Rethinking paradigms: Mainstream responses to the crisis and change

Sergio Tzotzes*

To be presented at the *1st International Conference in Contemporary Social Sciences*

"**Crisis and the Social Sciences: New Challenges and Perspectives"**

Rethymno, 10 - 12 June 2016

* PhD Candidate, Department of Economics, University of Crete

Please contact for quoting at e-mail: stzotzes@econ.soc.uoc.gr

Abstract

This paper seeks to contribute to an understanding of the dynamics of change in economics considering the impact of the recent economic and financial crisis. It argues that owing to its theoretical premises and sociological/institutional factors shaping the profession, mainstream economics remains static and immune to change even in the face of momentous economic disruption. These parameters inhibit prospects of change and the generation of new knowledge. To explore this argument and assess the prospects and the nature of change, this research examines how mainstream economics responded to the crisis and attempts to elucidate factors that influence mainstream receptiveness or resilience to change. The context for this research is set by post-crisis debates that discuss the state of economics in terms of a paradigm change. A number of commentators diagnose a paradigmatic crisis while others perceive neither the need nor the imminence of paradigm shift in post-crisis mainstream economics. Compounding this ambivalence, both viewpoints tend to use the term paradigm shift loosely as a verbal generalisation outside an appropriate framework of scientific construction that is an essential criterion to appraise change in terms of knowledge creation. Another drawback limiting the analytical depth of this change/paradigm problematic is that it largely overlooks the issues of social structure and social relations relating to scientific communities. To address these drawbacks, this research draws on Kuhnian insights of normal science, paradigm and scientific community evaluating mainstream economics as a system of ideas and as a specific scientific community.

Keywords: crisis responses, mainstream economics, paradigm, scientific community, change

INTRODUCTION: OVERVIEW, RATIONALE AND LAYOUT

Let us then assume that crises are a necessary precondition for the emergence of novel theories and ask next how scientists respond to their existence.(Kuhn 1962:77)

Recognised as the worst economic downturn since the Great Depression of the 1930s, the recent economic crisis sparked a flood shed of response. Intense critique questioned the performance, the standing and the prospects of mainstream economics focusing on the inability of the neoclassical paradigm to reconcile theory and reality, its formalism and modelling techniques as well as the professional practices of economists and economics education. Evoking the Keynesian revolution in the wake of the Great Depression, the recent crisis raised expectations that it would be a catalyst for change in economics and prompted an intense scholarly debate around an 'economic crisis – crisis in economics' problematic.

A strand in this literature examines the 'crisis in economics' in terms of a paradigm change. Contrary views are expressed leaving the matter at hand inconclusive. On the one hand, characteristics of a paradigmatic crisis are diagnosed alluding to the need for a new paradigm in economics (Buiter 2009; Fox 2014; Kobayashi 2009; Lagadec 2009; Palley 2011; Stiglitz 2010; Whitehouse 2009). On the other hand, others detect no need or imminence of a paradigm shift in mainstream economics (Altig 2009; DeLong 2014; Dobusch and Kapeller 2012; Saint-Paul 2010). In particular, many prominent exponents of the mainstream establishment categorically reject the need for change in the dominant economic paradigm (Cassidy 2010a, 2010b; Sargent 2010; Taylor 2010; Coyle 2012).

This inconclusive debate leaves important questions unanswered blurring the prospects of change in mainstream economics under the impact of the economic crisis. Is a paradigm shift in economics necessary and imminent or is economics in good shape requiring no change in its dominant paradigm? Does the economic crisis mark the end of the neoclassical dominance sweeping away core assumptions such as "rational individual behavior and market discipline" (Heukelom and Sent 2010:26)? What about the anomalies exposed by the crisis? A limitation in the 'paradigm' debate is that both viewpoints tend to use the term 'paradigm change' loosely and as a verbal

generalisation. The indiscriminate use of the term outside an appropriate philosophy of science framework, constrains the analytical depth of the discussion. What is also lacking from the recent change/paradigm problematic is that it largely overlooks the complexity of social structures and social relations in play.

To address these drawbacks, the present paper pursues a different path and attempts a systematic analysis of post-crisis mainstream responses drawing on Kuhnian concepts of paradigm, scientific community and normal science. It argues that theoretical and institutional/sociological parameters constrain the prospect of paradigm change in mainstream economics and inhibit the generation of new knowledge. To explore this claim, mainstream responses to the crisis and the post-crisis state of play in economics are assessed and the attempt is made to identify factors that may inhibit change in mainstream economics. Mainstream economics is examined in terms of paradigm and scientific community which are two interrelated constitutive elements of normal science. Central to this inquiry is a critique of a) the conceptual premises of mainstream economics and b) the sociological and institutional elements shaping the mainstream of the economics profession.

This paper is organised as follows. Section 2 examines the basic elements of Kuhn's framework of scientific change which, despite its shortcomings, provides a frame of reference to make sense of change in economics. Section 3 describes and analyses mainstream economics as the dominant paradigm in economics. It examines the theoretical and methodological underpinnings and the nature of the paradigm in general and after the crisis. Section 4 critically examines the pre-crisis state of play in economics and scrutinises post-crisis 'intra-paradigm' responses by the mainstream of the profession classifying them in three groups. Section 5 examines the scientific community of mainstream economics. Section 6 summarises, discusses findings and concludes. Section 7 presents some final reflections.

This research emanates from the need to better understand the dynamics of change in economics under the impact of the global economic crisis which is an issue greatly bearing on the future of a discipline that uniquely influences the economy, policy and society with broader implications for the ability of the discipline to generate knowledge. To make sense, change in economics should create knowledge that will add

to our capacity to better understand and improve the world in some way. This broader aspect, too, underpins our research.

1. PRELIMINARIES: KUHN, PARADIGMS, ANOMALIES AND NORMAL SCIENCE

Terms such as paradigm, exemplar, anomaly, scientific revolution, normal science and scientific community entered the academic—and often everyday—vocabulary following the publication of Thomas Kuhn's *The Structure of Scientific Revolutions* (1962), one of the most influential books on scientific knowledge of the twentieth century. In a nutshell, Kuhn set forth a framework to explain scientific change drawing on the historical development of a mature science. Positing that to understand the nature of scientific knowledge we have to examine the actual history of science, Kuhn successfully contested the Received View[1] of scientific knowledge that "empirical sense experience forms the incorrigible foundations for legitimate scientific knowledge" (Hands 2001:110, 2003:169). Kuhn's work challenged the hitherto hegemony of positivism by showing the disjuncture between its key tenets and the actual practice of science; the tenets targeted by Kuhn include the cumulative conception of scientific progress whereby science piles new truths upon older truths, the means by which scientific beliefs are produced, the idea that science aims only at truth deploying methods that pursue that goal, or that theoretical language is reducible to observational language (Bird 2012:861–3; Laudan et al. 1986:142).[2] In the context of this research, it is important to note that by emphasising the importance of the scientific community for the nature of scientific knowledge, Kuhn challenged the claim to superiority of dominant paradigms "in any absolute sense" indicating that alternative paradigms could reasonably claim their own legitimacy (Dow 2007:3).

[1] The 'Received View on Theories' formed the epistemic core of logical empiricism providing the dominant framework within Anglo-American philosophy of science during the 1950s and 1960s. The 'Received View' lost credit in the 1960s with the work of Kuhn, Feyerabend and others who argued that nothing in the actual history of science confirms that an "incorrigible empirical basis was used to test, serve as foundations for, or build up, scientific theories" (Hands 2003b:170).

[2] Kuhn emerges as the leading figure of the early 1960s when several new theories of science were advanced as alternatives to positivism by, among others, N. R. Hanson, Paul Feyerabend and Stephen Toulmin; in the seventies mainly as a response to Kuhn, a new generation of scholars including Lakatos, Laudan, Holton and Shapere set out models of scientific change based upon the empirical study of the workings of actual science as opposed to the logical or philosophical ideals of the positivist tradition (Laudan et al. 1986:142).

Kuhn's work has been both influential and controversial. Among other things, Kuhn's notion of incommensurability[3] and the concept of paradigm itself drew criticism for being largely inaccurate, ambivalent and confusing (Bird 2002, 2013). Margaret Masterman (1970:61–65), a sympathetic critic, counted twenty-one distinct uses of the term paradigm which she categorised in three main groups.[4] She emphasised, however, that Kuhn's work brought fundamental new ideas, which his critics never bothered to elucidate. Arguing that Kuhn overlooks the continuities which exist in every revolution, Toulmin (1970:45) noted that the transition from normal science to scientific revolution is abrupt. *The Structure of Scientific Revolutions* has also drawn political critique as "an exemplary document of the Cold War era" that served to blunt the critical acumen of academics and shield science from democratic control (Fuller 2000:5). Feyerabend (1970:197–8) who shared a number of concerns raised by Kuhn, criticised Kuhn's presentation and evaluation of normal science and his "general ideology" which could "inhibit the advancement of knowledge" by enlarging the anti-humanitarian aspects post-Newtonian science. In the last years of his life, however, Feyerabend recognised the great complexity, the coherence and the power of Kuhn's thought finding many similarities with his own system of thought (Hoyningen-Huene 2002).

As regards economics, notwithstanding that Kuhn was not concerned with the social sciences, his ideas proved to be quite inspiring for economists coming from both orthodoxy and heterodoxy (Fine 2004:107). A sizeable volume of literature examined the application of Kuhnian ideas in economics discussing whether they presented an appropriate framework for economics or not (Argyrous 1992; Bronfenbrenner 1971; Coats 1969; De Vroey 1975; Dillard 1978; Dow 2004, 2007; Eichner and Kregel 1975; Fine 2002, 2004; Gordon 1965; Johnson 1983; Khalil 1987; Stanfield 1974; Ward 1972).[5] In Blaug's (1975:399) view, the term paradigm should be "banished from

[3] The incommensurability thesis advanced by Kuhn (and Feyerabend in 1962) holds that due to radically distinct norms and terms used by different scientific communities, competing paradigms are by implication incommensurable because their practitioners cannot communicate and speak past each other: they "practice their trades in different worlds" (Kuhn 1962:148–150).

[4] The three main groups are a) metaphysical paradigms, or metaparadigms, b) sociological paradigms and c) technological paradigms (Masterman 1970:65).

[5] A bibliography provided by Redman (1991:96 fn. 1) cites thirty-one entries on Kuhn and economics. For a systematic review of Kuhnian and Lakatosian explanations in economics see Drakopoulos and Karayiannis (2005).

economic literature, unless surrounded by inverted commas". Redman (1993:144–45) argues that the concept of paradigm should be permanently cast out from economic literature as it obscures rather than clarifies issues owing to its indiscriminate use by economists. Arguing that philosophy of science has had a negative impact on economics, Fullbrook (2003) contends that mainstream economists saw Kuhn's ideas as a justification to perpetuate a dominant paradigm. Yet, Kuhn's emphasis on the community-specific social nature of science that is not bound by "its own or an absolute standard of truth" has helped demystify dominant paradigms and their claim to scientific superiority showing that alternative paradigms are entitled to their own legitimacy (Dow 2007:2; Fine 2004:132). As Fine (2004:109) emphasises, notwithstanding flaws and limitations, the important insights provided by Kuhn's work and the interdisciplinary discourse it inspired should not be discarded.

Anomalies, according to Kuhn (1962:52) are essential to scientific discovery and change: "discovery commences with the awareness of anomaly", which denotes "recognition that nature has somehow violated the paradigm-induced expectations that govern normal science". The accumulation of significant anomalies, which cannot be addressed by a universally accepted paradigm, prompt a paradigmatic shift leading eventually to a new paradigm. The resulting transition to a new paradigm is a scientific revolution (Kuhn 1962:90). Kuhn (1962: x) describes paradigms as "universally recognizable scientific achievements that for a time provide model problems and solutions to a community of practitioners" and defines it as follows:

> A paradigm is what the members of a scientific community share, and, conversely, a scientific community consists of men who share a paradigm. (Kuhn 1962:176)

A "strong network" of "conceptual, theoretical, instrumental, and methodological commitments" (p.42), define a paradigm as "the source of the methods, problem-field, and standards of solution accepted by any mature scientific community at any given time" (p.102).

Kuhn has himself admitted ambiguity, lack of clarity and difficulties in his work and tried to modify his arguments or improve their exposition.[6] In his *Second Thoughts*

[6] Kuhn (1970, 1974) addressed with diligence criticism that came from Popper, Lakatos, Masterman, Feyerabend, Watkins, Shapere, Toulmin and others. He tried to clarify his positions which he did not

on Paradigms (1974), he proposed to replace the term 'paradigm' with the term 'disciplinary matrix', which he thought captured more accurately both the sociological nature and the conceptual constitution of a paradigm:

> 'Disciplinary' because it is the common possession of the practitioners of a professional discipline; 'matrix' because it is composed of ordered elements of various sorts, each requiring further specification (Kuhn 1974:463, 1970:271).

Constituents of the disciplinary matrix include most or all of the objects of group commitment described in *The Structure of Scientific Revolutions* as "paradigms, parts of paradigms, or paradigmatic" (Kuhn 1974:463, 1977:297). These are described by Kuhn (1974:463) as beliefs, symbolic generalizations, models, and exemplars: "symbolic generalizations" are "formal, or readily formalizable, components" used unquestioningly by the group, provide "preferred analogies or, when deeply held, with an ontology" while exemplars are concrete problem solutions accepted by the group as conforming to the paradigm.[7]

Paradigms can be global or local. In the global sociological sense, a paradigm comprises "law, theory, application, and instrumentation" (Kuhn 1962:43, 10). The global paradigm refers to the entirety of commitments, beliefs, values and techniques shared by the members of a scientific community, while the local paradigm "isolates a particularly important sort of commitment and is thus a subset of the first" (Kuhn 1977:294). Hence, each subfield in a discipline develops its own paradigm "as well as its own practical understanding of the global paradigm that characterizes the scientific field as a whole" (Nickles 2003:8). Paradigms are incommensurate because their appraisal would be unavoidably paradigm-specific and absolute criteria to judge theories are lacking (Dow 2007:1). Perception and observation are not independent of theory but they are influenced by the paradigm within which a scientist operates (Bird 2002:451). Most importantly, for a paradigm shift to occur the existence of a new

---

hesitate to modify. Responding to the rounds of criticism he received at the 1965 International Colloquium on the Philosophy of Science that was chaired by Karl Popper, Kuhn (1970:231) remarked that some readings of his book are so vastly differed from his own understanding that he was "tempted to posit the existence of two Thomas Kuhns" who authored two different books with the same title, one of which was the object of criticism by "Professors Popper, Feyerabend, Lakatos, Toulmin and Watkins."

[7] Adding to the confusion over the term paradigm, Kuhn (1974:463) states that the term `exemplar' "provides a new name for the second, and more fundamental, sense of 'paradigm' in the book."

paradigm to replace the existing one is required. In Kuhn's (1962:79) words, "to reject one paradigm without simultaneously substituting another is to reject science itself." The paradigm provides the members of a scientific community with guidelines and a frame of reference for normal science, which denotes what scientists are trained to do:

> [N]ormal science, is the generally cumulative process by which the accepted beliefs of a scientific community are fleshed out, articulated, and extended. It is what scientists are trained to do, and the main tradition in English-speaking philosophy of science derives from the examination of the exemplary works in which that training is embodied. (Kuhn 1970:250)

Research within normal science seeks to articulate "those phenomena and theories that the paradigm already supplies" based on previous achievements accepted as the basis for further practice (Kuhn 1962: 24, 10). Notably, normal science is mainly engaged in mop-up work and solving puzzles. Puzzles are the "special category of problems" chosen by the criterion provided by the paradigm: they serve to test "ingenuity or skill in solution" regardless of the puzzle solving outcome (Kuhn 1962: 35-36, 37). Throughout their careers, scientists are mostly occupied by mopping up operations: the mopping-up framework of normal science is described as an "attempt to force nature into the preformed and relatively inflexible box that the paradigm supplies [...] indeed those that will not fit the box are often not seen at all (Kuhn 1962: 24). According to Kuhn (1962:35, 52), the most remarkable aspect of normal science is that it hardly seeks "to produce major novelties, conceptual or phenomenal": normal science "does not aim at novelties of fact or theory and, when successful, finds none". Grounded on the "assumption that the scientific community knows what the world is like", normal science "often suppresses fundamental novelties because they are necessarily subversive of its basic commitments" (Kuhn 1962:5). Thus, scientists usually do not aim to formulate "new theories, and they are often intolerant of those invented by others" (Kuhn 1962:24).

Overall, normal science emerges as a "quasi-medieval, convergent, tradition-bound, authoritarian" structure (Nickles 2003:5). Kuhn (1962: 24, 37) identifies certain merits in this restrictive framework: it assures continuity in research and education and provides focus and depth to scientific inquiry shielding a scientific community from distractions posed by other problems that are rejected "as metaphysical, as the concern of another discipline, or sometimes as just too problematic to be worth the time. Yet, it

is important to highlight that it is precisely such merits that are often evoked to justify intolerance for alternative frameworks and lack of pluralism which are serious drawbacks for the social sciences, economics in particular. As Kuhn (1962:37) recognised, normal science is thus insulated from "*socially important problems*" that are not reducible to puzzles because they "cannot be stated in terms of the conceptual and instrumental tools the paradigm supplies" [Emphasis added]. The constraints imposed by the structure of the paradigm and those "born from confidence in a paradigm" are essential to the development of science, while an in-built mechanism eases off restrictions if the paradigm fails to function effectively (Kuhn 1962:24).

