/civilr/farmwk_ch7.htm]; timeline at: [http://depts.washington.edu/civilr/farmwk_timeline.htm];
Print source available at: Alaniz, Yolanda, and Megan Cornish. Viva la raza: a history of Chicano identity and resistance, p. 287-308. Seattle, WA: Red Letter Press, 2008. Print.

[13] "After the war, my father found a job as a welder at a commercial refrigeration company, Lewis Refrigeration. He became a craftsman, then a sales engineer, then sales manager, and eventually president of the company. He had no college degree and no engineering training, and learned the engineering he needed from the people he worked with and from handbooks."
Quote from: [http://www.econlib.org/library/Enc/bios/Lucas.html].

[14] Politically, Lucas is libertarian. Asked by an interviewer in 1982 whether there is social injustice, Lucas replied, 'Well, sure. Governments involve social injustice.' Asked by another interviewer in 1993 to name the important issues on the economic frontier, Lucas answered, 'In economic policy, the frontier never changes. The issue is always mercantilism and government intervention vs. laissez-faire and free markets.'
More available at: 1) [http://www.econlib.org/library/Enc/bios/Lucas.html].
2) Arjo Klamer, Conversations with Economists (Totowa, N.J.: Rowman and Allanheld, 1983), p. 52; and
3) Interview with Robert E. Lucas Jr., The Region, Federal Reserve Bank of Minneapolis (June 1993), online at: [www.minneapolisfed.org/pubs/region/93-06/int936.cfm]

After graduating, Lucas went to work at Carnegie Mellon, under the looming shadow of Herbert Simon—a very active participant in the Cowles Commission and a Chicago Political Science PhD—who had a lasting influence throughout the school (particularly in human behavior and decision-making, the subject of which extends as far back as Simon's graduate dissertation). Here Lucas befriended his student Edward Prescott who—when Prescott went to work at University of Pennsylvania—Lucas joined in discussions led by Lawrence Klein in his 'Conference on the Micro Foundations of Wage and Price Determination'.

This must have been a site of fascinating debate and conflict, as it held two important traditions that were influencing Lucas throughout his academic career. These could be described as micro/logic/theory and macro/empirics/policy, but experienced by Lucas via the schools surrounding the *theory of rational expectations* versus the *Cowles Commission*, respectively (in the LC, the names assigned to these categories are the "traditional economic theory" and the "theory of economic policy", which from here on this paper may refer to as TET and TEP). These traditions were both present in Klein's Conference on Micro Foundations, and are literally posed against one another in the LC; Lucas himself draws out each one then states, "one of these traditions is fundamentally in error."

The first tradition, microeconomics (or 'traditional economic theory'—TET), is easily traced to his alma mater, University of Chicago, where he studied under Milton Friedman. These were the years leading up to Friedman's publication of his magnum opus, *A Monetary History of the United States*; this work established the foundations for the now out-of-style Monetarism. Maybe more importantly, Lucas studied in Friedman's price theory course during this time, the title of which operates as a pre-Keynesian division in theory, much of which was grounded in Friedman's earlier publication *A Theory of the Consumption Function* (1957). Of lasting significance, however, was the role John Muth played in Lucas' early career, in the mid-1960s; the first three years at Carnegie were spent with this man who is popularly described as the "father of rational expectations". The first paper Lucas co-wrote with Prescott came to being due to Muth's influence, as he describes (emphasis added):

> Edward Prescott had come to GSIA as a doctoral student in the same year I joined the faculty, and we were immediate friends. A few years later, when Ed had become a faculty member at Penn, I enlisted his help on a theoretical project I had begun

> on the dynamics of an imperfectly competitive industry. That problem defeated us, but in the course of failing to solve it we found ourselves talking and corresponding about everything in economic dynamics. In a couple of years we learned large chunks of modern general equilibrium theory, functional analysis, and probability theory, **and wrote a paper, "Investment under Uncertainty," that reformulated John Muth's idea of rational expectations in a useful way. During this brief period my whole point of view of economic dynamics took form (along with Ed's), in a way that has served me well ever since**.[15]

The other tradition, macroeconomics (or 'theory of economic policy'—TEP), that Lucas was being exposed to operated, at one point, in each of the universities he worked in. University of Chicago was home to the Cowles Commission, which was for a period of time run with contributions from Lawrence Klein (of U. Penn.) and Herbert Simon (with his notions of bounded rationality). Klein was of the generation of left-wing economists who were harassed during the cold-war era McCarthy trials (some have speculated that his denial of tenure at University of Michigan was due to his former communist ties). This era had a sustained influence on the discipline that has yet to be fully appreciated. For example, a lesser-known fact about the McCarthy red purges (under the auspices of the House Un-American Activities Commission) was its impetus in establishing our discipline's monumentally influential neoclassical synthesis. To quote a recent letter by The New School's Professor Velupillai:[16]

> [Paul] Samuelson is, by now, on record (the most pungent 'confession' is recorded in Robert Clower's unpublished 'Perugia Lectures on Monetary Theory') as having 'confessed' that he had to coin the phrase 'neoclassical synthesis to keep McCarthy off [his] back'.