To wrap up, normal science has two interrelated constitutive elements: the paradigm and the scientific community. Adherence to a shared paradigm shapes a group "of otherwise disparate men" into a scientific community, while a 'paradigm' cannot be effectively elucidated without first recognising the "independent existence" of scientific communities (Kuhn 1974:460). In other words, the independent existence of a scientific community is encircled by the paradigm and the shared conceptual and ideational mindset of its practitioners.

In this light, normal science encompasses the "specific state of development of two related but distinct realities, namely, science as a social system and science as a system of ideas" (De Vroey 1975:420). Drawing on this framework, our inquiry examines mainstream economics a) as a paradigm or a system of ideas that is the first component of normal science and b) in terms of the scientific community that shares the paradigmatic constellation of ideas focusing on the practice of the mainstream economics community during the recent economic crisis.

In sum, the recent crisis in Kuhnian terms has exposed a host of anomalies setting a context that challenges the dominant paradigm of mainstream economics. To determine whether the crisis has set in motion a paradigm shift, the starting point of our inquiry is the first component of normal science: mainstream economics paradigm as a system of ideas.

2. THE PARADIGM: MAINSTREAM ECONOMICS AS A SYSTEM OF IDEAS

This section describes and analyses the paradigm of mainstream economics and

its theoretical and methodological underpinnings, arguing that they act as blinders which reduce the explanatory power of the paradigm and limit its prospects for change. The neoclassical premises of the dominant mainstream paradigm like a unifying thread pervade the theoretical/analytic framework, the practice and the teaching of economics. They underscore the anomalies that were exposed by the crisis and ultimately influence the paradigm's ability to change.

2.1. The mainstream paradigm, its basic beliefs and its constitution

In the broadest sense, the term mainstream economics is used in this paper to denote the approach that has acquired a dominant position in contemporary economics as regards the analytical/theoretical framework as well as the practice, research, teaching and the professional stratification of economics. Mainstream economics includes but is not confined to neoclassical economics, which constitutes its bedrock. Lawson (2013:947) remarks that the term neoclassical economics pervades scholarly debates in a loose and rather inconsistent manner to refer to a number of substantive theories and policy options. As Milonakis (2012:246) explains:

> Neoclassical economics denotes the body of economic theory that has its roots in the so-called 'marginalist revolution' and has come to dominate modern economic science, especially since the Second World War. It is also variously called orthodox or mainstream economics, although the meanings of these three terms are not identical and vary over time. Neoclassical economics represents the main modern expression of what Marx called 'vulgar economics'.

Mainstream economics encompasses a diversity of successive schools of thought and research programmes. These include the neoclassical synthesis (which amalgamates core neoclassical tenets with Keynesian macroeconomics but leaves out vital Keynesian insights), the monetarist, new classical and new Keynesian approaches as well as the new neoclassical synthesis (NNS) known also as the new consensus in macroeconomics (NCM). Mainstream economics also comprises various non-neoclassical new subfields, focal points and research tracks including behavioural, evolutionary, experimental economics, complexity economics, game theory, neuroeconomics, market design

economics[8] and others (Davis 2008a).

A number of scholars (Colander, Holt, and Rosser 2004; Colander 2000; Coyle 2010; Davis 2006; Sent 2006) interpret the diversity of new research programmes as a sign of change in method that brings a new pluralism in mainstream economics. The implication is that mainstream economics has itself become heterodox leaving no need for heterodox economics in terms of alternative theories and economists that systematically oppose doctrines held to be true and fundamental by the dominant opinion within a scientific community (Lawson 2003:195; Lee 2008, 2011:542).[9] In particular, as Milonakis (2009) emphasises, Colander's (2009) call to leave aside the rhetoric of pluralism in favour of an "inside the mainstream" heterodoxy, is essentially a call to "accept the mainstream's own terms of reference" amounting to a "conditional or pseudo pluralism, and as such is no pluralism at all".

To assess the essence of mainstream economics as a dominant "global" paradigm and its readiness to accommodate change, we should examine the entirety of commitments, beliefs, values, practices and techniques of mainstream economics that are shared by the scientific community of its practitioners (Kuhn 1962:175, 1977:294). Shared beliefs are of fundamental importance; they determine the view taken of the subject matter underscoring the "value system applied to the content" and the evaluation of scientific activity (Dow 2007:2). What are, then, the closely integrated commitments, beliefs, values, practices and techniques emanating from the mainstream disciplinary matrix?

---

[8] Defined as the engineering domain of economics "intended to further the design and maintenance of markets and other economic institutions" , design economics is considered a "natural complement" to game theory together with experimental and computational economics (Roth 2002:1341–42). Design economics examines efficient markets focusing on institutional structure and pricing mechanisms to create efficient markets or reform inefficient ones (Davis 2008a:11).

[9] The term 'heterodox' is interpreted variously while the boundaries between heterodox and orthodox are seen as blurred and changing over time (Backhouse 2000; Coats 2000; Davis 2008b). Subject matter, schools of thought and methodological similarities are used to demarcate and categorise heterodox economics (Dow 2004; Hands 2001). Dow (2007) discusses heterodox economics as a single school of thought which endorses methodological pluralism and orthodox economics as the school of thought which does not. Lawson (2006:493, 495–7) argues that "the essence of the heterodox opposition is ontological in nature" expounding this view within his theory of social ontology. Both Lawson (2003) and Davis (2003) emphasise the degree to which individuals are embedded in social structures and the inclusion of social structures in the underlying social ontology.

The key shared beliefs that sustain and inspire mainstream economics are predicated upon the neoclassical postulates of rationality, methodological individualism and equilibrium analysis. As Arnsperger and Varoufakis (2006:12, 14) note, the three meta-axioms of methodological individualism, methodological instrumentalism and methodological equilibration define the practice of "any standardly trained economist": they form the "well hidden, and almost completely unspoken of" foundations of all mainstream approaches in a wide range of academic fields as varied as general equilibrium theory, evolutionary game theory or analytical Marxism. Tightly knit in a complex, these meta-axioms increasingly develop "almost symbiotic, links with one another" (Arnsperger and Varoufakis 2006:12). In other words, they form the foundations of the disciplinary matrix, which is the "common possession of the practitioners of a professional discipline (Kuhn 1974:463). Following Kuhn (1974:463), we can codify the three key axioms as the formal elements or the "symbolic generalisations" of the mainstream disciplinary matrix that are "deployed without question by the group". First, individual economic agents are the building block of economic explanations. Second, not only individuals are rational but they are rational optimisers in a quite particular instrumental manner.[10] Third, in economics equilibrium is a "central organising idea" (Hahn 1973): quantities supplied and demanded in a particular market reach equilibrium, a state where opposite external forces neutralise each other annulling their respective effects on the system (Kornai 1971; Tieben 2009).

Expanding these generalisations, we can have a better understanding of our paradigm and the logic which firmly binds together its components. Following the definition of economics as "the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses" (Robbins 1935:16), economics became the science of rational choice. As Margaret Archer (2000:36) notes, "rational choice theory requires rational actors: insofar as they deviate by behaving as

[10] According to Michael Friedman (2001:54 cited in Hands 2007:3) as a philosophic term 'instrumental rationality' refers to "our capacity to engage in effective means-ends deliberation or reasoning aimed at maximizing our chances of success in pursuing an already set end or goal. It takes the goal in question as given, and it then attempts to adjust itself to environmental circumstances in bringing this desired state of affairs into existence in the most efficient way possible."

normative or expressive agents, they vitiate the theory". Hence, mainstream economic explanations deploy rational choice theory—the theory explains rational behaviour– to the extent that any illness in this theory "eventually stands to infect all of economic science" (Hands 2007:2,6). The idea that the instrumentally rational individual is the starting point of economic explanations underpins, in turn, the mainstream belief in microfoundations: all macroeconomic phenomena derive from microeconomic phenomena so that macroeconomics can be reduced to microeconomics and macroeconomic theory can be drawn from microeconomic general equilibrium based analysis (Hoover 2010:329). Defining the very nature of economics as microeconomic implies that any macroeconomic phenomenon will be seen to need a reductive explanation (Hoover 2001:70). Hence, mainstream explanations start from an asocial, ahistorical instrumentally rational individual and are extended to explain macroeconomic phenomena failing to engage with social and historical analytical elements including relations of class and the actual process of social production. As long as economics is defined "purely as a matter of choice" following Robbins, "it can have only an incidental connection with the actual process of social production which is its ostensible subject" (Hobsbawm 1997:106).

The configuration briefly exposed above pulls the mainstream paradigm away from reality and excludes important work that most people would regard as economics including Keynesian theory (Hausman 2008:32). The retreat of economics from realism is reinforced by the discipline's increasing dependence on the precise modelling of abstract theories in mathematical form (Morgan 2001:14). Rooted in the marginalism of the 1870s, an "increasingly formalistic, axiomatic and deductive analytical framework" characterises the prevalence of neoclassical economics (Fine and Milonakis 2009; Milonakis and Fine 2009:5). As Debreu (1986:1261) argues, "deductive reasoning about social phenomena invited the use of mathematics from the first" and economics was in an advantaged position to take up the invitation. As a result, mathematical economics in the mainstream paradigm were elevated to the "*only possible form* of any scientifically robust theorisation over economic phenomena" (Giocoli 2005:2–3)[Emphasis added]. As Robert Lucas wrote:

> [M]athematical analysis is not one of many ways of doing economic theory: It is the only way. Economic theory is mathematical analysis. Everything else is just pictures and talk.(Lucas 2001:9)

This framework is grounded on (and confined within) unrealistic assumptions establishing a tradition "which states basic assumptions and derives the rest from them" (Feyerabend 1991:96). So, assuming perfect competition, perfect information and perfect foresight, rationally choosing and utility maximising individuals engage in exchanges in competitive markets which will achieve equilibrium outcomes: these outcomes "would not only be optimal, but intrinsically stable and capable of 'self-correction'" (Palma 2009:830). These assertions may be as far removed from reality as possibly conceivable. Yet, as Friedman (1953:14–15) famously argued, higher abstraction levels are not considered as flaws but assets for theories: "To be important [...] a hypothesis must be descriptively false in its assumptions":

> A hypothesis is important if it "explains" much by little, that is, if it abstracts the common and crucial elements from the mass of complex and detailed circumstances surrounding the phenomena to be explained and permits valid predictions on the basis of them alone. (Friedman 1953:14-15)

In sum, confined within the restrictive framework briefly described above, the mainstream of the economics profession over the last 30-40 years practically avoided/refused to consider explanatory templates, tools and research programmes that did not conform to the conceptual premises and the methodological practice of the paradigm.

2.2 The unchanging nature of the paradigm

Why and how does the framework briefly described above affect the mainstream paradigm's propensity to resist change? Lucas's phrase "it is the *only* way" points to the mathematisation of the economic method. A belief firmly shared within the mainstream scientific community is that the 'economic method' is the superior scientific method and the only method applicable to all social sciences (Rothschild 2000:724). This is the method encapsulated in Gary Becker's economic approach as follows:

> The combined assumptions, of maximizing behaviour, equilibrium and stable preferences, used relentlessly and unflinchingly, form the heart of the economic approach [that] is not restricted to material goods and wants, nor even to the market sector. (Becker 1976:5–6)

So, why change a paradigm that is not only universally applicable to all human

behaviour but also provides a powerful tool in understanding the behavior of other "nonhuman species" (Becker 1993:307)? The notion of universal applicability and scientific rigour fortifies the paradigm and its intolerance to change. Claiming to achieve explanatory unification, mainstream economics contends to have achieved a 'complete' all-inclusive theory that is at once micro, macro, static and dynamic notwithstanding the levels of abstraction that inhibit its explanatory and predictive power (Bresser-Pereira 2009:510). The illusion that only one single theory can explain socio-economic phenomena is the bedrock of the hypothetico-deductive (H-D) model of explanation, known also as 'covering law,' used in mainstream economics.[11] Reliance on the H–D model confined explanation in economics to assumptions/axioms which function as explaining rules precluding change in terms of conceptual development and theoretical innovation (Reuten 1996:40).

The idea of immutability is built in the paradigm as a central belief. The mainstream paradigm conceptualises reality itself as immutable. Future developments in the economy and "future conditional consequences of all possible choices are predetermined" as programmed by natural laws: even if the economy changes over time, human action cannot change future movements that are already predetermined by the fundamental real parameters of the system (Davidson 1996:479–80). Similarly, a belief that integrates the mainstream paradigm is that its basic tenets are uncontradictable. New classical economics, for example, is built around the assumptions that representative agents form forward-looking rational expectations.[12] They possess systemic knowledge about how the economy works and they are ad infinitum optimisers in a frictionless world where markets always clear. In Lucas's words:

---

[11] Articulated formally by Hempel and Oppenheimer (1948), the H-D or D–N (deductive–nomological) model in its most general formulation, is used to explain "general regularities" , "laws" and specific events that occur at a particular time and place. An event (the explanandum) is explained under at least one general or covering law (the explanans) and a given set of preliminary conditions without any change in other relevant variables. For a detailed discussion see Blaug (1992) and Woodward (2011).

[12] The notion of rational expectations is attributed to John F. Muth who argued that as economic agents have expectations based on the same information with economists, their expectations are essentially the same as the predictions of economic theory (Udehn 2001:240).

> [...] all prices are market clearing, all agents behave optimally in light of their objectives and expectations, and expectations are formed optimally (Lucas 1972:103).

These basic tenets are uncontradictable: they are either non-binding because other principles can equally produce "observationally identical" outcomes, or they preclude modifications to the model in models that may reflect "possible, but perhaps 'irrational' behavior" (Hoover 1994:72). This is hardly surprising given that, for over one hundred and fifty years, strong apriorism has been a key methodological standpoint in mainstream economics, which considers economic theories as "being grounded in a few intuitively obvious axioms or principles that do not need to be independently established" (Blaug 1992:249). Apriorism in the mainstream paradigm is linked to both received principles and social practices and defines the inflexible nature of the paradigm (Jones 1994:24):

> Economic knowledge is 'apriori' insofar as economic propositions are ascribed validity without reference to experience or evidence; it is apriori when a conceptual structure is built on propositions perhaps relevant to time and place, but thereafter inflexible; it is apriori when it is established by uncritical reference to a pre-existing body of theory as the ultimate authority.

Ultimately, strong apriorism restricts theory not only on account of non-empirical categories, e.g. beliefs and expectations, but because the steadfast commitment of scientific community to these beliefs does not allow their adjustment (Hoover 1994:73). In new classical economics, for example, the use of parameters that do not comply with individual optimisation and the school's central belief in microfoundations and in equilibrium theory is rejected as an "ad hoc" unjustified adjustment (Blaug 1992:231; Hausman 2008:28).

Not only the paradigm with its constellation of beliefs remains immutable within the discipline but it is also part and parcel exported to colonise the entire social science field giving another dimension to Kuhn's idea of a global paradigm which refers to the paradigm within a science. Fine and Milonakis (2009; Fine 1997, 1999)[13] discuss in detail the key characteristics, the evolution, the intellectual roots and the implications of economics imperialism that hinges on the application and exportation across the social sciences of the "economic approach", considered to be the only scientific method

[13] See also Fine 1999; Fine 1998; Fine 2003. Mäki (2009) treats EI from a philosophy of science viewpoint as an attempt to achieve explanatory unification.

which is applicable to every conceivable aspect of human, social (and animal) activity.

The economics imperialism framework explicates how economics became a monolithic science intolerant of any alternative approach that could challenge its disciplinary matrix. Criticism coming from its own ranks is at best treated with indifference while history of economic thought and methodology are subjected to an "intellectually-barbaric treatment" (Fine and Milonakis 2011:15). Practiced over the years as a paradigmatic tradition by the mainstream scientific community, intolerance of alternative views and research paths naturally inhibits change. Avoiding historical and social analytical perspectives—and structural explanations for the crisis—mainstream normal science free from distractions retains its "drastically restricted vision": it is forced by the paradigm itself (and confidence in the paradigm) to focus attention on a "small range of relatively esoteric problems" in a detailed and deep manner that "would otherwise be unimaginable" (Kuhn 1962:24).[14] Not by chance, "denial of divergent thought" peaked during the recent crisis (Mirowski 2013:22).

2.3 The paradigm under stress: the crisis

For the past three decades or so, mainstream explanations for dynamic fluctuations that persist over time and space were grounded on the conceptual and methodological premises of the paradigm relying on equilibrium theory, representative agents with rational expectations, and reductionist microfoundations. Drawing on the belief that high levels of abstraction enhance economic theorising (Friedman 1953), modern macroeconomic models omitted key aspects of the economy that were essential in understanding how it works, including involuntary unemployment, money finance, bank failures and the possibility of financial crises. The eruption of the financial and economic crisis in 2008, exposed the macroeconomic theoretical innovations introduced after the 1970s as sources of anomalies in the sense that "anomalies, by definition, exist only with respect to firmly established expectations" (Kuhn 1977:221). Firmly established expectations and beliefs of the paradigm were drastically upset when the crisis tested the new classical rational expectations (REH) (Lucas 1972; Sargent and

[14] Having the physical sciences in mind, Kuhn (1962:24) notes that even if these restrictions, "born from confidence in a paradigm" are defects they are "essential to the development of science".

Wallace 1975), real business cycle theory (RBC) (Prescott 1986), efficient markets hypothesis (Fama 1970, 1991) and dynamic stochastic general equilibrium (DSGE) models.

The disjuncture between reality and the abstract representations of the above-mentioned theories was laid bare by the crisis, exposing them at best as inadequate to address a major financial and economic disruption. The real business cycle analysis (Prescott 1986),[15] for example, explains fluctuations by shocks that are random and exogenous to technology and productivity denying that money matters or that involuntary unemployment exists (Greenwald and Stiglitz 1993:39–40). In other words, productivity and the rational reaction of individuals to shocks are seen as the 'real' variables that cause recession bypassing "nominal" factors such as money, credit and debt (Ormerod 2010). With money and finance assigned minimal role and universally optimal and markets always clearing, the RBC does not refer to a cycle at all. Recessions and depressions are seen as "optimal responses to random shocks": the economy is in a constant growth rate trend until a shock occurs and it directly adjusts to a new trend leaving little space for policy to address recession (Wray 2011:4).

The financial crisis also shattered the mainstream belief in the efficiency of financial markets as set out by the efficient markets hypothesis (EMH). According to the efficient markets hypothesis (Fama 1970, 1991), security prices fully reflect all available information and they adequately represent market efficiency:

> "In general terms, the ideal is a market in which prices provide accurate signals for resource allocation [...] a market in which prices always 'fully reflect' available information is called 'efficient'" (Fama 1970: 383).

Hence, markets that clear continuously are assumed to process information efficiently with prices adjusting to all new information so that investors "cannot make above average returns in the long run on the basis of any generally available information" (Bryan and Rafferty 2005:127). Even before the crisis, empirical evidence from key asset markets indicated serious flaws in EMH. As early as 1978, when EMH was considered to be consistent with data from a wide variety of markets globally, flaws were becoming evident:

[15] Edward Prescott received the Nobel Prize in 2004 together with Finn Kydland.

> Yet, in a manner remarkably similar to that described by Thomas Kuhn in his book, The Structure of Scientific Revolutions, we seem to be entering a stage where widely scattered and as yet incohesive evidence is arising which seems to be inconsistent with the theory [...] we are beginning to find inconsistencies that our cruder data and techniques missed in the past. It is evidence which we will not be able to ignore. (Jensen 1978:2)

Yet, against all warnings, evidence was ignored. EMH was maintained in its strongest version by the new classical and new Keynesian approaches manifesting extraordinary durability within the mainstream paradigm in macroeconomics and finance as well as in economics education (Buiter 2009; Mirowski 2013:265).

Just like the efficient market hypothesis, the development of DSGE models proceeded as if criticism did not exist and in spite of the empirical evidence and their theoretical weaknesses (Kirman 2009:82). Until the crisis, dynamic stochastic general equilibrium (DGSE) models were thought to represent the macro economy accurately and more scientifically than earlier models. DSGE models are "derived from micro foundations: utility maximization by consumers-workers, value maximization by firms, rational expectations with fully specified imperfections (Blanchard 2008:23–24). In other words, the central tenets and beliefs of the mainstream paradigm are intact while involuntary unemployment, money, finance and banks are ignored as modelling parameters precluding the possibility of major crises that are a recurrent feature of the economy (Kirman 2010:501). Among other things, five major anomalies were identified in DSGE constructions with regard to the economics of high inflation: none of the characteristic high inflation phenomena were predicted by DSGE models including the extreme volatility of relative prices (Leijonhufvud 2009:751). Despite accumulating anomalies, DSGE models represent the high point of formalisation in economics enlisting Bayesian inference, ultra sophisticated computing and electronic hardware.[16] They are not just widely used; they are the crown jewel of major financial institutions such as the IMF:

> Nearly every central bank has one, or wants to have one. They are used to evaluate policy rules, to do conditional forecasting, or even sometimes to do actual forecasting.

[16] In the words of former IMF chief economist Blanchard (2008:22, 24), "the number of parameters has been steadily increasing with the power of computers [...] 19 structural parameters and 17 parameters corresponding to the variances and the first order autocorrelation coefficients of the underlying shock processes [...] software such as Dynare, which allows one to solve and estimate non-linear models under rational expectations, to specify and solve large dynamic models at the touch of a button."

> There is little question that they represent an impressive achievement (Blanchard 2008: 24).

As Kuhn (1977:174) observed, "though awareness of anomaly marks the beginning of a discovery, it marks only the beginning." Not all anomalies lead to significant changes in the paradigm. Yet, anomalies mostly require some action to address them and they often indicate rewarding directions for future research. While qualitative anomalies may be disguised by ad hoc modifications of theory, an established quantitative anomaly "suggests nothing except trouble" also providing a "razor-sharp instrument for judging the adequacy of proposed solutions" (Kuhn 1977:209). The anomalies that relate to EMH and DSGE models qualify as serious cumulative anomalies both in the qualitative and the quantitative sense.

In the light of the foregoing discussion, the emerging question is "How were the anomalies exposed by the crisis addressed?" To answer this question, the next section reconstructs the responses registered by the scientific community of mainstream economists in the wake of the crisis. In other words, following Kuhn (1962:77) we assume that "crises are a necessary precondition for the emergence of novel theories and subsequently ask how scientists respond to their existence".

3. THE PARADIGM AND CRISIS: MAINSTREAM RESPONSES TO THE CRISIS

Paradigm shifts involve a fundamental change in the way a scientist perceives his or her area of inquiry: a "transformation that fundamentally alters the scientific 'world' in which the scientist lives" (Hands 2001:102). In other words, were the practitioners of mainstream economics ready for a major transformation in their worldview? How did they appraise their role in the context of the 2008 crisis and beyond?

3.1 The paradigm before the crisis: the new consensus in macroeconomics

In the period leading to the financial crisis of 2008, the idea of change hardly occupied the thoughts of the mainstream establishment of the profession. Economists appeared confident that a period of stability and prosperity described as the 'Great Moderation' reigned in the economy (Bernanke 2004). The term epitomised how policymakers and central bankers pursued an "illusion" believing that inflation

targeting, financial deregulation, and the fine-tuning central banks' policy rate had combined to create a shock-resistant, stable and flourishing global economy (Argitis 2013:483). The consensus in mainstream macroeconomics was achieved after years of conflict between "intellectual giants" of the new classical and new Keynesian schools (Mankiw 2006:12–13). Synthesising the contributions of real business cycle theory and the new Keynesian approaches, the new consensus in macroeconomics (NCM)[17] embodied convergence in macroeconomics (Goodfriend and King 1997; Woodford 2009). Exerting great influence on economic thinking, NCM decisively shaped macroeconomics and the pre-crisis monetary policy build-up (Arestis 2009). For this reason, few months before the Lehman Brothers crash, Olivier Blanchard (2008:2) declared that "the state of macro is good" assuring that macroeconomics was scene to an exciting period of "great progress". No one from the mainstream scientific community mentioned the elements that were missing from the consensus: money markets and financial institutions were "not mentioned, let alone modeled" ("no banks, no money") in the NCM theoretical framework that draws directly from the efficient markets hypothesis (EMH) considering disequilibria such as bubbles as highly unlikely and policy to address them as "financial repression" (Arestis 2009: 10, 13).

The watershed that followed the collapse of Lehman Brothers in September 2008 shattered the 'Great Moderation'. At the same time, the crisis dealt a severe blow to its academic twin, the great convergence in mainstream macroeconomics contesting its theoretical and methodological precepts. The testimony of Alan Greenspan[18] before the US House of Representatives Committee on Oversight and Government Reform encapsulates sentiments in the immediate aftermath of the crisis:

> [T]he whole intellectual edifice, however, collapsed […] a very solid edifice, and, indeed, a critical pillar to market competition and free markets, did break down. And I think that, as I said, shocked me. I sti1l do not fully understand why it happened. (Greenspan 2008)

In the words of James Heckman, "everybody was blindsided by the magnitude of what happened"—not only Chicago economists but "the whole profession was blindsided" (Cassidy 2010c). A flood shed of response followed the shock questioning the state of

[17] Known also as the new neoclassical synthesis (NNS).

[18] Chairman of the Board of Governors of the Federal Reserve (1987-2006)

economic theory and the role of economists in addressing the crisis. A substantial body of criticism coming from outside the mainstream scientific community investigated various aspects of the 'economic crisis – crisis in economics' problematic (Bresser-Pereira 2010; Bryan et al. 2012; Cameron and Siegmann 2012; DeMartino 2011; Fine and Milonakis 2011; Harcourt 2011; Hodgson 2009b; King et al. 2012; Kirman 2009; Kurz 2010; Lawson 2009; Palley 2013; Skidelsky and Wigstrom 2010; Wray 2011; Zamagni 2009).

In this context, the upcoming discussion undertakes a systematic examination and evaluates the intra-paradigm post-crisis responses that followed a shock of such magnitude. The attempt is made to decipher how/if the mainstream establishment of the profession perceived and evaluated the impact of the crisis as regards both the paradigm and scientific community aspects of normal science.

3.2 Mainstream responses

A typical general mainstream response is to assess the crisis itself as an anomaly—an unexpected rare "black swan" phenomenon (Palley 2012:95–96; Zamagni 2009:326), identified Taylor (2008) in the money market. Thus, mainstream economists avoid the need to account for their failure to predict or explain the economic crisis. How can one predict and explain outlier phenomena of "extreme impact" located beyond "regular expectations" (Taleb 2010:xvii) with no past experience to indicate their possibility? As history has shown, however, financial crises are not outstanding rare events (Eichengreen and Bordo 2002; Kindleberger and Aliber 2005). Furthermore, the recent crisis did expose a host of severe anomalies in the Kuhnian sense that are neither resolved nor accounted for by the mainstream establishment. More importantly, as Fine and Milonakis (2011:8) emphasise, the recent economic crisis itself embodies "a huge anomaly with respect to all existing mainstream-theories" that are grounded "on mathematical modelling and the twin assumptions of representative rational agents and the efficient-market hypothesis."

Such general responses do not address the intense and widespread criticism that questions the performance and the prospects of mainstream economics. Focusing on the inability of the neoclassical paradigm to reconcile theory and reality, criticism

questioned formalism, unrealistic assumptions, modelling techniques as well as the professional practices of economists and economics education. The heartland of the dominant macroeconomics paradigm was questioned including rational expectations (Lucas 1972; Sargent and Wallace 1975), real business cycle theory (Prescott 1986), efficient markets hypothesis (Fama 1970, 1991) and DSGE models. The Chicago School of Economics became a focal point of critique. Divisions within the mainstream establishment appeared as prominent names including Paul Krugman, Richard Posner, Willem Buiter, Brad DeLong and Joseph Stiglitz joined in public disputations. The use of the blogosphere and online media amplified the polemical tones of the debate between economists.[19] In the wake of the crisis, the profession slipped into "uninformed quarrelling" that spread confusion, "degraded the quality of the discussion" and hindered policy responses, wrote Krugman (2012), one of the most prolific blogosphere contributors.

Did the collapse of the entire mainstream 'intellectual edifice' spark a process of change? How did mainstream economists perceive the effects of the crisis? How were anomalies perceived and addressed? Following Fine and Milonakis (2011), our discussion identifies three broad categories of reaction by mainstream economists. Having in mind the overlaps in an extensive and fragmented debate, the attempt is made to identify the most representative views in each category and distil their implications for the prospect of change in mainstream economics. Another caveat is that substantial part of the debate was confined to policy discussions revolving around potential preventive pre-crisis and corrective post-crisis measures. Compared to the policy content of the debate, discussion on theory and substantial reform for economics tended to be sparse. The proceedings of a conference published under the title *In the Wake of the Crisis: Leading Economists Reassess Economic Policy* (Blanchard et al. 2012) provide a case in point. Seeking answers to crucial post-crisis questions around six

[19] Samples include David Levine to Paul Krugman:"Speak for yourself kemo sabe. And since you got it wrong—why should we believe your discredited theories?" (Levine 2009); "John Cochrane does not know this consensus theory. Edward Prescott does not know this consensus theory. Eugene Fama does not know this consensus theory but somehow thinks the equilibrium condition that is the savings-investment identity is also a behavioral relationship" (DeLong 2009). For a detailed account see Mirowski (2010, 2013).

themes,[20] all twenty-three essays by Nobel laureates, major academics, and policymakers engage in a technical examination of policy and crisis governance without any critical inquiry into core theoretical and analytical issues that bear upon policy.

The three intra-paradigm response groups are categorised according to the content of their responses. The first group (a) rejects criticism, declines any professional responsibility and denies that the crisis exposed critical flaws in the theoretical and methodological mainstream apparatus. Expressed mainly by leading exponents of the Chicago school, this viewpoint represents a hard 'loyalist' orthodox defense line. It directly advocates letting things be and 'change nothing' since nothing was revealed to be wrong with mainstream economics. The second group (b) of 'moderates' adopts a more discerning attitude conceding that the crisis did challenge some aspects of mainstream economic theorising and practice. Scholars in this group, however, do not anticipate or discuss any change considering that the paradigm emerged fundamentally unscathed from the crisis. The third 'insider critics' group (c) voices strong criticism recognising misguided conceptual/methodological choices in mainstream theorising and flaws in policy choices during the build-up to the crisis. Mainstream economists in this category propose remedies to rectify mistakes and improve the mainstream toolkit. Within the third category, we can identify a subgroup which favours a "more genuine return to Keynes" evoking hitherto forgotten aspects of Keynesian economics (Fine and Milonakis 2011:17-18).

a) Loyalists: all is well, no change

I don't know what a credit bubble means. I don't even know what a bubble means.
Eugene Fama, interviewed by John Cassidy

The hardline mainstream responses mainly come—but are not confined to–from major Chicago school economists following strong criticism from 'within' Chicago by Richard Posner (2009a, 2009c) as well as Krugman's (2009b) attack on the Chicago

[20] The six themes are monetary policy, fiscal policy, financial intermediation and regulation, capital-account management, growth strategies and the international monetary system.

core, efficient markets and rational expectations in particular. The integrating defense line in this response group is to wholly absolve the mainstream paradigm and its practitioners of any responsibility. A recurrent theme is that markets are both unpredictable and unbeatable conveying a sense of mystification. In other words, markets are powerful, efficient and the best purveyors of knowledge but at the same time they are capricious and beset by unpredictable irregularities. Hence, the knowledge and explanatory power of the paradigm appears inherently limited in the face of bubbles and other unexpected phenomena of financial disruption. As Kevin Murphy emphasises:

> The fact is that much of the variation in the market is unpredictable. In finance research, it's a major victory if you can explain half of one per cent of the price variation with your model. The idea that you can't beat the market, or predict it—that part of the efficient-markets hypothesis is very much alive and well. (Cassidy 2010e)[21]

Thus, in typical normal science mode, only phenomena supplied by the paradigm can be articulated: "No part of the aim of normal science is to call forth new sorts of phenomena; indeed those that will not fit the box are often not seen at all" (Kuhn 1962:24, 10).

The hard line 'change nothing' attitude reveals how key practitioners of the mainstream paradigm insist that the paradigm performed adequately in forecasting and explaining the crisis without recognising any anomalies. In his article titled *How Did Paul Krugman Get It So Wrong,* John Cochrane (2011:39, 36) describes the efficient markets hypothesis as "probably the best-tested proposition in all the social sciences" arguing that its "central empirical prediction" is specifically that market behaviour is unpredictable. Evoking Hayek, Cochrane (2011: 39, 37) asserts that no one can "fully explain" market volatility and dismisses Keynes to conclude that "the problem is that we don't have enough mathematics. Mathematics in economics serves to keep the logic straight" and ensures logical consistency, which is the ultimate "siren of beauty". Asked what is left from efficient markets and rational expectations after the crisis, Cochrane replies that everything remains standing (Cassidy 2010d). According to Eugene Fama, the main promulgator of the efficient markets hypothesis (Fama 1970, 1991), the theory

[21] The *New Yorker's* economic journalist John Cassidy in a series of interviews investigated the reaction of major Chicago school economists as regards criticism directed against efficient markets and rational expectations as well as their assessment of anti-crisis policy measures e.g. bank rescue (Cassidy 2010a).

"did quite well" during the crisis which is precisely "what you would expect if markets were efficient" (Cassidy 2010a). Precluding any changes in economics as a legacy of the crisis, Fama appears mystified and professes agnosticism regarding economic knowledge:

> We don't know what causes recessions [...] That's where economics has always broken down [...] We've never known [...] Economics is not very good at explaining swings in economic activity. (Cassidy 2010a)

In a similar vein, Thomas Sargent (2010) defends real business cycle models and new Keynesian models against misdirected criticism which fails to understand "the purpose for which those models were devised". He argues that economists need to "learn and use some math" to account for uncertainty and ambiguity: to know more about bubbles we need "well-confirmed quantitative versions" of relevant models. Eric Maskin (2010) flatly rejects criticism that "economic theory failed to provide a framework for understanding this crisis" and suggests a reading list for policymakers. In Lucas's (2009) view, the principal lesson as regards efficient markets hypothesis is "the futility of trying to deal with crises and recessions": "anomalies" that have been exposed by the crisis are too small to matter for macroeconomic analysis. "Like Bob Lucas", Robert Barro (2009b), too, could not take "seriously the view that the financial and macroeconomic crisis has diminished economics as a field". Seeing no evidence that mainstream models "led policy makers astray or were a cause of the financial crisis", John Taylor (2010, 2014b) defends mainstream theorising (and his own work), blaming policymakers for failing to apply recommendations and concludes that "the crisis does not call for a new paradigm". Chicago economist Casey Mulligan (2009) does not think that macroeconomics is "off track" and notes that economists often suspect that markets do not function efficiently. Against Krugman, he defends the neoclassical growth model which has "neither money nor fiscal policy" and gives examples of its application to the current and previous recessions.