In the era of Senator Joseph McCarthy's show trials (the early to mid-1950s), faculty members in Chicago became hostile to the work produced by the Cowles Commission with its attempt to produce more general macroeconometric models, so it transferred its facilities

15 "Robert E. Lucas, Jr. - Biographical", Nobelprize.org. Nobel Media AB 2013. [http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1995/lucas-bio.html]

16 Vellupillai, V. Forthcoming as: Letters to the Editor, Economic & Political Weekly, Vol. XLIX, # 6. Distributed online to New School Economics graduate students on 25 January 2014. Also mentioned as footnote 15 in: After the Revolution: Kerry A. Pearce and Kevin D. Hoover. "Paul Samuelson and the Textbook Keynesian Model", currently available online at: [http://public.econ.duke.edu/~kdh9/Source%20Materials/Research/After%20the%20Revolution.pdf]

to Yale University (an event that took place in Chicago just as Lucas arrived for undergraduate studies). The tension between these two traditions in this history is palpable and competitive; the director of the Cowles Commission when it was rejected from Chicago, Tjalling Koopmans, received the Nobel Prize in economic sciences in 1975, the same year that William Phillips died, and just one year before the LC was published.[17]

Since the Crisis: Analysis and Results

The LC has been a foundational piece of Neoclassical orthodoxy for some time now, but many of the notions held dearly to the field have been shaken in light of the recent financial crisis. It is hard not to look at events just before the crisis without a sense of irony. Lucas himself reflected on the state of "modern depressions" in February of 2007, commenting on the monumental nature of the 1970s 'stagflation' and the fact that "modern depressions are nothing".[18] His stature as an economist was at its height in this year, as when in September 2007 Clemson University held a "Conference in Honor of Robert E. Lucas, Jr." After the crisis took place, Lucas made a defense of the field and accused critics of current modelling techniques that, "[they] have seized on the crisis as an opportunity to restate criticisms they had voiced long before 2008."[19] Have any of these features changed? Is Robert Lucas, or more relevantly the LC, viewed with different colored glasses than just five years earlier? Here this paper aims to answer this question with a review of economic literature on the LC since 2008.

Literature Review: Theory

To answer the question posed above (has the LC been reconsidered in light of the 2008 financial crisis) one must agree with Duncan Foley; there is very little evidence that a paradigm shift is happening in our discipline. Moreover, there is sufficient evidence of surprising interpretations and uses of the Lucas Critique.

For one, many papers in this literature review cite the LC with very little explanation or definition. It gives the impression that many scholars believe they are girding their research with legitimacy by association. Secondly, of the papers that attempt to define the LC, many provide descriptions that veer far from the content within the paper itself. Some go so far as to provide definitions that verge on homespun interpretations of various levels of

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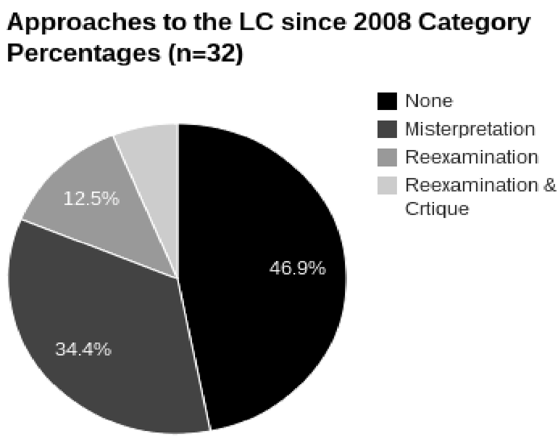
[17] The commission has gone on to be remarkably successful in its association with nobel prize laureates: [http://cowles.econ.yale.edu/archive/people/nobel.htm]
[18] Econ Talk Podcast (*op. cit*).
[19] Lucas, R. "In defence of the dismal science", The Economist Online. Posted 6 August 2009. Available at: [http://www.economist.com/node/14165405]

obscurity; by identifying these articles in the Appendix, it is left to the readers to sample these formulations further.