To sum up, the 'no change' hard line response group steadfastly rejects criticism directed against the performance of mainstream economics vis-à-vis the financial crisis and absolves mainstream theorising and the profession of any responsibility. For this group, the possibility of any previous oversight over the last 30 years is inconceivable and anomalies are not recognised. Cochrane makes this point abundantly clear in his

response to Krugman:

> Pretty much all we have been doing for 30 years is introducing flaws, frictions and new behaviors, especially new models of attitudes to risk, and comparing the resulting models, quantitatively, to data. The long literature on financial crises and banking which Krugman does not mention has also been doing exactly the same. (Cochrane 2011:39)

As views surveyed above demonstrate, the hardline mainstream establishment reiterates that all is well and envisages no change for post-crisis economics other than to uphold the existing paradigm and fortify its mathematical toolkit and quantitative orientation.

b) Moderates: Problems recognised, no change

Yeah, markets aren't fully efficient. Expectations go wrong [...]
There are a lot of things that people got wrong, that I got wrong,
and Chicago got wrong. (Gary Becker)[22]

In this group, James Heckman (Cassidy 2010c) concedes that the crisis exposed "some" anomalies mainly in rational expectations and efficient markets hypotheses which lack in empirical content: the dogmatic "culture of efficient markets—on Wall Street, in Washington, and in parts of academia, including Chicago" had caused pre-crisis warnings to be ignored so that "the whole profession was blindsided". Asserting that the bedrock of the Chicago "rocket" is standing intact, Heckman attributes the exposed anomalies to scholars who neglected Friedman's solid Chicago legacy of matching ideas with data.

Raghuram Rajan (Feldman 2009) recognises that market inefficiencies have been unveiled and cites problems which confirm his pre-crisis warnings (Rajan 2006) about the imminent downturn. He mentions a "sense of market infallibility" which pervaded the economics profession (and regulators) combined with prioritising the private sector over regulation. According to Rajan, rational expectations in macroeconomics and efficient markets in finance came under attack because of their dominant position rather than their "specific failings". Rajan asserts that rational expectations remain a convenient and useful tool even if macroeconomists overlooked its "plumbing". Hence, the natural reaction is now to compile models which have the

[22] Cassidy, John. 2010. "Interview with Gary Becker." *The New Yorker Blogs - January 14*. (http://www.newyorker.com/rational-irrationality/interview-with-gary-becker).

details of the plumbing. Referring to behavioural research on inefficient and irrational markets, Rajan thinks that the profession as a whole does not deserve blame. For Luigi Zingales (2010:31), the 2007–2008 financial crisis has only marginally affected the intellectual foundation of the efficient markets theory because it has not provided significant new evidence on the deviations of markets from fundamentals. Thus, the recent crisis, has weakened mainly "the already-losing side of hard-core believers in the EMT". Noting that we must learn to live with the idea of inefficient markets, Zingales recommends rethinking but not abandoning the EMT because it still holds useful insights and he professes his own mystified agnosticism:

> This is the uncharted territory where the crisis leaves us: a world where confidence in the rationality of the market is shaken but where there is no clear, viable alternative. Eventually, a grander theory will emerge, one that will enable us to understand when we should expect market prices to deviate from fundamentals. At the moment we can grasp only some elements of this theory. (Zingales 2010:37–8)

Defending his work and the rationality principle, Gary Becker rejects the idea that the profession will be affected by the crisis noting that people are already working to understand the financial crisis even if "forecasting major events like that is very hard to do in any field" (Herfeld 2012:74). He emphasises that, above all, economists "have to understand that they could end up interfering with the natural recuperative powers of the economy" (Milken 2009:53). Becker carefully balances a measured critique with the exoneration of the Chicago theoretical core and his mentor Friedman[23] acknowledging "some theology built into the efficient-markets literature" that prevailed over empirical evidence but left its "real heart" intact (Cassidy 2010b). Describing as "extreme" the view that markets "were always efficient", Becker recognises Lucas's key contribution but remarks that some "simplistic" dynamic general equilibrium models and "their builders" assumed crises out failing to understand new financial instruments such as derivatives or mortgage-backed securities that ultimately tested EMH:

> Systemic risk. I don't think we understood that fully, either at Chicago or anywhere else [...] Maybe some of the calls for deregulation of the financial sector went a little too far, and we should have required higher capital standards, but that was not just Chicago. (Cassidy 2010b)

[23] Becker argues that market economists including his mentor Milton Friedman have ardently supported more government intervention during the Depression and claims that Chicago was never pro-zero regulation: Chicago people "always believed there was a significant role for government, and not simply in the obvious areas, like law and the military, and so on" (Cassidy 2010c).

Becker defends the use of mathematics and the rationality principle because despite the contributions of behavioural economics, we need the "rationality assumption" to explain why "people prefer more to less, which in turn helps us to understand market outcomes and explain prices" (Herfeld 2012:77, 85). Therefore:

> If you want to abandon rational choice theory altogether, you have to substitute it with a new framework, and I do not see any new framework available at the moment—neither in the behavioral economics literature nor anywhere else—that has comparable explanatory and predictive power. That is the test. (Herfeld 2012:78)

Regarding the future, Becker thinks that economists will "improve macro" and appears confident that the recent crisis—being much milder—did not at all warrant a "revolution in economic thinking" comparable to what prevailed for decades after the Great Depression (Cassidy 2010b).

c) Insider critics: change something – repair and continuity

Although economists have much to learn from this crisis, I think that calls for a radical reworking of the field go too far. (Bernanke 2010:2)

Featuring strong criticism coming from prominent mainstream 'dissenters' including Krugman, Stiglitz, DeLong and the Chicago jurist and economist Richard Posner, this viewpoint identifies oversights and anomalies in pre-crisis mainstream theorising and acknowledges predictive and explanatory failure. Views and discourse from both academics and policymakers in this response group range from mild critiques that recognise the issues raised by the crisis to harsher attacks. Macroeconomic theory emerges as the main target of criticism focusing particularly on efficient markets and rational expectations hypotheses, real business cycle theory and DSGE models including their unrealistic assumptions, particularly the representative agent, rationality, perfect markets, the neutrality of money and policy ineffectiveness (Ascari 2011:18; Wray 2011:7). Among other things, mainstream modelling techniques, finance theory, lack of research in microeconomics and neglect of behavioural insights in economic analysis emerge as problematic areas. Yet, these ate treated mostly as minor anomalies by this group. The integrating idea in this response group is to limit change to what essentially amounts to Kuhnian mopping up operations to patch flaws and anomalies exposed by the crisis. In other words, prospective changes should ensure continuity without involving any radical shift in the mainstream paradigm.

More specifically, recognising that the crisis challenged "important economic principles and research agendas", Bernanke (2010:10) argues for continuity in the mainstream paradigm and some repairs claiming that the mainstream tradition of research and analysis can fix any anomalies by attentive research on asset price bubbles, market liquidity, uncertainty and modeling human behaviour. In Bernanke's view, the problem is technical: rather than flaws in mainstream theorising, the crisis exposed a "failure of economic engineering and economic management" (p.3). Willem Buiter (2009) launched a much more terse criticism against the "uselessness" of most mainstream theoretical macroeconomic advances and research since 1970,[24] which he describes as follows:

> Self-referential, inward-looking distractions at best. Research tended to be motivated by the internal logic, intellectual sunk capital and aesthetic puzzles of established research programs rather than by a powerful desire to understand how the economy works—let alone how the economy works during times of stress and financial instability. So the economics profession was caught unprepared when the crisis struck. (Buiter 2009)

Buiter shares with many of his peers the belief that the future lies in behavioural approaches drawing on empirical studies that would examine how market actors respond to changing environments.

A sharp insider critique comes from the eminent Chicago law professor Richard Posner[25] who berates economists—starting with Lucas—for overconfidence in rational expectations hypothesis, efficient-markets and the real business cycle theories that have proven to be mistaken (Posner 2009a). Describing modern economics as a dangerous mix of mathematics and gullibility about self-regulating markets, Posner reprimands business and academic economists as well as policymakers and regulators for ignoring warnings about finance deregulation and for overlooking a host of parameters such as uncertainty, the possibility of bubbles, market imperfections, irrational market actors, institutional specificity in markets and the limited self-healing powers of laissez-faire

[24] Buiter (2009) cites the new classical rational expectations revolution associated with Lucas Jr., Prescott, Sargent, Barro etc, and the new Keynesian approach of Michael Woodford, the manifest failure of the EMH and others.

[25] Posner, a member of the neoliberal Mont-Pèlerin society, is a central figure in the Chicago 'Law and Economics' movement advocating the application of rational choice models to law and a key exponent of the regulatory 'capture theory' on the transformation of a regulatory agency into an anticompetitive tool of the regulated industry (Van Horn 2009).

capitalism (Posner 2009a, 2009b). Yet, Posner's scathing critique is not accompanied by a comparable strong advocacy in favour of reorienting economics leading Solow (2009) to describe Posner's suggestions as a "laundry list" rather than "a blueprint for reform". Declaring that he has now become a Keynesian, Posner (2009c, 2009b) calls for reform that will reactivate Keynesian and behavioural insights.

One of the most vocal insider mainstream critics, Krugman (2009a, 2009b), too, proposes to reorient economics away from the current "Dark Ages" by reviving Keynesian ideas in theory and policy and pursuing work in behavioural finance. Using to advantage his influential public profile over the cyberspace, Krugman argues that "most macroeconomics of the past 30 years was spectacularly useless at best, and positively harmful at worst". Freshwater economics[26] had developed into a cult that disregarded and ridiculed ideas not conforming to its paradigm; hence, change can only emerge from within requiring "patient empirical spadework, documenting crises past and present, in the hope that a fresh theory might later make sense of it all" (Krugman 2012; The Economist 2009:65,67).[27] Notwithstanding Krugman's polemical tone and the problems he identifies, his vision of change remains fundamentally constrained within the core of the paradigm, confirming the view that mainstream economics can be fixed with measured doses of remedy that ensure continuity. The following passages reveal Krugman's understanding of the nature and the scope of change within continuity:

> The brand of economics I use in my daily work – the brand that I still consider by far the most reasonable approach out there – was largely established by Paul Samuelson back in 1948 [...] It's an approach that combines the grand tradition of microeconomics, with its emphasis on how the invisible hand leads to generally desirable outcomes, with Keynesian macroeconomics.(Krugman 2010)

[26] Krugman repeatedly discusses diverging viewpoints in terms of a saltwater–freshwater split (designating scholars in coastal and inland US universities, respectively). Saltwater scholars "continued to view Keynes as broadly right" even without rigorously justifying some of their assumptions while "freshwater" people pursued unrealistic modelling at odds with "lived" experience (Krugman 2012).

[27] Stiglitz and Krugman were asked about the future of economic thinking at an INET event. Krugman once more advocated empirics and humility in believing your own models. Stiglitz observed that lots of empirical work was done in the last 30 years but it was guided by bad theory that blinded researchers who saw all the empirics with exclusively with one lens (INET:Conversation on the State of the Economy 2012 - video at http://tinyurl.com/hgbllz5).

> I like to think that I am more open-minded about alternative approaches to economics than most, but I am basically a maximization-and-equilibrium kind of guy. Indeed, I am quite fanatical about defending the relevance of standard economic models in many situations. (Krugman 1996)

Another outspoken celebrity critic, Joseph Stiglitz argues that a new paradigm is needed and proposed a more precise change agenda. Stiglitz (2010a:1) enumerates the flawed methodological assumptions of the prevailing paradigm and links them to "miserably failed" policy precepts and recommendations. Echoing his analysis in *Freefall* (Stiglitz 2010b), he itemises a list of critical methodological problems that underscore "much of the standard paradigm": the representative agent tops the list which includes equilibrium/disequilibrium, rationality, microfoundations and methodological individualism (Stiglitz 2010a:3-8). Mainstream theoretical assumptions are criticised in relation to efficient markets, rational expectations and models; the emphasis is on Stiglitz's own contribution to information asymmetries and incomplete markets. In Stiglitz's (2010d) view, rather than flaws in economic theory, "the free marketeers" were to blame for not paying attention to his work on imperfect and asymmetric information:

> [E]conomic theory never provided much support for these free-market views. Theories of imperfect and asymmetric information in markets had undermined every one of the 'efficient market' doctrines, even before they became fashionable in the Reagan-Thatcher era. Bruce Greenwald and I had explained that Adam Smith's hand was not in fact invisible: it wasn't there. [...] Free marketeers, and the special interests that benefited from their doctrines, paid little attention to these inconvenient truths. (ibid.)

Stiglitz's critique can be seen as typical of the trend identified by Mirowski (2013:157) that in post-crisis debates economists from the Hayekian ultra right to the "legitimate left" including the "polemical" Stiglitz who declared that the crisis confirms their own research and their preferred economic theory implying that substantial change in economics is not needed. In sum, while Stiglitz urges for a new paradigm, his change agenda reiterates the repair and continuity outlook that is common to all the insider critic responses. The message delivered by Stiglitz's critique is to refurbish macroeconomics and fix flawed models by building on the tremendous progress of the last thirty years to create what he calls a 'New Macroeconomics' (Stiglitz 2010a, 2010c, 2011a):

> The New Macroeconomics will need to incorporate an analysis of risk, information, and institutions set in a context of inequality, globalization, and structural

> transformation, with greater sensitivity to assumptions (including mathematical assumptions) [...] It will have to be predicated on an understanding that in the presence of imperfect information and incomplete risk markets, market economies are not necessarily either efficient or stable [...] New policy frameworks need to be developed based on this new macroeconomic modeling. (Stiglitz 2011a:636–73)

Jeffrey Sachs considers change in terms of broader global issues. Sachs (2009:8,5) urges for a new "structural" macroeconomics which must shed outmoded "operating assumptions" engaging with poverty reduction, education, food, energy, and climate to ensure sustainable recovery and development. While all these are important issues, Sachs's account does not specify the theoretical and conceptual changes required for his proposed reorientation of mainstream macroeconomics. Another insider critic, Barry Eichengreen (2009) uses strong language to denounce, among other things, economic models as "weapons of economic mass destruction". He hints at economists' conflicts of interest and "generous speaker's fees" for those "prepared to drink the Kool-Aid". He describes in gloomy tones the prelude and the early aftermath of the crisis. Yet, he finds nothing fundamentally wrong with modern economic theory despite the "generic problems that created our current mess" and the "structural weaknesses and conflicts of interest that paved the way to our current catastrophe" (Eichengreen 2009). In Eichengreen's view, recent advances such as complexity economics, behavioural research, information economics and agency theory bring hope for the future while new emphasis on empirical work and the IT revolution herald a "quiet revolution" to the practice of economics, paving the way for the inductive economics of the 21st century.

According to Daron Acemoglu (2009:185–6, 194), the financial crisis has partly caused an "embarrassment for economic theory" and the economics profession was "partly complicit in the buildup" to crisis; nevertheless, economic theory has still has a lot to teach us and economists still have important things to say. Therefore, it is not right to "condemn wholesale" even the financial innovations that were involved in the crisis as they have been extremely productive and will continue to be with the right regulations. Warning against the "risk that belief in the capitalist system may collapse", Acemoglu (2009:191–3, 187–8) evokes Schumpeter to note that capitalism as a process of creative destruction, needs "institutions that allow for innovation" and a better framework for regulation and reallocation of resources such as reallocating funds or highly skilled workers from the financial industry towards more innovative sectors.

Diane Coyle, another 'enlightened'[28] insider, spots a "gaping vacuum in macro-economics" and emphasises macroeconomists' failure to learn from the progress in microeconomics (Coyle 2010:264). Yet, Coyle (2012a:7, 11) believes that attacks on mainstream economics do not warrant a Kuhnian paradigm shift in economics: she feels that recent radical changes prove that mainstream economics was "never monolithic" having resolutely left some neoclassical assumptions to shift its central focus from theory to applied work, from macroeconomics to microeconomics, and "from abstraction to institutional and behavioural detail". Coyle (2013) advocates moving economics away from abstraction towards a "deeply, genuinely empirical subject, not a playground for competing political philosophies". Like previous 'insider' critics, Coyle delineates a path of change confined to mop up repairs that ensures the continuity of the paradigm. This path retains unchanged the neoclassical core elements of mainstream methodology with first and foremost rational choice and the use of equilibrium in modelling:

> If these are limitations, so be it: every subject has core restrictions in its methodology, which in fact represent its strengths and distinctive insights. It's not that we believe that everybody chooses rationally all the time—on the contrary, the most orthodox of economists is interested in learning from behavioral research. Nor do we think the economy is always in equilibrium [...] Nevertheless, both elements are core to our way of thinking. Rational choice is distinct from self-interested choice, but self-interest too is a powerful assumption. (Coyle 2010:266)

Having examined the responses to the crisis coming from within the scientific community, our inquiry next focuses on this particular community and its characteristics pursuing our argument that institutional/sociological parameters constrain the prospect of paradigm change in mainstream economics and inhibit the generation of new knowledge.

[28] Diane Coyle, OBE, is the head of "Enlightenment Economics", a consultancy specialising in innovation, competition policy, corporate governance and institutional reform and the economic and social effects of new technologies (http://www.enlightenmenteconomics.com/).

4. THE SCIENTIFIC COMMUNITY: THE ECONOMICS PROFESSION IN CRISIS

4.1 The scientific community and the 'sociological base' of the paradigm

In Kuhn's account of the scientific community, the social context of science emerges as indispensable in understanding science. Even if Kuhn was not concerned with the social sciences, his account of the scientific community offers a framework that can help make sense of the responses of the mainstream economics establishment as regards the role of the profession in the face of the recent economic crisis.

As intimated previously, Kuhn increasingly recognised the importance of scientific community (Kuhn 1962: 176).[29] In the *Postscript* to *The Structure,* Kuhn (1962 [1969]: 176) remarks that were he to rewrite the book he would start with a discussion of the community structure of science. Replying to critics like Lakatos who had "misconstrued the sociological base" of his position, Kuhn (1970:240–41) emphatically explains that his unit of reference is "the normal group rather than the normal mind": "there are no ideal minds, and the 'psychology of this ideal mind' is therefore unavailable as a basis for explanation". As noted by Margaret Masterman (1970:65–7), it is the 'sociological sense' that defines the originality of Kuhn's notion of a paradigm integrating many of Kuhn's different uses of the term 'paradigm'.

According to Kuhn (1962:177, 1977:296), a scientific community consists "of the practitioners of a scientific specialty." In his *Second Thoughts on Paradigms*, Kuhn (1974:460-61) asserts the "close proximity, both physical and logical" between a 'paradigm' and a 'scientific community': "A paradigm is what the members of a scientific community, and they alone, share". In other words, paradigms and scientific communities are inextricably linked together: "paradigms are the core commitments of scientific communities, whose boundaries are defined by their shared acceptance of a paradigm" (Rouse 2003:104–5). The members of the community:

> See themselves and are seen by others as the men responsible for the pursuit of a set of shared goals, including the training of their successors. Such communities are

[29] One of the three types of paradigms distinguished by Margaret Masterman is the sociological paradigm (Masterman 1970:65).

> characterized by the relative fullness of communication within the group and by the relative unanimity of the group's judgment in professional matters. (Kuhn 1974:461)

What shared elements, then, ensure "the relatively unproblematic character of professional communication and for the relative unanimity of professional judgment" (Kuhn 1974:462)? How does one come to hold the paradigm "as the result of a process of social acculturation" (Hands 2001:105)?

According to Kuhn (1970:271–72, 1974:463), the members of the scientific community are bound together by their commitment to shared theoretical beliefs, values, instruments, concrete problem solutions and techniques, and the metaphysics of the paradigm which make up the three main constituents of the disciplinary matrix, namely symbolic generalizations, models, and exemplars: these are central to the "cognitive operation of the group" and ensure unproblematic communication within the group. The common traits binding together members of the community also include similar educations and similar "professional initiations"; "to a remarkable extent the members of a given community will have absorbed the same literature and drawn similar lessons from it" (Kuhn 1974:461). Moreover, the scientific community "functions as a producer and validator of sound knowledge" and provides education based on the three components of the disciplinary matrix: the symbolic generalizations, the models and the exemplars (Kuhn 1974:463, 1977:298). The practitioners of a science refine concepts, develop complex equipment as well as an "esoteric vocabulary and skills" that progressively professionalise the field leading at the same time to a rigid science (Kuhn 1962:64).

Emphasising the "theory-ladenness" of observations, Kuhn points out that the paradigmatic lens determines what and how scientists see: trained in the tradition of the paradigm, the members of a scientific community do not just 'see'; they 'see as' through the interpretative lens of the paradigm (Hands 1997:103). Moreover, the paradigm provides the scientific community with a criterion for choosing which problems to work on. As long as the paradigm is taken for granted, problems "can be assumed to have solutions" and to a great extent "*these are the only problems* that the community will admit as scientific or encourage its members to undertake" (Kuhn 1962:37)[Emphasis added]. So, in the course of normal science, a scientific community becomes a vastly "efficient instrument for solving the problems or puzzles that its

paradigms define" (Kuhn 1962:166). Ultimately, then, paradigm change emerges as a social process underscored by changes in the beliefs prevailing in a scientific community and not as a transformation that could be explained by "any simple 'rules' of proper scientific method" (Hands 2001:102).

In this light, following Kuhn (1970:249) we next examine how a "particular constellation of beliefs, values, and imperatives" affected the behaviour of the scientific community vis-à-vis the recent financial and economic crisis.

4.2. The mainstream scientific community and the crisis

Notwithstanding the intensity of the debate inside and outside mainstream economics, the scientific community largely exhibits detachment, severe myopia and amnesia as regards its role and responsibility in the face of the crisis. Overall, a sense of detachment pervades mainstream responses, including those coming from 'insider' critics; as if the scientific community and the paradigm were separate realms rather than the two closely interrelated aspects of normal science. Disinvolvement is implied when mainstream economics practitioners profess agnosticism claiming insufficient knowledge about the future and mysterious unpredictable phenomena such as crises, bubbles and black swans (Cochrane 2011; Taylor and Williams 2008). Agnosticism goes hand in hand with the mainstream 'accident' hypothesis to explain the crisis as the result of contingent actions by "real economy actors" (Gowan 2009). In fact, across all response groups, bankers, mortgage borrowers, policy makers, regulators, risky investors, ratings agencies and so on emerge as the guilty parties—as if these individuals were recruited from the ranks of heterodox economics. Seventeen laureates attending the 4th Nobel Laureates Meeting on Economic Sciences in Lindau, Germany[30] identified regulators, politicians, ratings agencies, greed, too-big-to-fail banks and moral hazard, irrational and exuberant investors, risky financial products and defective models as responsible for the crisis (Thoma 2011). Similarly, the crisis is seen as a "massive

[30] This event brings together Nobel laureates in economics with young economists from all over the world aiming to enhance personal dialogue between scientists across generations and cultures. (http://www.lindau-nobel.org/). See also the 2011 Annual report of the event at http://www.mediatheque.lindau-nobel.org/publications/34842/annual-report-2011-economics

institutional failure, involving financial institutions, regulators, rating agencies, and international organizations" as well as a deficient international regulatory and supervisory framework for the financial sector (Ortiz 2012).

Thus, rhetoric of blame and accountability incriminates individuals or professional groups instead of in-depth critical self-reflection regarding the role and the responsibility of the profession. Post-crisis discussions are channeled towards policy issues evading critical reflection on the role of the scientific community and its theoretical commitments—as if these were unrelated to flawed policy recommendations. Insider critics (Buiter 2009; Krugman 2009b; Posner 2009b) also name and shame their colleagues of the hardline mainstream establishment:

> And at this point I think it important to call out Robert Lucas, Richard Posner, and Eugene Fama, and ask them in the future to please do at least some of their homework before they talk nonsense. (DeLong 2011)

The mainstream discourse of individual blame is typical of capitalism as it "both blames and exculpates, disclaiming responsibility in the name of responsibility" (Pludwin 2011:469). Ultimately, exoneration comes in many guises and for all. Regulators are "only human" and "got caught up in the same bubble mentality as investors" failing to deploy their authority (Becker and Murphy 2009; Cochrane 2009:35). Mistakes made by economists are largely due to the inherently difficult economic issues they confront: hence we should not exaggerate in thinking that the profession could have done something to avert economic disaster (Posner 2009b).[31] Even if policy was mistaken, mistakes were "small, forgivable under the circumstances and may not have done much harm" (Blinder 2014). Myopia and amnesia combine to foster absolution. More specifically, four years after the momentous events of 2008, the cream of the mainstream establishment (twenty-three Nobel laureates, prominent academics, and policymakers) in a volume of collected essays on the crisis (Blanchard et al. 2012) focuses on policy issues and hardly finds anything worth mentioning about the role of the profession. Six years after the crisis, the role of the scientific community and the paradigm is wholly forgotten. In a collection by the Hoover Institution (Baily and Taylor 2014), 'expert' contributors such as John Taylor, Larry Summers, John

[31] Posner's conclusion comes after his scathing attack on Lucas.

Cochrane, Alan Blinder, and Michael Bordo analyse the causes of the 2008 financial crisis. They wonder why recovery is so slow to come in a debate wholly devoid of any sense of critical reflexion about the profession and its paradigmatic constraints.

Referring to wrong theoretical choices, insider mainstream critics have been more vocal in criticising economists for failing to predict the crisis and deliver warnings as well as for providing flawed policy advice before and after the crisis (Acemoglu 2009; Buiter 2009; Colander et al. 2009; Eichengreen 2009; Krugman 2009b, 2011). The wrong theoretical choices made by economists, however, largely refer to EMH, REH and the DSGE models that were identified as 'usual suspects' previously in this paper. Acemoglu (2009) deplores how economists wrongly "equated free markets with unregulated markets" allowing regulators, "their policies and rhetoric set the agenda for our thinking about the world and, worse, perhaps, even for our policy advice". The problem, Eichengreen (2009) writes, was "a partial and blinkered reading" of the literature; economists—like regulators—were hit by a syndrome of 'cognitive capture'. Censuring economists for over-confidence and hubris that created blind spots, Rodrik (2009) emphasises that the sociology of the profession needs fixing as economists have too often acted not as analysts but as ideologues. He does not, however, offer any suggestions as to what is wrong with the sociology of the profession or how to fix it.

The foregoing discussion demonstrates the reluctance of mainstream economists to engage in critical self-reflection about their role or accept that the crisis had implications for the profession and its standing. This unwillingness is confirmed by a recent comprehensive survey (2007–2009) of conference proceedings, academic journals, articles and interviews in printed and online media as well as economic blogs showing that at best the profession recognises some macroeconomic assumptions as flawed but refrains from in-depth self-criticism (Negru 2013). While all practitioners profess to be critically self-reflexive, Negru (2013) points to a major problem, namely the reluctance of the profession to identify the terms of self-criticism and recognise the institutional constraints of the discipline. In all, the economics profession emerges as unwilling to respond to the crisis in any "sense that it should change": it chooses to go on with current practices with minor changes such as "some mainstream researchers moving from the periphery of the mainstream to the center, and others moving the other

way" (Colander 2010:242).

Why is this case? Why does the mainstream economics scientific community resist change?

4.3. The scientific community and its constraints: resistance to change

The type of question I ask has therefore been: how will a particular constellation of beliefs, values, and imperatives affect group behaviour?

(Kuhn 1970:249, Reflections on my Critics)

Capitalism without failure is like religion without sin.
(Meltzer 2007)

Myopia vis-à-vis anomalies and resistance to change exhibited by the mainstream establishment as a scientific community pursuing normal science is not exceptional by Kuhn's account. Kuhn (1962:24) was explicit that normal science does not in any way aim to "call forth new sorts of phenomena". Phenomena that do not fit the box are mostly invisible while extensive professionalisation vastly restricts scientists' vision and induces substantial resistance to paradigm change (Kuhn 1962: 62, 64). Lifelong resistance to "any change in paradigm categories", particularly from those committed by their careers to an older normal science tradition, is built-in the "nature of the perceptual process itself": it is "not a violation of scientific standards but an index to the nature of scientific research itself" (Kuhn 1962: 24, 62, 151).

The work of Ludwik Fleck (1979),[32] which in many respects foreshadows key Kuhnian concepts, provides further insights in making sense of the scientific

[32] Ludwik Fleck's *Genesis and Development of a Scientific Fact* (1979) was published in German 1935. A dedicated opponent of Logical Positivism, Fleck (1896–1961) was a Polish medical microbiologist with a major interest in epistemology. His pioneering work on epistemological questions went wholly unnoticed as Fleck survived brutal anti-Semitism, the Lvov Ghetto and Nazi concentration camps. An exceptionally open-minded scholar, Fleck conducted research on the anti-typhoid vaccine. Acknowledging his intellectual debt, Kuhn (1962: ix) wrote that Fleck's work anticipated many of his own ideas. He also wrote the Foreword to the 1979 translation of Fleck's book. A wealth of material and Fleck's unpublished work is collected in Cohen and Schnelle (1986). Comparative insights on the work of Kuhn and Fleck are provided in Mößner (2011) and Harwood (1986). Wittich (1981) proffers a Marxist analysis of both scholars and their contribution.

community and its resistance to change. Conceptualising the scientific community as a 'thought collective' and paradigms as 'thought styles', Fleck (1979: 42, 43) emphasised the social character of knowledge and the social structure that underpins "the very nature of scientific activity". As a "structurally complete and closed system", the thought collective demonstrates the extraordinary "tenacity of closed systems of opinion" and an "enduring resistance to anything that contradicts" its thought style (Fleck 1979: 28–32). To resist change and defend the paradigm, the thought collective adopts a five-fold "active approach", a strategy which aptly describes the response pattern of mainstream economists:

> (1) A contradiction to the system appears unthinkable. (2) What does not fit into the system remains unseen; (3) alternatively, if it is noticed, either it is kept secret, or (4) laborious efforts are made to explain an exception in terms that do not contradict the system. (5) Despite the legitimate claims of contradictory views, one tends to see, describe, or even illustrate those circumstances which corroborate current views and thereby give them substance ((Fleck 1979:27)

As previously intimated, Kuhn emphasised that resistance to change may have its uses in generating new knowledge:

> By ensuring that the paradigm will not be too easily surrendered, resistance guarantees that scientists will not be lightly distracted and that the *anomalies that lead to paradigm change will penetrate existing knowledge to the core.*(Kuhn 1962:65)[Emphasis added]

Conversely, mainstream economists as 'producers and validators of sound knowledge' (Kuhn 1962:178) and gate-keepers of the dominant paradigm, emerge as preoccupied precisely with how anomalies *will not* penetrate what the paradigm has come to dictate as scientific knowledge. This seeming paradox can be explicated by Kuhn's emphasis on the role of value-systems, ideology and the mechanisms of their transmission and enforcement

> [I]t should be clear that the explanation must, in the final analysis, be psychological or sociological. It must, that is, be a description of a value system, an ideology, together with an analysis of the institutions through which that system is transmitted and enforced. Knowing what scientists value, we may hope to understand what problems they will undertake and what choices they will make in particular circumstances of conflict. I doubt that there is another sort of answer to be found. (Kuhn 1977:290)

Nonetheless, the post-crisis mainstream discourse bypasses any discussion of the institutional/sociological parameters which delimit the performance and the reaction of the mainstream economics profession vis-à-vis the financial crisis and cripple the

prospect of paradigm change. The depoliticised and 'technocratic' ppst-crisis discourse ignores, in particular, constraints imposed by the "underlying worldview economists have in common, and the constraints imposed by power in the normal social science system and its environment" (Ward 1972:31). Following Kuhn (1970:249), an examination of the "particular constellation of beliefs, values, and imperatives" that affect the behaviour of the scientific community is in order. In other words, do mainstream economists as a scientific community share a worldview? Does a value system affect their response to the recent crisis and how?

According to Friedman (1953:4) "positive economics is in principle independent of any particular ethical position or normative judgments". The proper scientific method prohibits subjective value judgments and addresses economic phenomena only in terms of their directly observable appearance (Robbins 1935:87).[33] As a discipline, economics "tends to pride itself (inevitably erroneously) on being value-free and independent of external influence" (Milonakis and Fine 2009: 3). Accordingly, there is no room for ideology in the value-free 'neutral' science of economics. Hence, both the practice and the practitioners of mainstream economics— in general and in crises—should be beyond the influence of ideology. As Cochrane (2010d), asserts, Chicago today "is not an ideological place". What is, then, the part of ideology in post-crisis mainstream responses?

Despite mainstream claims of value-free scientificity and ideologically neutral scientists, ideology is very much part of the debate. Mainstream economists in all three response groups readily discuss or refer to ideology. Alan Greenspan (2008) is shaken to discover flaws in his ideology which were exposed by the crisis. Testifying before the competent US Senate Committee, he is on record saying that:

> "I do have an ideology. My judgment is that free, competitive markets are by far the unrivaled way to organize economies [...] to exist, you need an ideology".

More specifically, when mainstream economists refer to ideology they mean the belief in the efficiency of self-regulating markets. Directly or by implication, they indicate

[33] A survey of the origins and development of value-free economics is provided in Drakopoulos (1996).

free-market 'ideology' as responsible for the failure of both economics and economists in the face of the crisis. Coyle (2012b) describes an intellectual environment "in which deduction has driven out induction and ideology has taken over from observation". In Krugman's (2011) view, the belief that markets cannot go wrong played a major role pointing to a "structural flaw in the profession". This belief extends beyond the "bastions of capitalism" pervading countries with "established socialist traditions, such as China, India, and Russia" (Akerlof and Shiller 2010:2). Ideology is what underpins the "great faith" of politicians and policy makers in the self-regulation of financial markets (Maskin 2013). This "powerful ideology—the belief in free and unfettered markets—brought the world to the brink of ruin" (Stiglitz 2011b). The ideological view within the discipline that "the market economy is inherently self correcting and state intervention is unnecessary and undesirable" obstructs recovery and continues to influence the teaching of macroeconomics (Wren-Lewis 2011:42, 45). Many economists and officials who are "heavily invested in the ideology of free markets" deflected attention from pre-crisis warnings (Posner 2009a:134). Ideology along with budgetary considerations "starved the regulatory agencies of resources" (Eichengreen 2008).