But more central to our research question is understanding categories and quantities of assessments of the LC post-2008. Here this paper has broken down the results of this literature review into four categories: None, Misinterpretation, Reexamination, and Reexamination & Critique. To explain briefly:

- 'None' is a categorization of papers that by no means reconsider the tenets or features of the LC—their treatment of this theory is non-critical;
- 'Misinterpretation' includes papers that provide definitions or uses of the LC that significantly diverge from or do not include content from the LC paper itself and/or historical context surrounding the moment of its publication;
- 'Reexamination' includes papers that consider whether or not the LC is a legitimate theoretical basis for economic research, but fall short of criticizing the LC or reinterpreting it in a transformative way;
- 'Reexamination & Critique' includes the short list of papers that question the LC and come to conclusions which alter the theory's significance in their framework.

From the 32 papers drawn from my literature review, my categorization of their treatment of the theory are as follows:



Here, the reader can see that almost half of the treatments of the LC since 2008 have not reconsidered their theoretical implications in any way. Fascinatingly, however, is the large percentage of papers that utilized the LC in a fundamentally divergent way ('Misinterpretations') often by citing the paper but providing little reference to its actual content or context (or by assigning a definition that seriously diverges from the original 1976 paper). Also, one can see a decent showing for 'Reexamination'; one should note that many of these offered hard empirical reconsiderations, some utilizing *a la mode* statistical techniques in this endeavor (covered in detail later in this literature review). Others often utilized *fascinating* techniques with or extensions of the LC without questioning its apparent legitimacy (Bowles & Reyes, 2009). Finally, among the papers that actually provided a 'Reexamination & Critique' we see only two results. Among these are a fascinating retrospective on the meaning of the Phillips Curve (Turnovsky 2009) and a hard statistical critique of the predictive ability of representative agent models (Chang et al 2010).

Literature Review: Policy

Beyond theoretical implications, it is important to assess the LC's perceived effect on policy and measurement. Is the LC still considered a legitimate foundation when formulating *policy recommendations* and *econometric models*? Here the literature review is expanded to assess these two considerations.

First, regarding policy, the LC has carried significant weight. Within his paper, Lucas offers what he believed were the key limitations for using econometrics in the method prescribed by the TEP (Theory of Economic Policy) for policy simulations: models that aggregate past experiences and behavioral characteristics are non-stochastic and arbitrary; therefore, infinite variances arise in the *long run* and behavioral parameters (which are "governing the rest of the system") react definitively to policy changes in the *short run*. In other words, as expressed by Soorea (2007),

> "[a]ccording to the Lucas critique, changes in policy affect the behavior of rational agents and such behavioral changes can invalidate the model relationships estimated under the previous policy regime [which means] shifts in economic policy change how policy affects the economy because agents in the economy are forward- rather than backward-looking and adapt their expectations and behavior to the new policy stance."

Based on the immediate historical context surrounding the paper's publication and the stated target repeated in the LC itself, such policy implications were intended to primarily affect monetary policy; instead, it affected economics in general.

But what about our subset of papers since the crisis? How have they considered the implications for using behavioral models that follow a random walk and provide the driving micro-grounded forces for macroeconomic phenomena, suggested by the LC? Of all the 32 papers reviewed in this study, 14 were policy-applied. Among these 14 papers we get a sense of what contemporary policy realms are considered relevant for the LC.

Unsurprisingly, the policy field most addressed (8 of 14) with the LC in these papers was *monetary policy*. The applications ranged widely, from Sweden's monetary policy (Jonung and Fregert, 2010) to firm behavior (Tepper, 2010; Mash, 2010) to large, international data sets (Petreski, 2010). The implications, however, though nuanced, provided some predictable results. One paper stated that the forward-looking effects inherent in the LC's prediction of policy neutrality could neither be proven nor rejected (Sooreea, 2008) and another stated that assessing international growth rates before and after the monetary policy shift brought on by the decline of the Bretton Woods exchange-rate system dismantles the LC's predicted policy neutrality (Petreski, 2010). But besides these, the other six papers all categorically accept the LC's policy implications—for firm behavior (Tepper; Mash), Swedish, Canadian, and US inflation-targeting policies (Jonung; Kitov and Kitov, 2011; Thomas and Nakov, 2011), and Fed policy 'conundrums' (Thornton, 2012).

Three other papers address policy topics tangentially related to monetary policy, which include Fed 'bubble' policies (Assenmacher-Wesche and Gerlach, 2010), policies related to contemporary macroeconomic 'control theory' (Turnovsky, 2009), and the politics affecting international monetary policies (Aizenman and Marion, 2011). With the exception of Turnovsky (who provides a more holistic assessment of the pros and cons of the LC's introduction to macroeconomics), these papers regard these realms as rife with policy-neutralizing, behavioral effects.