Defining ideology exclusively as the belief in self-regulating markets reduces the debate to an ineffectual discussion of "'how much' and 'what kind' of regulation would set matters straight" (Gowan 2009:20). This attitude fits hand in glove with mainstream responses that lay the blame on efficient markets hypothesis limiting change in economics to minor repairs. The implication is that a bit of regulation can set free-market ideology right—just as a few corrective patches can set a flawed theory right. This line of reasoning masks the overarching deep belief of mainstream economists of all stripes in capitalism and their commitment to its perpetuation at all costs. Avoiding any reference to classes, exploitation and the social relations of production, it focuses on saving the capitalist system from the effects of the crisis and its own excesses:

> Yes, capitalism is good. But yes, it also has its excesses. And it must be watched. [...] Yet, we are currently not really in a crisis for capitalism. We must merely recognize that capitalism must live within certain rules. Indeed our whole view of the economy, with all of those animal spirits, indicates why the government must set those rules. (Akerlof and Shiller 2010:146–7, 173)

Despite pleas for regulation, anything that can harm the social order of capitalism should be avoided including excessive regulation. Economics, after all, is "the science by which economic policy can be formulated thereby resolving conflicts both within and between classes without threatening the social order of capitalism" (Fine 1980:141). Becker and Murphy (2009) emphasise that financial and other reforms must not destroy capitalism and its gains. In their view, it is precisely the "so-called capitalist greed" that motivates business and ambitious workers rescuing "hundreds of millions" from poverty. Taylor (2014a), cautions against bad monetary and regulatory policy and particularly "interventionist policy" with Keynesian fiscal stimulus packages. Becker (Milken 2009:54) worries about the government is "getting bigger and it will be hard to go back" posing a very real threat to the economy. Luigi Zingales (2009a: 26, 35) worries that an erosion in the belief that "the system is fair" threatens post-crisis American capitalism and warns against populist notions such as cutting executive bonuses or that a firm is too big to fail. According to Myron Scholes (Milken 2009:58), government cannot be a substitute for markets because it simply cannot "provide the vital information that markets provide". Asking "Why Capitalism?", Meltzer (2012:5) replies that despite some flaws, capitalism works and cites Kant: "Out of timber so crooked as that from which man is made, nothing entirely straight can ever be carved." No wonder, then, that Nobel laureate Myerson (2012:848, 873) recommends using "poor workers' taxes to subsidize rich bankers" to offset weak investment during recessions, which may "actually benefit the workers, as the increase of investment and employment can raise their wages by more than the cost of the tax".

Ideological commitment to preserving the capitalist social order is not confined to the intellectual sphere. It has decisively shaped the mainstream economics scientific community defining acceptance to the community, career advancement, getting published and finding employment. As Stigler, back in 1959, declared, the "professional study of economics makes one politically conservative [...] It is indeed true that a believer in the labor theory of value could not get a professorship at a major American university (Stigler 1959:522, 531). He described this particular individual and his/her value system as follows:

> A person who wishes most economic activity to be conducted by private enterprise, and who believes that abuses of private power will usually be checked, and incitements to efficiency and progress usually provided, by the forces of competition. (ibid)

Stigler was not exaggerating. As early as the 1890s, "economic non-conformity" was considered to be a new kind of heresy resulting in the persecution of economists like Richard T. Ely, Edward W. Bemis and Edward A. Ross (Goodwin 1998). Frederic Lee (2009:66) in his *History of Heterodox Economics* recounts how the mainstream community after the 1970s institutionalised McCarthyism and its values including anti-pluralism and "red scare-repression".[34] Bringing to life incidents of real persecution of scholars like Sweezy and Baran, Lee reconstructs the post-war demise of communist and non-communist radical economics schools. The changing political and social atmosphere in the 1960s with the rise of the rise of the New Left, the civil rights movement and anti-Vietnam war protests, brought a partial respite to outright political repression; the "pro-free enterprise" outlook of capitalism, however, was already well-entrenched in academia together with mainstream theorising and methodology (Fourcade 2009:160–61; Lee 2009). In the 1970s, dissenters had started feeling the censorship of the orthodoxy accompanied by the imposition of a consensus that considered economists as "technicians with access to a specialized body of knowledge that could be applied" (Backhouse 2005:387).

In contrast to the hardship accompanying dissent and diversity, membership to the mainstream scientific community brings privileges and advantages. Adherence to the scientific community of mainstream economics benefits from the support of other patrons besides universities: Government, the business community, charitable or other foundations and free market think tanks provide extra opportunities of entrepreneurship (Backhouse 2005:386; Goodwin 1998). Making life and work easier for the practitioners of the mainstream scientific community, generous patronage also directs and shapes the paradigm. Sonja Amadae (2003) has exposed the role of the RAND Corporation in the development of rational choice theory that become a cornerstone of mainstream economics expanding to the social science field and the mainstream

[34] Schrecker (1986) meticulously documents the repression of academics during the Great Depression and in the period before and after the Second World War culminating in the Cold War anti-Communist crusade led by Senator McCarthy.

economics community. Starting with a RAND internship, Kenneth Arrow's career "as a key contributor to the neoclassical synthesis in economics is inseparable from his Cold War policy role" (Amadae 2003: 85).

In the post-crisis context, the roots, the pathways of influence and the implications of a closely knit academic, governmental, financial and corporate complex are exposed in detail in Mirowski (2013) who demonstrates how this complex ensured immunity to mainstream economists, banks, hedge funds and ratings agencies (Mirowski 2013:216). As Fourcade (2009:454) observes:

> If professions are essentially about securing rents, then how the particular profession of economics allows (or does not allow) its members to make money in different countries is of paramount importance to its structure as well as its ideational dimensions. The United States occupies a unique place in this narrative. (Ibid)

As members of an elite powerful group bound by the dominant paradigm, mainstream economists have no interest in highlighting anomalies and institutional constraints such as mechanisms of "dangerous interconnectedness", which implicate them in conflicts of interest through their private ties to the financial sector (Carrick-Hagenbarth and Epstein 2012). These members of the mainstream scientific community populate mostly the hard-line, 'loyalist' no change group.[35] Posner (2008:258) names economists' close involvement with the financial sector as one of the reasons for their ignoring pre-crisis warnings:

> They are not armchair theoreticians. They are involved in the financial markets as consultants, investors, and sometimes money managers. Their students typically have worked in business for several years before starting business school, and they therefore bring with them to the business school up-to-date knowledge of business practices.

In her account of the rise of conservativism in the US, Phillips-Fein (2009) traces how the "invisible hands" of business from the 1930s to the Reagan era organised, funded and fostered think tanks and foundations such as the Foundation for Economic Education and economists like Friedman and Hayek and other Mont Pèlerin Society members; such channels conducted a massive populist campaign of political indoctrination in the virtues of capitalism. In this light, it may be little wonder that

[35] Carrick-Hagenbarth and Epstein (2012:124) name Alan Blinder, Charles Calomiris, Richard Herring, John Taylor, Jeremy Stein, Andrew Bernard, John Campbell, John Cochrane, Douglas Diamond, Darrell Duffie, Kenneth French, Anil Kashyap, Frederic Mishkin, Raghuram Rajan, David Sharfstein, Robert Shiller, Hyun Song Shin, Matthew Slaughter, and Rene Stulz.

recipients of the Swedish Central Bank's Prize in economics, including Gary Becker, Kevin Murphy and Myron Scholes, rally to defend capitalism mingling with politicians, corporate CEOs and financiers in forums such as the Milken Institute, founded by the notorious profiteer Michael Milken[36] who was convicted in 1991 for six felonies, including insider trading, fraud, and bribery. In all, the interplay between neoliberalism and the increasingly neoliberal economics profession (Mirowski 2006), the arrogance and the privileges of the orthodox élite, including 90 per cent of Nobel prizes in economics, (Milonakis and Fine 2011:16), the Americanisation of the discipline (Fine and Milonakis 2009:136–7) and the impact of the Chicago School (Caldwell 2011; Nik-Khah and Van Horn 2012) underscore the value-system that emerges at the post-crisis discourse of the mainstream scientific community. The 'Americanisation' of the profession, in particular, along with the conceptual and methodological underpinnings of mainstream economics encompasses the disproportionate access to "journals, textbooks, appointments, doctoral training, even Nobel Prizes, by a limited range of institutions and individuals" (Fine 2002:2063).

Regarding the educational responsibility of the scientific community, Kuhn's analysis provides insights into the development of economics education. For, Kuhn (1962:4-5, 161) noted how the scientific community like a medieval guild transmits received beliefs via the "rigorous and rigid" education that "licenses the student for professional practice" ensuring that the received beliefs exert a "deep hold" on the student's mind: "in learning a paradigm the scientist acquires theory, methods, and standards together, usually in an inextricable mixture." The Chicago School provides an example. Its distinct sub-culture or style relied on the tough PhD programme, rigorous training in price and monetary theory and intensive workshops (Reder 1982). Views falling outside of the paradigm were not tolerated. The community penalised views seen to "violate any maintained hypothesis of the paradigm" considering diversity as a failure to take in the school's rigorous standards; empirical research was evaluated by standards that required findings to be "consistent with the implications of standard price theory" (Reder 1982: 13, 19).

[36] On Milken's shady dealings in junk bonds involving savings and loan associations see Akerlof and Schiller (2010:30–3).

Exerting a stronger influence than generally believed, economics textbooks crystallise the paradigm in its rudimentary form providing the entry point of the initiation process through which students are admitted into the economics profession (Argyrous 1992:234). The increasing formalisation and mathematisation of the discipline is manifest in "the high degree of uniformity in the undergraduate and graduate curricula and in the leading textbooks" (Coats et al. 2000:145). Furthermore, as "authoritative" sources of education textbooks perpetuate normal science by systematically concealing "the existence and significance of scientific revolutions" focusing on already articulated "problems, data, and theory" within the paradigm (Kuhn 1962:136–38). In other words, textbooks make scientific revolutions invisible. They convey only "the stable outcome of past revolutions"; importantly, the history of the discipline is removed from textbooks "truncating the scientist's sense of his discipline's history" (Kuhn 1962:137). It is hardly surprising, then, that "economics as normal science misrepresents the history of economics thought" just as "it misrepresents economic realities" (Fine 2004:135 fn.3).

No wonder, then, that an increasingly asocial and ahistorical economics education has steadily served to strengthen the dominance of the mainstream paradigm together with its conceptual and methodological underpinnings and its discursive frame marginalising alternative views and research paths:

> This dominance has brought with it a total indifference and an intellectually frightening treatment of the history of economic thought and of methodology both of which have been dropped from most undergraduate and postgraduate courses in economics. (Milonakis 2012:251)

Students in top Anglo-American economics departments are required to be proficient in mathematics: the implication is that these students may graduate with the highest grades without having read a single word of Adam Smith, Marx, Mill, Keynes, Schumpeter or Hayek (Hodgson 2009a:1208; Skidelsky 2010). Fifty five years later and following a major economic crisis, economics students at the University of Manchester report that economics education at Manchester has elevated one economic paradigm, neoclassical economics, to the only object of study in the field as if it "represented universally established truth or law" and emphasise that syllabuses are almost homogenous in many English universities (The Post-Crash Economics Society 2014). Similarly, 65 student

associations from 30 countries around the world launched a call for pluralism in economics[37] protesting against the narrowing of the curriculum over the last couple of decades and the crippling lack of intellectual diversity in education and research. Yet, major changes in economics curricula should not be expected. Macro should not be taught like a "course in the history of economic thought" given that "the mainstream is much more integrated": when lessons from the financial crisis have been learnt, "the basics of the macroeconomics we teach will still be there" (Wren-Lewis 2012, 2013). According to Gregory Mankiw (2009), author of two widely used textbooks, some subtle changes may come in response to recent events: yet, despite the enormity of the economic crisis, students still need to learn the "bread-and-butter of introductory courses", namely "gains from trade, supply and demand, the efficiency properties of market outcomes, and so on". In brief, economics education, too, may see "adjustments but no paradigm shift" (Saint-Paul 2010). Even if pluralist adjustments to economics education materialise, inevitably questions arise as to who is going to teach the new curricula. For, in the post-crisis professional landscape of mainstream economics, the picture is complex:

> Hedge funds run by economists blow up: Tenured economists who run hedge funds do not. Promotion depends upon tenure and that depends upon acceptance of the reigning paradigm that all the people reading your tenure file created. As such, adding incrementally to the existing corpus of knowledge rather than nailing contrarian theses to the disciplinary door is the way to succeed. (Blyth 2013:13)

At the same time, the censoring function of the paradigm as practiced by the gatekeeper community prevents articles that strongly challenge the dominant paradigm from getting published in major journals where referees are consistently prominent exponents of the paradigm (Williams and McNeill 2005:8). Can initiatives like the Institute for New Economic Thinking (INET) funded generously by financier George Soros prompt a change in the attitude of the mainstream scientific community and its economic thinking mindset? Despite a promising start, recent evidence cautions that this initiative could be a "Trojan horse of the financial oligarchy, meant to control the movement for reform of economics" (Haering 2014).

In conclusion, the foregoing discussion suggests that the mainstream scientific

[37] http://www.isipe.net/open-letter/

community and its particular sociological/institutional parameters including a deep belief in the superiority of the capitalist system have played an important role that critically restricts prospects for a paradigm change in the discipline.

5. SUMMARY AND DISCUSSION: THE WAY FORWARD?

Drawing on Kuhnian insights, this paper examined the prospects of a paradigm change in mainstream economics. The attempt was made to elucidate whether the recent economic crisis set in motion a paradigm change in mainstream economics arguing that theoretical and institutional /sociological parameters constrain the prospect of a paradigm change and inhibit the generation of new knowledge. To explore this argument, post-crisis 'intra-paradigm' mainstream responses were examined and evaluated.

Identifying three main groups of responses, our analysis indicated that in stark contrast to the intensity and the charged rhetoric of the debate, the mainstream soul-searching exercise has been short lived and lacking in in-depth critical self-reflection. 'Business as usual' or normal science was quickly resumed as the mainstream establishment largely advanced the idea that nothing really problematic has occurred confirming the views of other commentators (Fine and Milonakis 2011; Mirowski 2013; Palley 2012). Normal science could continue as usual because the mainstream establishment (a) did not find anything to be amiss in mainstream economics, (b) identified some minor challenges or (c) felt that where appropriate Kuhnian mopping up operations could fix problems by repairs. The unifying concern emerging in all three groups is to ensure tradition and the continuity of the dominant paradigm. In other words, the "obvious" is not to throw out the baby and the bathwater:

> It is important to start by stating the obvious, namely, that the baby should not be thrown out with the bathwater. Most of the elements of the precrisis consensus, including the major conclusions from macroeconomic theory, still hold. (Blanchard, Dell'Ariccia, and Mauro 2010:10)

The framework for a post-crisis change in mainstream global paradigm ultimately remains confined within efficient markets (EMH), rational expectations hypothesis (REH) and DSGE models, which appear to be designated as universal scapegoats detached from the history and the conceptual underpinnings of mainstream

economics. According to critical insider mainstream views, fixing the subparadigms of EMH, REH and the DSGE models by some repairs is what economics needs. For example, "putting financial frictions into DSGE models is an urgent activity, on which many scholars are now engaged. Ditto, learning, and credit or money" (Coyle 2012b). Our research could not identify any evidence that such mopping up operations are underway suggesting that even minor repairs remain limited to discourse or are not feasible. The profession can learn to "live with not-so-efficient markets" (Zingales 2010).

The manner in which the mainstream of the profession treated anomalies that were exposed by the crisis provides a further analytical insight to our discussion. First, the hard line 'loyalist' group refuses to recognise any anomaly at all including the existence of bubbles. Influential members of the scientific community manifest a kind of cognitive blindness or agnosticism as regards everything that went beyond the guiding assumptions of the paradigm. Second, the insider-critic group recognises anomalies exposed in the course of the crisis but opts to treat manifest serious anomalies as "puzzles" or minor irritants in the routine of normal science that can be mopped up to fit "the preformed and relatively inflexible box that the paradigm supplies" (Kuhn 1962:24). Notwithstanding that anomalies are numerous, prolonged, severe and quantitative, the mainstream of the profession acts in the manner suggested by Kuhn (1962:77) for scientists who are "confronted by even severe and prolonged anomalies":

> Though they may begin to lose faith and then to consider alternatives, they do not renounce the paradigm that has led them into crisis. They do not, that is, treat anomalies as counter-instances, though in the vocabulary of philosophy of science that is what they are.

Instead, the application of layers of repairs is chosen to ensure continuity and tradition in the paradigm. Yet, even before the crisis new features were introduced to smooth out manifest divergences between prediction and data in DGSE models so that each new layer created a new set of puzzles (Driffill 2011:2). This approach, then, increasingly converts the paradigm into a Ptolemaic system of "compounded circles", whose "complexity was increasing far more rapidly than its accuracy" so that "a discrepancy corrected in one place was likely to show up in another" (Kuhn 1962:68).

Yet, if anomalies were to be recognised as epistemological counter-instances, rather than minor irritants, they would "help to permit the emergence of a new and different analysis of science within which they are no longer a source of trouble" (Kuhn 1962:78). Should this happen, mainstream economics could no "longer evade anomalies that subvert the existing tradition of scientific practice" and would have to engage in the "extraordinary investigations that lead the profession at last to a new set of commitments, a new basis for the practice of science" (Kuhn 1962:6). This does not seem to be the case.

Conversely, the mainstream scientific community appears to be engaged in preserving the black box rather than engaging in a course that can generate new knowledge. Secure within the guidelines supplied by the paradigm, the mainstream scientific community remains unshaken by the anomalies that the crisis exposed. At the same time, the scientific community component of mainstream normal science with its underlying value system and particular sociology emerges as the paradigm gate keeper and validator of knowledge consolidating the paradigm's immunity to change. The sociological/institutional parameters that define the mainstream scientific community help elucidate why anomalies exposed by the crisis are either bypassed or mopped up by mainstream economists. In the physical sciences, prolonged and severe anomalies would challenge at worst, the prestige or the psychological "integrity" of a scientist while in mainstream economics his/hers "moral position as a member of a social order" is at stake:

> The discovery of unexpected results in the social universe almost invariably threatens or confirms the legitimacy of the social system of which the social investigator is unavoidably a part. (Heilbroner 1973:139)

In sum, our discussion strongly suggests that contrary to expectations the present crisis has not driven serious changes, let alone a paradigm shift in mainstream economic theorising and practice. Therefore, the crisis in economics that was brought to the fore by the recent economic and financial crisis cannot be resolved within the boundaries of the current paradigm and the specific scientific community. Our research suggests that both the paradigm and the scientific community inherently inhibit change and contribute fundamentally to a static, monolithic paradigm that is resistant to change. This leaves a small margin of hope that in the future anomalies will build up to an extent that will

spark a process of paradigmatic change while generation of new knowledge cannot be envisaged within the paradigmatic boundaries.

5.1 The way forward: an assessment

What is, then, the way forward for economics? Leaving aside pleas for more mathematics, our examination of the 'intra-paradigm' responses indicated two more options which deserve closer examination. A Keynesian revival evoking the change that followed the Great Depression and shifting the emphasis to behavioural economics have been suggested as hopeful future avenues for economics. In this light, two questions need to be addressed.

First, is a return to Keynes feasible? The Keynesian revival option appears mainly in the insider critics (c) group. Perplexed by the state of economics and the profession, Posner (2009c) found a transformative revelation in Keynes. For Krugman "Keynesian economics remains the best framework we have for making sense of recessions and depressions" (Krugman 2009b). Overall, the mainstream notion of a Keynesian revival focused on irrationalities of human psychology that affect market behaviour and the animal-spirits associated with the work of Akerlof and Shiller (Fine and Milonakis 2011:17). Akerlof and Shiller (2010:xi) propose to develop "the role of animal spirits in macroeconomics in a way that the early Keynesians could not" and build an unassailable theory centered on animal spirits instead of sweeping them under the carpet. Yet, there is nothing to suggest that the Keynesian revival goes beyond the level of discourse. On the contrary, the mainstream establishment rushed in to restrain Keynesianism (Barro 2009a; Sachs 2010; Zingales 2009b) or dismiss Keynes and Keynesian "interventionist policy" with fiscal stimulus packages (Cochrane 2011, Taylor 2014a). The return to Keynes for the mainstream of the profession appears as a transitory idea peaking in early 2009 and subsiding by mid-2010 (Farrell and Quiggin 2012). DeLong (2010, 2014) who initially called for a paradigm change in economics, later on felt that "Keynes & Co lost the stimulus argument".

Second, can behavioural economics suffice for a paradigmatic change? In the wake of the financial crisis, new impetus to behavioural economics comes from the search to explain events that appeared to falsify a paradigm which assumes that markets

are efficient and equilibrating (Dow 2013:27). Proposed as a promising path that challenges the rationality postulate, the case of behavioural economics—and its subfields—provides a useful touchstone to determine how mainstream economists envisage change. Across all mainstream response groups, behavioural economics appears to provide all at once an explanation for the crisis, a proof of diversity and a hopeful prospect for the future. Fama who staunchly defends EMH saying that the theory "did quite well" during the crisis, argues that behavioural research by Chicago economists explains how individual behaviour diverges from rationality and praises the originality of Steve Levitt, the father of the 'freakonomics' genre (Cassidy 2010a).[38] Akerlof and Shiller (2010:4, ix) recall Keynes' view that "animal spirits are the main cause" for market fluctuations as well as involuntary unemployment. They argue that changing thought patterns in terms of confidence, temptations, envy, resentment, illusions and "changing stories" about the economy are "precisely" what caused the crisis. Policymakers like former ECB president Trichet (2010) call for behavioural economics to provide alternative motivations in choice analysis. According to Diane Coyle (2010), "seasoning" economics with psychology, particularly in behavioural finance and consumer research, will hopefully improve economics and policy options. Dale Mortensen (Hoover and Young 2013:1189) thinks that there are real issues, where behavioural economics can "make a very big contribution" to what the rest of economists does. Blaming human frailty, greed, corruption and leverage for the crisis, Richard Thaler (Clement 2013; 2008), a pioneer of behavioural economics at Chicago, sees a slow but certain current towards behavioural economics that will change economics.

Furthermore, a strand in recent literature that includes non-mainstream views identifies signs of positive change pointing to a pluralist future for the discipline in the emergence of new subfields and research tracks most of which are connected to behavioural research. These include various non-neoclassical new subfields, focal points and research tracks such as evolutionary, experimental economics, complexity

[38] According to Fama, Levitt is a "very unusual" economist who continues and extends Gary Becker's research "taking over" microeconomics (Cassidy 2010).

economics, game theory, neuroeconomics, market design economics[39] and others. The new research paths are seen as signs of diverse and constantly changing "substantive content, focus and policy orientations" (Lawson 2013). Pioneering "work at the edge of economics" is considered to drive the dynamics of change in mainstream economics (Colander et al. 2004:486–89).[40] The case of a "reverse imperialism" from other fields into economics and its implications for pluralism is explored (Davis 2008b; Frey and Benz 2004). In particular, the economic crisis is seen to mark the end of the "dominant neoclassical paradigm" that is gradually replaced by behavioural economics (Heukelom and Sent 2010:26, 34). The dynamics of this change are found to establish an 'inside-the-mainstream heterodoxy' within modern economics (Colander 2009) reinforcing pluralism and decentralisation (Davis 2006, 2008a; Sent 2006). Even the trivialisation of economics by the 'freakonomics[41] genre is considered a driver of change that enhances our understanding of "social cooperation and progress" (Boettke, Leeson, and Smith 2008:14).

Coming from both mainstream and non-mainstream voices, these arguments call for an assessment. To recall Kuhn, a prerequisite of paradigm change is the existence of an alternative convincing new paradigm. Can, then, behavioural economics and the related new subfields and research paths provide the foundation of a convincing alternative paradigm challenging mainstream beliefs and tenets? After all, groundbreaking cross-cultural research has convincingly contested the universality of the homo economicus prototype refuting the "adequacy of self-interest as a behavioral foundation for the social sciences" (Henrich et al. 2005:997). Other experiments have shown that people

[39] Defined as the engineering domain of economics "intended to further the design and maintenance of markets and other economic institutions" , design economics is considered a "natural complement" to game theory together with experimental and computational economics (Roth 2002:1341–42). Design economics examines efficient markets focusing on institutional structure and pricing mechanisms to create efficient markets or reform inefficient ones (Davis 2008a:11).

[40] According to Colander, the edge of economics accommodates mainstream critics of the orthodoxy, and the part of heterodox economics which is taken seriously by the elite of the profession (Colander, Holt, and Rosser 2004:492)

[41] The term 'freakonomics' denotes the application of economic principles to unusual issues and paradoxical facts seemingly alien to economics which trivialises economics by selecting topics that allow simple explanations (Backhouse 2012:231). Fine and Milonakis (2009) expose freakonomics as a most extreme form of economics imperialism that advances its colonising designs on the other social sciences.

sacrifice their own gains exhibiting a large range of other-regarding behaviour (Fehr and Schmidt 2006; Hoffman, McCabe, and Smith 1996). In other words, massive evidence from laboratory or open-air field experiments has shown that human beings behave in ways that contradict rational choice theory. 'Anomalies' in human behaviour have provided scope for research on loss aversion, altruism, preference reversals, endowment effects, framing effects, availability bias, and so on (Hands 2007:6).

The starting point of our assessment regards the sincerity of mainstream pleas for behavioural research. For, mainstream economists who identify promises in behavioural research, at the same time express reservations about its efficacy. The field is found lacking in terms of providing mathematical models that could predict depressions or offer recovery solutions (Posner 2009d). Robert Shiller (Hoover and Young 2013:1188) thinks that behavioural economics does not provide "elegant behavioral economics models". Another argument deplores the lack of a uniform framework in new behavioural fields which prevents an assessment to determine whether psychologically richer assumptions are scientifically superior to the "good old" neoclassical self-interest assumption (Coyle 2010:133, 149). Behavioural economics appears to be perceived as a complementary embellishment that can improve but not really change economics. To serve the future of economics, behavioural approaches should aim to steer the field towards the "more serious task of restating, re-applying, and extending the tools of traditional economics" (Harrison 2010). Furthermore, scholars who see a wind of change do not really anticipate or hope for a Kuhnian paradigm shift, let alone a scientific revolution. As Colander (2004:485, 488–89; 2009) assures his readers, the "stealth change" in mainstream methodology comes "from within"; it is not a Kuhnian paradigm shift that could replace neoclassical orthodoxy with a heterodox alternative.

Indeed, the recent subfields and research tracks come from within and remain within the core methodological principles of the paradigm, namely methodological individualism and equilibrium while they rely on mathematical modelling and other sophisticated formalised techniques. Behavioural economists themselves profess unwillingness to deviate from mainstream standards. According to prominent behavioural economist Camerer and his colleagues, providing more realistic

psychological foundations that enhance the explanatory power of economics does not mean breaking away from the dominant paradigm. This is how they describe what behavioural economics tries to do:

> At the core of behavioral economics is the conviction that increasing the realism of the psychological underpinnings of economic analysis will improve the field of economics *on its own terms*—generating theoretical insights, making better pre- dictions of field phenomena, and suggesting better policy. *This conviction does not imply a wholesale rejection of the neoclassical approach to economics based on utility maximization, equilibrium, and efficiency.* The neoclassical approach is useful because it provides economists with a theoretical framework that can be applied to almost any form of economic (and even noneconomic) behavior, and it makes refutable predictions. (Camerer and Loewenstein 2004:4)[Emphasis added]

According to Nobel laureate Daniel Kahneman (2003:1469), theories in behavioural economics retain "the basic architecture of the rational model, adding assumptions about cognitive limitations designed to account for specific anomalies". Considered as the founding father of behavioural finance, Richard Thaler does not at all reject the fundamentals of mainstream economics such as supply and demand or cost-benefit analysis: "it's just that the frame of analysis needs considerable broadening" (Clement 2013).

So, even if homo economicus has evolved to resemble a human being, much of behavioural economics maintains the framework of methodological individualism. The individual may be irrational or altruistic but she/he still provides the building block of mainstream economic explanations: complex socio-economic phenomena are analysed focusing on the individual and deploying the analytic-synthetic method to understand the whole. Experiments are designed to observe self-interested behaviour by isolating individuals from social interaction in order to make experiments conform accurately to the theoretical framework based on methodological individualism and the rationality principle (Dow 2013:33–34). Exploring the neurological basis of decision making in humans and other species, neuroeconomics actually seeks to provide new physiological and evolutionary grounds to reinforce rational choice theory (Hands 2007:10). Berg and Gigerenzer (2010:162) found pervasive similarity and common constraints in the methodological foundations and the scientific standing of neoclassical and behavioral research programs. The two scholars (2010:141, 133, 134) emphasise that behavioural economics overly relies on Friedman's 'as-if' canon to validate empirically weak

'psychological' models which refer to neoclassical axiomatic norms without subjecting them to empirical investigation. Behavioural economics ultimately evolved into "economics based on its use of mathematical modeling" arguing that without mathematics we cannot assess the usefulness of psychological insights; in incorporating these insights the "economist's principal objective is to engineer individuals' behavior to more rational expressions of their preferences" (Heukelom 2014:200).

Thus, while questioning certain aspects of the neoclassical paradigm, the new research programmes literally linger at the margin of mainstream economics without introducing "a new entry point to economic theorizing, a genuine break from and beyond neoclassical economics" (Wolff and Resnick 2012:288). Hence, the new behavioural approaches essentially can be seen as modified variations of the mainstream paradigm. Despite importing concepts and tools from other disciplines, the new behavioural research paths confirm the view expressed by Fine (2013:7) that the "unyielding core" in mainstream economics retains its strength.

Summarising, mainstream economists explore and accept certain behavioural anomalies or stylised facts that do not require any substantive change in the enduring core of the dominant paradigm. This is in line with the strong record of mainstream economics for tolerating anomalies, particularly those that traverse the sub-disciplines, "on a scale that would be impossible in most natural sciences—and would be regarded as a scandal if they were" (Lipsey 2001:173). Instead of addressing anomalies , then, behavioural approaches ensure the continuity of the paradigm by focusing selectively on what kind or which aspect of psychology suits the given the goals/interests of individual economic theorists and/or the profession in general (Hands 2009). Two decades of behavioural research has not induced significant revisions of microeconomics, much less macroeconomics (Mirowski 2013:259). Hence, it is not reasonable to expect that more behavioural research of the same configuration can prompt a change akin to a post-crisis paradigm shift, let alone a revolution. As emphasised by a leading exponent of the field (Rabin 2002:658–59), while broadening the scope of economics, psychological economics remains confined within the "spirit of economics" much like game theory: it does not propose a "paradigm shift in the basic approach" but is "destined to be absorbed" by economics and not exist as an alternative approach. In this

respect, Gary Becker's assessment should be heeded:

> In fact, I do not think that behavioral economics is a revolution. However, it has added some insights into human behavior and those insights, to the extent that they are verifiable, will be absorbed into the rational choice model. They will not lead to a radical change of the model. (Herfeld 2012:79)

6. FINAL REFLECTIONS

History, if viewed as a repository for more than anecdote or chronology, could produce a decisive transformation in the image of science by which we are now possessed. (Kuhn 1962:2)

Despite its logical contradictions, accumulating empirical anomalies and the crisis, the mainstream paradigm and its bedrock neoclassical theory have not collapsed. The dominant paradigm comes out of the crisis not only unchanged but with its core theoretical architecture and technical toolkit reinforced (Fine 2013:6). Its overall structure has remained largely unchanged for more than a century—a achievement not found in any other science; thanks to the help of substantial business and government subsidies it has managed to marginalise all alternative approaches and its theoretical competitors (Nitzan and Bichler 2009:83). Participating in a panel to commemorate the 50th anniversary of John Muth's article on rational expectations, Michael Lovell, Robert Lucas, Dale Mortensen, Robert Shiller, and Neil Wallace unanimously concluded that for the coming fifty years rational expectations will continue to play an essential role in the future development of economics (Hoover and Young 2013:1191). As stated by Shiller at the same event: "Kuhn talks about scientific revolutions throwing out theories. This is not a theory that's going to be completely thrown out".

Still, few fields of scientific inquiry have as many social, political, and economic implications as economics. If new approaches and research programmes do not really change the mainstream paradigm, the unsettling question that emerges is "whither economics"? Is economics destined to remain in a "state of Ptolemaic astronomy that was a scandal" before the Copernican revolution (Kuhn 1962:67) with rationality looming large after 50 years? The answer is not an easy one. Instead of an answer we can pose another line of reasoning and another question. Economics essentially remains "an explanation system whose purpose is to enlighten us as to the workings, and therefore to the problems and prospects, of that complex social entity we call the

economy […] If economics is not to be a science of society, what is to be its ultimate usefulness" (Heilbroner 1999: 311, 319)?

7. REFERENCES

Acemoglu, Daron. 2009. "The Crisis of 2008: Lessons for and From Economics." *Critical Review* 21(2-3):185–94.

Akerlof, George A., and Robert J. Shiller. 2010. *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*. Princeton University Press.

Altig, David. 2009. "Economists Got It Wrong, but Why." *Federal Reserve Bank of Atlanta, Macroblog - September 10* 10. Retrieved (http://macroblog.typepad.com/macroblog/2009/09/economists-got-it-wrong-but-why.html).

Amadae, Sonja M. 2003. *Rationalizing Capitalist Democracy*. Chicago IL: University of Chicago Press.

Archer, Margaret Scotford. 2000. "Homo Economicus, Homo Sociologicus and Homo Sentiens." Pp. 36–57 in *Rational Choice Theory. Resisting Colonization*, edited by Marg aret S. Archer and Jonathan Q. Tritter. London & New York: Routledge.

Arestis, Philip. 2009. "New Consensus Macroeconomics : A Critical Appraisal." *The Levy Economics Institute of Bard College - Working Paper No. 564.* 1–26.