Lastly, three papers assess less traditionally LC-relevant policy realms: labor market policy effects (Chang et al, 2010), experimental education policy (Carrell et al, 2011), and international competition and trade liberalization in Australia (Karunaratne, 2012). One perceived the LC's policy-neutralizing effects as evident from their experimental observations (Carrell), while the other two posed serious critiques regarding the LC's supposed behavioral super-parameters (Chang) and empirical implications for neoliberal trade policies (Karunaratne).

Literature Review: Statistical Techniques

Finally, regarding econometric or statistical tools for measurement, the LC's impact was equally important, yet more diversely so. As explained earlier, the LC posed a challenge to the old way of assembling macroeconometric models, which was done on a large scale with a tremendous quantity of historic data and sectoral variables in a linear, time series analysis. This was exemplified in the work performed by the Cowles Commission and Lawrence Klein. These models aimed to be comprehensive in nature and capable of forecasting future outcomes of key economic variables. This approach's most popular embodiment was in the Phillips Curve, which negatively related unemployment with inflation. The publishing and promotion of the LC timed precisely with the decline in the Phillips Curve's historic relationships. He subsequently argued for economic models constructed on theoretically-confirmed relationships that are invariant to policy changes.

This is a long walk to rehash what has been stated earlier; however, it leads to a key point in understanding what happened to the field of macroeconometric modelling: a desire to build models fortified by fundamental relationships confirmed by economic theory, also known as 'microfounded models'. These were not constructed on the national level, but instead aggregated from the individual level. This seismic change contextualizes our task in this section: to assess (among the reviewed papers) what statistical techniques are considered on various macroeconomic problems, how they're used, their relationship to the LC, and how robust they're perceived to be in this light.

Below several statistical techniques, and how the reviewed papers perceive them against the LC, are summarized and discussed. The techniques, and their prevalence in the literature sample, are: Dynamic Stochastic General Equilibrium models (4 papers), Vector Autoregression models (4 papers), Kalman filter (1 paper), the Generalized Method of Moments (2 papers), and Agent-based modelling (1 paper).

The Dynamic Stochastic General Equilibrium (DSGE) models were the first major tools established after the LC; these simplified difficult equations primarily utilized (at least initially) aggregated, homogenous representative agents and aimed to establish cross-market, equilibrium forecasts based on prices derived from summed rational expectations. These ideas, like the nature of the agents they eventually chose to represent, evolved over time into two competing schools of thought (Real Business Cycle and New Keynesian Models) divided by their willingness to incorporate 'realistic' features into wage and price adjustments.

The discussion and use of these models in this literature review was, not surprisingly, substantial. What was surprising was the widespread sense of inadequacy with these tools. Some papers expressed an interest in increasingly sophisticated iterations of these classic models, such as incorporating heterogeneous agents (Levine and Pearlman, 2008), but also expressed concern for the continued prevalence of the time-inconsistency problem. Other complaints noted the irony that fundamental parameters (taste and technology) of representative agent models (i.e. DSGE) could equally be subject to changes in policy regimes (Chang et al, 2010), as well as a concern with frequent data fit and misspecification problems without wide range of ad hoc improvements (Feve, 2010), and a frustration in application such that not all relevant parameter values can be pinned down by microeconomic evidence (Jeanfils, 2010). This classic model, it seems, has been displaced by more modern statistical and computational alternatives.

One of these other methods was the Vector Autoregression model (or VAR). Built on processes from statistical AR (Autoregressive) models, the VAR model offered another rebuttal to the LC, since it provides an output based on the continuous stream of past values. This process permits adaptive variables that can be explained by lagged effects of their own or, other, variable values. The key difference here is that the relationship between variables does not have to be strictly defined—as prescribed by Lucas in his argument for deep parameters. Fascinatingly, this process has also been modified recently by Bayesian theory, altering the perceived randomness of the hypothesized variables to, as one might expect, prior probabilities.

Though the VAR models enable an econometrician to freely assess the relationships between any numbers of variables, they are, within this literature review sample, almost universally perceived as vulnerable to the LC. This is for a number of reasons, which include the ultimate bias resulting from long-run restrictions (Freve, 2010), vulnerability to structural economic changes (Jeanfils, 2010; Sooreea, 2008), and a perceived inability to capture important effects of important macroeconomic parameter changes (Benati, 2010). For these authors, even though VAR models permits one to represent aggregate data and conduct diverse quantitative tasks with few restrictions, the VAR models simply cannot overcome the overwhelming demands of the LC.

With similarities to dynamic Bayesian probabilities and no reliance on a body of past evidence, the Kalman filter, which operates at real-time, has provided one of the more exciting fringes of practical econometrics unbound by the LC. This two-step process operates recursively and is unconstrained by expectations of parametric error distributions.

Its implications, according to Turnovsky (the only author who addressed the Kalman filter in this literature review), are essential: “The idea is that the policy-maker does not need to be able to predict exactly how private agents will respond to its policies. Rather, it can simply use the Kalman filter and update parameter estimates each period. While this means that the policy-maker will always be one period behind in his perception of the private sector's behavioural responses, they argue that this may be good enough for most applications of macroeconomic policy." This opinion sample is certainly too small, but such a conclusion appears resoundingly hopeful for the Kalman filter's potential.

Generalized Method of Moments, a statistical method that earned its champion Lars Peter Hansen the most recent Nobel prize in economics, is a modification of much older ideas devised by the famed statistician Karl Pearson that had fallen out of fashion with the rise of maximum likelihood estimation. Using a concept derived from physics, GMM's "moment" operates as a metaphor for a population's parameters that under certain conditions (non-finite dimensional parameters) work beyond the capabilities of maximum likelihood estimation, while maintaining all of its desired statistical benefits (i.e efficiency, consistency, normality, etc). GMM, however, does not stand in contrast to models exhibited above. Its increased use has opened up econometrics to confidently impute new, potentially unorthodox information regarding previously held parametric assumptions as the "information contained into the population moment restrictions is used as the [tool's own] instruments." In other words, it prepares forecasts for the unpredictable, but it still operates with structural models, something Lucas would have, in theory, appreciated.[20]

This literature review discovered opinions of hesitant optimism toward the GMM's potential *overall*, but unrestrained optimism in its implications for the LC. The brief hesitancy was directed toward the GMM's strength in its specificity, as the GMM provides but a "partial specification of an econometric model", which is considered "both an advantage and a disadvantage," but, in general, "allows an econometrician to learn something without needing to know all the things (Feve, 2010)." Other drawbacks include the GMM's balancing of total number of instruments (which expand rapidly over greater periods) and the apparent statistical efficiency with greater bias. These shortcomings did not decrease the perceived reliability of the tool to enable the author to make strong statements regarding the validity of the LC (Petreski, 2009).

The last technical approach to be explained and assessed is as old as modern computers: Agent-Based Modeling (ABM). Connected to the developments behind game-theory, ABM attempts to provide a generative framework for achieving equilibrium (and/or emergent) solutions with a system of potentially diverse agents guided by a set of assumptions that provide initial conditions driving their behavior under bounded rationality.

[20] Handbook of Research Methods and Applications in Empirical Macroeconomics, edited by Nigar Hashimzade, Michael A. Thornton, p. 207. ISBN-10: 0857931016.

Clear from this description is ABM's bearing of the torch offered by the LC in establishing microfoundations to macro-phenomena, but with considerable more nuance and complexity, in both meanings of the latter term. It is here that one can see the seriousness by which the LC's challenge can be taken, while managing to shed its ideological trappings.

Here, in potentially the most sophisticated of trappings, the final frontier of computational tools is viewed with sober pragmatism toward the LC. In an effort to guard against the LC, Ashraf et al (2012) states that the ABM approach may be made partially-robust by using a sensitivity analysis to determine which behavioral characteristics are most important in determining macroeconomic outcomes; therefore, the model partially incorporating the LC but does not subordinate all dynamics to all behavioral characteristics.

Conclusion

Collectively, the post-2008 literature review and the historical context leading up to the LC are meant to help answer the questions posed at the beginning of this paper. These questions are: "What is the significance of this goal [referring to Lucas' intent to eliminate macro altogether]? What was going on in the world when Robert Lucas wrote his now famous 1976 paper, which earned him his 'Nobel' prize? What was going on in his life? How has his reputation fared since the most recent financial crisis?"

First, what was going on in Robert Lucas' life when he wrote his now famous paper? One can see that Lucas was young man in his academic career who was caught between two warring traditions. One was from the school where he was educated, the other was from where he was employed. One was politically associated with counter-revolutionary, anti-statist, laissez-faire monetarists; the other with public-planning, economic-forecasting lefties shortly after the end of the Vietnam War. Lucas had chosen the political ideology of his extended family and his education over that of his immediate family and the elites of economics academia during, what seemed like, an endless recession. In the process he formalized this conflict in his 1976 paper.

What was going on in the world when Lucas wrote the paper? Stagnating wages, high unemployment, high inflation, Alan Greenspan as the Chair of the Council of Economic Advisers, Arthur Burns as the Chairman of the Federal Reserve, Gerald Ford as President, and forever altered energy prices due to OAPEC oil embargo in a post-Bretton Woods monetary system. For labor advocates, the world had regressed to a crueler, uncertain, and economically savage place; for the new generation of financial power brokers, the world had become their digitized, interconnected, deregulated land of opportunity; for politicians, a movement was underfoot to reassert business interests at the summit of national priorities.[21] Lucas' paper was very much at the right place at the right time.

So what was the significance of Lucas' goal to do away with macroeconomics as a discipline, dissolved within microeconomics? His goal, and the paper that mobilized it, operated as a zeitgeist in economics. He took two ideas of how to deal with economic crisis with all their political, historical, and social trappings, pit them against one another, and announced a winner. His goal was also rhetorical (utilizing the law of excluded middle) in its hardened theoretical presentation. Lastly, his goal was victorious. Lucas became a Nobel Laureate, a full-named Professor at his Alma Mater, and, if one is to judge ideas by their ability to set the terms of debate, the LC has managed to become maybe the strongest held assumption in macroeconomics over the last quarter century.[22]

But what about now? What about the LC since the 2008 financial crisis? Here I'd like to repeat what the evidence suggests and then offer advice for future thoughts about this problem, to help us learn more about the history of our field.

The *theoretical and policy aspects* of this paper's literature review of the LC since 2008 suggests that, though maybe not as referenced as it once was, it is still both a largely uncontested assumption as well as an often fashionable idea to associate with one's work. The *econometric aspects* of the literature review offers how one might expect future discussions on the LC unless we live to see a major paradigm shift; we can expect the LC to continue to be perceived as deeply scientific, too demanding for antiquated techniques, but a proper ideal for the macroeconometrics field with the emergence of better methods and computing technology.

I would like to offer some advice on future research on this topic. First, a history of the LC since its publication is needed. Clearly so much more has been attached to this idea since it was first published in 1976, which cannot be explained by the pre-LC history provided here.

Second, we need to distinguish between man and manuscript. The term 'Lucas Critique' needs to either refer to Robert Lucas' (often incendiary) words and opinions over time or to his 1976 paper, "Econometric Policy Evaluation: A Critique". It cannot conflate both because this affects the way we understand what was said, when it was said, why it was

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[21] Hedrick Smith states that the rubicon was crossed in favor of business interests in Washington in 1978. (Smith, Hedrick. Who stole the American dream. New York: Random House Trade Paperbacks, 2013. Print.)

[22] A simple search on the Google N-Gram Viewer shows the explosive rise of the use of the term "Lucas Critique" and the formal name of its relevant academic paper source.

said, and in what context. It shades our understanding of our discipline's history. Also, regarding the wide range of econometric techniques inspired by the LC, it is essential that if its non-normative characteristics are to receive their due, it should be without aid of any bald-faced political implications or associations.

Lastly, we need to demand Robert Lucas' complete papers be archived for future research. Many figures in the 'Chicago School' have carefully hedged what information becomes available about their careers and lives to the public and scholarly community. The best example may be the lack of an authoritative Milton Friedman biography—Lanny Ebenstein's 2009 bio was given access to Friedman's papers, but notoriously offered the Friedmans final editing rights. Unless these men of letters want to be associated with the long list of dark figures and institutions who forever limit access to their internal workings, they should open up, so that we young scholars can fully understand what's going on in this field we're committing our lives to.

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Appendix: List of post-2008 LC papers and assigned code

Symbol - *categorization*:

- no symbol - *None*,
- ## - *Misinterpretation*,
- ** - *Reexamination*,
- §§ - *Reexamination & Critique*.

Investigating Inflation Persistence Across Monetary Regimes
ECB Working Paper No. 851
Luca Benati
European Central Bank (ECB)
Date posted: January 26, 2008
Working Paper Series

The Credibility Problem Revisited: Thirty Years on from Kydland and Prescott
Review of International Economics, Vol. 16, Issue 4, pp. 728-746, September 2008
Paul Levine and Joseph Pearlman
University of Surrey - Department of Economics and London Metropolitan University - Department of Economics, Finance and International Business (EFIB)
Date posted: August 20, 2008
Accepted Paper Series

International Reserves Holdings with Sovereign Risk and Costly Tax Collection
Joshua Aizenman and Nancy Peregrim Marion
University of California, Santa Cruz - Department of Economics and Dartmouth College - Department of Economics
Date posted: October 23, 2008
Working Paper Series

The Failure of Models that Predict Failure: Distance, Incentives and Defaults
Chicago GSB Research Paper No. 08-19, Ross School of Business Paper No. 1122, EFA 2009 Bergen Meetings Paper
Uday Rajan , Amit Seru and Vikrant Vig
University of Michigan at Ann Arbor - Stephen M. Ross School of Business , University of Chicago - Booth School of Business and NBER and London Business School
Date posted: November 10, 2008
Last revised: August 15, 2010
Working Paper Series

***Are Taylor-Based Monetary Policy Rules Forward-Looking? An Investigation Using Superexogeneity Tests*
Applied Econometrics and International Development, Vol. 7, No. 2, 2007
Rajeev Sooreea
Pennsylvania State University
Date posted: November 24, 2008
Accepted Paper Series

Marketing Models and the Lucas Critique
ERIM Report Series Reference No. ERS-2004-080-MKT
Harald J. van Heerde , M. G. Dekimpe and William P. Putsis Jr.
Massey University , Catholic University of Leuven (KUL) - Department of Applied Economics and University of North Carolina (UNC) at Chapel Hill - Marketing Area
Date posted: January 17, 2009
Working Paper Series

Emerging Floaters: Pass-Throughs and (Some) New Commodity Currencies
Journal of International Money and Finance, Vol. 29, No. 8, 2010
Emanuel Kohlscheen
Government of the Federative Republic of Brazil - Central Bank of Brazil
Date posted: March 26, 2009
Last revised: April 10, 2011
Accepted Paper Series

An Incentive Theory of Matching IZA Discussion Paper No. 4145 Alessio J.G. Brown , Christian Merkl and Dennis J. Snower Kiel Institute for the World Economy , Kiel Institute for the World Economy and University of Kiel - Institute for World Economics (IfW) Date posted: May 3, 2009 Working Paper Series ***Economic Incentives and Social Preferences: A Preference-Based Lucas Critique of Public Policy* CESifo Working Paper Series No. 2734 Samuel Bowles and Sandra Polania Reyes Santa Fe Institute and University of Siena - Faculty of Economics Date posted: August 5, 2009 Working Paper Series *Evolving Phillips Trade-Off* ECB Working Paper No. 1176 Luca Benati European Central Bank (ECB) Date posted: April 26, 2010 Working Paper Series ##*Are Policy Counterfactuals Based on Structural VARs Reliable?* ECB Working Paper No. 1188 Luca Benati European Central Bank (ECB) Date posted: May 6, 2010 Working Paper Series *Monetary Policy and Financial Imbalances: Facts and Fiction* Economic Policy, Vol. 25, Issue 63, pp. 437-482, July 2010 Katrin Assenmacher-Wesche and Stefan Gerlach Swiss National Bank and Goethe University Frankfurt - Institute for Monetary and Financial Stability (IMFS) Date posted: July 20, 2010 Accepted Paper Series §§*Labor-Market Heterogeneity, Aggregation, and the Lucas Critique* NBER Working Paper No. w16401	Yongsung Chang , Sun-Bin Kim and Frank Schorfheide University of Rochester - Department of Economics , Concordia University, Quebec - Department of Economics and University of Pennsylvania - Department of Economics Date posted: September 27, 2010 Working Paper Series ##*Some Efficiency Effects of Inflation Under Nominal Wage Rigidity* Alexander Tepper University of Oxford - Christ Church College Date posted: October 17, 2010 Working Paper Series ***Dynamic Macroeconometric Modeling (La Modélisation Macro-Économétrique Dynamique) (French)* Banque de France Working Paper No. NER-E 129 Patrick Feve University of Toulouse 1 - Toulouse School of Economics (TSE) Date posted: November 6, 2010 Working Paper Series *A Guided Tour of the World of Rational Expectations Models and Optimal Policies* National Bank of Belgium Working Paper No. 16 Philippe Jeanfils National Bank of Belgium Date posted: November 6, 2010 Working Paper Series *Endogenous Indexing and Monetary Policy Models* Economics Discussion Paper No. 2007-36 Richard Mash University of Oxford - Department of Economics Date posted: November 29, 2010 Working Paper Series

##*Inflation and Price Adjustments: Evidence from Norwegian Consumer Price Data 1975-2004*
Fredrik Wulfsberg
Norges Bank
Date posted: November 29, 2010
Last revised: March 13, 2012
Working Paper Series

Inflation Targeting is a Success, so Far: 100 Years of Evidence from Swedish Wage Contracts
Economics: The Open-Access, Open-Assessment E-Journal, Vol. 2, 2008-31
Lars Jonung and Klas Fregert
Dept. of Economics, Lund University and Lund University
Date posted: December 18, 2010
Accepted Paper Series

*******Analysis of Exchange-Rate Regime Effect on Growth: Theoretical Channels and Empirical Evidence with Panel Data*
Economics Discussion Paper No. 2009-49
Marjan Petreski
School of Business Economics and Management, University of American college - Skopje
Date posted: December 18, 2010
Working Paper Series
§§*Stabilization Theory and Policy: 50 Years after the Phillips Curve*
Economica, Vol. 78, Issue 309, pp. 67-88, 2009
Stephen J. Turnovsky
University of Washington - Institute for Economic Research
Date posted: January 24, 2011
Accepted Paper Series

##*From Natural Variation to Optimal Policy? The Lucas Critique Meets Peer Effects*
NBER Working Paper No. w16865
Scott E. Carrell , Bruce Sacerdote and James E. West
University of California, Davis - Department of Economics , Dartmouth College - Department of Economics and Baylor University
Date posted: March 7, 2011
Working Paper Series

##*A Win-Win Monetary Policy in Canada*
Oleg Kitov and Ivan Kitov
University of Warwick and Russian Academy of Sciences (RAS) - Institute for the Geospheres Dynamics
Date posted: April 1, 2011
Working Paper Series

##*Real-Financial Linkages in the Canadian Economy: An Input-Output Approach*
Economic Analysis Research Paper No. 065
Danny Leung and Oana Secrieru
Statistics Canada and Bank of Canada
Date posted: June 15, 2011
Working Paper Series

##*International Reserve Holdings with Sovereign Risk and Costly Tax Collection*
The Economic Journal, Vol. 114, Issue 497, pp. 569-591, 2004
Joshua Aizenman and Nancy Peregrim Marion
University of California, Santa Cruz - Department of Economics and Dartmouth College – Dept. of Economics
Date posted: September 16, 2011
Accepted Paper Series

##*Optimal Monetary Policy with State-Dependent Pricing*
FEDS Working Paper No. 2011-48
Carlos Thomas and Anton Nakov
Banco de España and Bank of Spain
Date posted: November 16, 2011
Working Paper Series

Bank Capital Regulation with an Opportunistic Rating Agency
Swiss Finance Institute Research Paper No. 12-19
Matthias Efing
Swiss Finance Institute
Date posted: May 3, 2012
Last revised: October 25, 2012
Working Paper Series

Growth and Trade Dynamics Under Regime Shifts in Australia
Journal of Economic Studies Vol.23 No.2 1996
Neil Dias Karunaratne
University of Queensland - School of Economics
Date posted: June 16, 2012
Accepted Paper Series

How Inflation Affects Macroeconomic Performance: An Agent-Based Computational Investigation
Quamrul Ashraf , Boris Gershman and Peter Howitt
Williams College - Department of Economics, American University - Department of Economics and Brown University - Department of Economics
Date posted: July 7, 2012
Working Paper Series

##*Agency Theory, Values, and Early Evolutionary Economic Theory*
Gerhard Fink , Manuel Wäckerle and Maurice Yolles
IACCM International Association for Cross Cultural Competence and Management , affiliation not provided to SSRN and John Moores University - Centre for the Creation of Coherent Change and Knowledge (C4K)
Date posted: July 29, 2012
Working Paper Series

Greenspan's Conundrum and the Fed's Ability to Affect Long-Term Yields
FRB of St. Louis Working Paper No. 2012-036A
Daniel L. Thornton
Federal Reserve Bank of St. Louis - Research Division
Date posted: September 18, 2012
Working Paper Series

Hypothesis Testing and Finite Sample Properties of Generalized Method of Moments Estimators: A Monte Carlo Study
Federal Reserve Bank of Richmond Working Paper No. 90-12
Ching-Sheng Mao
National Taiwan University - Department of Economics
Date posted: November 3, 2012
Working Paper Series

##*The Lucas Critique and the Stability of Empirical Models*
FRB Richmond Working Paper No. 06-05
Thomas Lubik and Paolo Surico
Federal Reserve Banks - Federal Reserve Bank of Richmond and London Business School - Department of Economics
Date posted: December 7, 2012
Working Paper Series

##*Exploring the Common Roots of Culture, Politics and Economics*
Maurice Yolles and Gerhard Fink
John Moores University - Centre for the Creation of Coherent Change and Knowledge (C4K) and IACCM International Association for Cross Cultural Competence and Management
Date posted: December 8, 2012
Last revised: January 26, 2013
Working Paper Series