Argitis, Georgios. 2013. "The Illusions of The 'new Consensus' in Macroeconomics: A Minskian Analysis." *Journal of Post Keynesian Economics* 35(3):483–505.

Argyrous, George. 1992. "Kuhn's Paradigms and Neoclassical Economics." *Economics and Philosophy* 8(02):231–48.

Arnsperger, Christian, and Yanis Varoufakis. 2006. "What Is Neoclassical Economics? The Three Axioms Responsible for Its Theoretical Oeuvre, Practical Irrelevance And, Thus, Discursive Power." *Panoeconomicus* 53(1):5–18.

Ascari, Guido. 2011. "Macroeconomic Models: Better Horses for Tougher Courses." *The Manchester School Supplement* 79(2):17–20.

Backhouse, Roger E. 2000. "Progress in Heterodox Economics." *Journal of the History of Economic Thought* 22(02):149–55.

Backhouse, Roger E. 2005. "The Rise of Free Market Economics: Economists and the Role of the State since 1970." *History of Political Economy* 37(Suppl 1):355–92.

Backhouse, Roger E. 2012. "Economics Is a Serious and Difficult Subject." *Journal of Economic Methodology* 19(3):231–41.

Baily, Martin Neil, and John B. Taylor, eds. 2014. *Across the Great Divide: New Perspectives on the Financial Crisis*. Hoover Institution Press.

Barro, Robert J. 2009a. "Government Spending Is No Free Lunch." *Wall Street Journal (January 22)*.

Barro, Robert J. 2009b. “Lucas Roundtable: Don’t Fault the Economists.” *Economist. com November 9th*.

Becker, Gary S. 1976. *The Economic Approach to Human Behavior*. Chicago: University of Chicago Press.

Becker, Gary S. 1993. *Treatise on the Family*. Cambridge MA: Harvard University Press.

Becker, Gary S., and Kevin Murphy. 2009. “Do Not Let the ‘cure’destroy Capitalism.” *Financial Times- March 19*. Retrieved (http://tinyurl.com/l3lfay3).

Berg, Nathan, and Gerd Gigerenzer. 2010. “As-If Behavioral Economics: Neoclassical Economics in Disguise?” *History of Economic Ideas* 18(1):133–66.

Bernanke, Ben S. 2004. “The Great Moderation.” *Remarks at the meetings of the Eastern Economic Association Federal Reserve Board* - Febr. 20.

Bernanke, Ben S. 2010. “On the Implications of the Financial Crisis for Economics.” *Conference Co-sponsored by the Center for Economic Policy Studies and the Bendheim Center for Finance, Princeton University* (Sept. 24).

Bird, Alexander. 2002. “Kuhn’s Wrong Turning.” *Studies in History and Philosophy of Science Part A* 33(3):443–63.

Bird, Alexander. 2012. “The Structure of Scientific Revolutions and Its Significance: An Essay Review of the Fiftieth Anniversary Edition.” *The British Journal for the Philosophy of Science* 63(4):859–83.

Bird, Alexander. 2013. “Thomas Kuhn.” in *The Stanford Encyclopedia of Philosophy*, edited by Edward N Zalta. http://plato.stanford.edu/entries/thomas-kuhn/.

Blanchard, Olivier J. 2008. “The State of Macro.” *NBER Working Paper No.14259*.

Blanchard, Olivier J., Giovanni Dell’Ariccia, and Paolo Mauro. 2010. “Rethinking Macroeconomic Policy.” *Journal of Money, Credit and Banking* 42(1):199–215.

Blanchard, Olivier, David Romer, Michael Spence, and Joseph Stiglitz, eds. 2012. *In the Wake of the Crisis: Leading Economists Reassess Economic Policy*. Cambridge MA & London: MIT Press.

Blaug, Mark. 1975. “Kuhn versus Lakatos, or Paradigms versus Research Programmes in the History of Economics.” *History of Political Economy* 7(4):399–433.

Blaug, Mark. 1992. *The Methodology of Economics: Or, How Economists Explain*. 2nd ed. Cambridge MA: Cambridge University Press.

Blinder, Alan S. 2014. “Federal Reserve Policy Before, During, and After the Fall.” Pp. 84–97 in *Across the Great Divide: New Perspectives on the Financial Crisis*, vol. 652, edited by Martin Neil Baily and John B. Taylor. Hoover Institution Press.

Blyth, Mark. 2013. “Paradigms and Paradox: The Politics of Economic Ideas in Two Moments of Crisis.” *Governance* 26(2):197–215.

Boettke, Peter J., Peter T. Leeson, and Daniel J. Smith. 2008. “The Evolution of Economics: Where We Are and How We Got Here.” *Long Term View* 7(1):14–22.

Bresser-Pereira, Luiz Carlos. 2009. “The Two Methods and the Hard Core of Economics.” *Journal of Post Keynesian Economics* 31(3):493–521.

Bresser-Pereira, Luiz Carlos. 2010. “The Global Financial Crisis and Neoclassical Economics.” *Brazilian Journal of political Economy* 30(1):3–26.

Bronfenbrenner, Martin. 1971. “The ‘Structure of Revolutions’ in Economic Thought.” *History of Political Economy* 3(1):136–51.

Bryan, Dick, Randy Martin, Johnna Montgomerie, and Karel Williams. 2012. “An Important Failure: Knowledge Limits and the Financial Crisis.” *Economy and Society* 41(3):299–315.

Bryan, Dick, and Michael Rafferty. 2005. *Capitalism with Derivatives: A Political Economy of Financial Derivatives, Capital and Class*. Cheltenham, UK: Edward Elgar Publishing.

Buiter, Willem H. 2009. “The Unfortunate Uselessness of Most ‘State of the Art’ Academic Monetary Economics.” *The Financial Times, 3 March*.

Caldwell, Bruce J. 1994. *Beyond Positivism: Economic Methodology in the Twentieth Century*. London and New York: Routledge.

Caldwell, Bruce J. 2011. “The Chicago School, Hayek, and Neoliberalism.” Pp. 301–34 in *Building Chicago Economics: New Perspectives on the History of America’s Most Powerful Economics Program*, edited by Robert Van Horn, Philip Mirowski, and Thomas Stapleford. Cambridge and New York: Cambridge University Press.

Camerer, Colin, and George Loewenstein. 2004. “Advances in Behavioral Economics.” in *The roundtable series in behavioral economics*, edited by Colin Camerer, George Loewenstein, and Matthew Rabin. New York: Russell Sage Foundation & Princeton University press.

Cameron, John, and Karin Astrid Siegmann. 2012. “Why Did Mainstream Economics Miss the Crisis? The Role of Epistemological and Methodological Blinkers.” *On the Horizon* 20(3):164–71.

Carrick-Hagenbarth, Jessica, and Gerald A. Epstein. 2012. “Dangerous Interconnectedness: Economists’ Conflicts of Interest, Ideology and Financial Crisis.” *Cambridge Journal of Economics* 36(1):43–63.

Cassidy, John. 2010a. “Interview with Eugene Fama.” *The New Yorker Blogs - January 13*. Retrieved (http://tinyurl.com/pcbrzmn).

Cassidy, John. 2010b. “Interview with Gary Becker.” *The New Yorker Blogs - January 14*. Retrieved (http://www.newyorker.com/rational-irrationality/interview-with-gary-becker).

Cassidy, John. 2010c. “Interview with James Heckman.” *The New Yorker Blogs - January 14*. Retrieved (http://www.newyorker.com/news/john-cassidy/interview-with-james-heckman).

Cassidy, John. 2010d. “Interview with John Cochrane.” *The New Yorker Blogs - January 13*. Retrieved (http://www.newyorker.com/rational-irrationality/interview-with-john-cochrane).

Cassidy, John. 2010e. “Interview with Kevin Murphy.” *The New Yorker Blogs - January 15*. Retrieved (http://www.newyorker.com/rational-irrationality/interview-with-kevin-murphy).

Clement, Douglas. 2013. “Interview with Richard Thaler.” *The Region - Federal Reserve Bank of Minneapolis*.

Coats, Alfred W. 1969. “Is There a Structure of Scientific Revolution in Economics?” *Kyklos* 22(2):289–96.

Coats, Bob A. W. et al. 2000. “Roundtable: The Progress of Heterodox Economics.” *Journal of the History of Economic Thought* 22(02):145–48.

Coats, Bob A. W. 2000. *The Development of Economics in Western Europe since 1945*. Cheltenham, UK: Edward Elgar Publishing.

Cochrane, John H. 2009. “Lessons from the Financial Crisis.” *Regulation* 32(Winter 2009-2010):34–37.

Cochrane, John H. 2011. “How Did Paul Krugman Get It so Wrong?” *Economic Affairs* 31(2):36–40.

Cohen, Robert Sonné, and Thomas Schnelle, eds. 1986. *Cognition and Fact: Materials on Ludwik Fleck*. Dordrecht, Holland: D. Reidel Publishing Company.

Colander, David. 2000. “The Death of Neoclassical Economics.” *Journal of the History of Economic Thought* 22(02):127–43.

Colander, David. 2009. “Moving Beyond the Rhetoric of Pluralism: Suggestions for an ‘Inside the Mainstream’ Heterodoxy.” *Middlebury College Economics Discussion Paper No. 09-15*.

Colander, David et al. 2009. “The Financial Crisis and the Systemic Failure of the Economics Profession.” *Critical Review* 21(2-3):249–67.

Colander, David. 2010. “The Economics Profession, the Financial Crisis, and Method.” *Journal of Economic Methodology* 17(4):419–27.

Colander, David, Richard Holt, and J. Barkley Rosser. 2004. “The Changing Face of Mainstream Economics.” *Review of Political Economy* 16(4):485–99.

Coyle, Diane M. 2010. *The Soulful Science: What Economists Really Do and Why It Matters*. Princeton University Press.

Coyle, Diane M. 2012a. “The Public Responsabilities of Economists.” *Tanner Lectures, Brasenose College, Oxford, 18-19 May*.

Coyle, Diane M. 2012b. *What’s the Use of Economics?: Teaching the Dismal Science After the Crisis*. London Publishing Partnership.

Coyle, Diane M. 2013. “How to Criticise Economics.” *The Enlightened Economist (November 5)*. Retrieved (http://www.enlightenmenteconomics.com/blog/index.php/2013/11/how-to-criticise-economics).

Davidson, Paul. 1996. “Reality and Economic Theory.” *Journal of Post Keynesian Economics* 18(4):479–508.

Davis, John B. 2003. *The Theory of the Individual in Economics: Identity and Value*. Cheltenham, UK: Edward Elgar Publishing.

Davis, John B. 2006. “The Turn in Economics: Neoclassical Dominance to Mainstream Pluralism?” *Journal of Institutional Economics* 2(1):1–21.

Davis, John B. 2008a. “The Change in and State of Recent Economics.” *The Long Term View* 7(1):7–13.

Davis, John B. 2008b. “The Turn in Recent Economics and Return of Orthodoxy.” *Cambridge Journal of Economics* 32(3):349–66.

Debreu, Gerard. 1986. “Theoretic Models: Mathematical Form and Economic Content.” *Econometrica* 54(6):1259–70.

DeLong, Bradford J. 2009. “Robert Waldmann on Justin Fox Trying to Referee John Cochrane v. Paul Krugman.” *October 08*. Retrieved (http://delong.typepad.com/sdj/2009/10/robert-waldmann-on-justin-fox-trying-to-referee-john-cochrane-v-paul-krugman.html).

DeLong, Bradford J. 2010. “Keynes & Co. Have Lost the Stimulus Argument.” *The Week (July 6)*. Retrieved September 5, 2014 (http://theweek.com/article/index/204665/keynes--co-have-lost-the-stimulus-argument).

DeLong, Bradford J. 2011. “What Have We Unlearned from Our Great Recession?” *The Berkeley Blog - 02 December*.

DeLong, Bradford J. 2014. “In What Sense Does Economics Need a ‘New Paradigm’?:” *Washington Center for Equitable Growth - May 6th*. Retrieved July 15, 2014 (http://equitablegrowth.org/2014/05/06/sense-economics-need-new-paradigm-thursday-focus-may-1-2014/).

DeMartino, George. 2011. “The Economic Crisis and the Crisis in Economics.” Pp. 25–44 in *Consequences of Economic Downturn: Beyond the Usual Economics*, edited by Martha A Starr. Palgrave Macmillan.

Dillard, Dudley. 1978. “Revolutions in Economic Theory.” *Southern Economic Journal* 44(4):705–24.

Dobusch, Leonhard, and Jakob Kapeller. 2012. “A Guide to Paradigmatic Self-Marginalization: Lessons for Post-Keynesian Economists.” *Review of Political Economy* 24(3):469–87.

Dow, Sheila C. 2004. “Structured Pluralism.” *Journal of Economic Methodology* 11(3):275–90.

Dow, Sheila C. 2007. “Heterodox Economics: A Common Challenge to Mainstream Economics?” Pp. 31–47 in *Macroeconomics and Macroeconomic Policies: Alternatives to the Orthodoxy*, edited by Eckhard Hein and Achim Truger. Cheltenham UK: Elgar.

Dow, Sheila C. 2013. “Formalism, Rationality, and Evidence: The Case of Behavioural Economics.” *Erasmus Journal for Philosophy and Economics* 6(3):26–43.

Drakopoulos, Stavros A. 1996. “Origins and Development of the Trend towards Value-Free Economics.” *MPRA Paper 15245* 19(2):286–300.

Drakopoulos, Stavros A., and Anastassios Karayiannis. 2005. “A Review of Kuhnian and Lakatosian ‘Explanations’ in Economics.” *History of Economic Ideas* XIII(2):51–73.

Driffill, John. 2011. “The Future of Macroeconomics: Introductory Remarks.” *The*

Manchester School Supplement 79(s2):1–4.

Eichengreen, Barry. 2008. "Origins and Responses to the Current Crisis." *CESifo Forum* 4:6–11.

Eichengreen, Barry. 2009. "The Last Temptation of Risk." *The National Interest* 30(June).

Eichengreen, Barry, and Michael D. Bordo. 2002. "Crises Now and Then: What Lessons from the Last Era of Financial Globalization." *National Bureau of Economic Research. Working Paper 8716*.

Eichner, Alfred S., and Jan Kregel. 1975. "An Essay on Post-Keynesian Theory: A New Paradigm in Economics." *Journal of Economic Literature* 13(4):1293–1314.

Engelen, Ewald et al. 2012. *After the Great Complacence: Financial Innovation and the Politics of Reform*. Oxford: Oxford University Press.

Fama, Eugene F. 1970. "Efficient Capital Markets: A Review Of Theory And Empirical Work." *The journal of Finance* 25(2):28–30.

Fama, Eugene F. 1991. "Efficient Capital Markets: II." *The journal of finance* XLVI(5):1575–1617.

Farrell, Henry, and John Quiggin. 2012. "Consensus, Dissensus and Economic Ideas: The Rise and Fall of Keynesianism during the Economic Crisis." *RSMG Working Paper: P11_2* 1–54.

Fehr, Ernst, and Klaus M. Schmidt. 2006. "The Economics of Fairness, Reciprocity and Altruism--Experimental Evidence and New Theories." Pp. 615–91 in *Handbook of the economics of giving, altruism and reciprocity*, vol. 1, edited by Serge-Christophe Kolm and Jean Mercier Ythier. Amsterdam: Elsevier.

Feldman, Ron. 2009. "Interview with Raghuram Rajan." *Federal Reserve Bank of Minneapolis* (December).

Feyerabend, Paul. 1970. "Consolations for the Specialist." Pp. 197–230 in *Criticism and the Growth of Knowledge. Proceedings of the International Colloquium in the Philosophy of Science, 1965 London.*, vol. 4, edited by Alan Lakatos, Imre and Musgrave. Cambridge: Cambridge University Press.

Feyerabend, Paul. 1991. *Three Dialogues on Knowledge*. Cambridge: Wiley-Blackwell.

Fine, Ben. 1980. *Economic Theory and Ideology*. London: Edward Arnold.

Fine, Ben. 1997. "The New Revolution in Economics." *Capital & Class* 21(1):143–48.

Fine, Ben. 1999. "A Question of Economics: Is It Colonizing the Social Sciences?" *Economy and Society* 28(3):403–25.

Fine, Ben. 2002. "Economics Imperialism and the New Development Economics as Kuhnian Paradigm Shift?" *World Development* 30(12):2057–70.

Fine, Ben. 2004. "Economics Imperialism as Kuhnian Revolution?" Pp. 107–44 in *The Rise of the Market Critical Essays on the Political Economy of Neo-Liberalism*, vol. 30, edited by Philip Arestis and Malcolm Sawyer. Cheltenham, UK: Edward Elgar Publishing.

Fine, Ben. 2013. "Unfit for Purpose: The Director's Cut." *SOAS Department of*

Economics Working Paper Series, No. 176.

Fine, Ben, and Dimitris Milonakis. 2009. *From Economics Imperialism to Freakonomics: The Shifting Boundaries between Economics and Other Social Sciences*. London & New York: Routledge.

Fine, Ben, and Dimitris Milonakis. 2011. "Useless but True: Economic Crisis and the Peculiarities of Economic Science." *Historical Materialism* 19(2):3–31.

Fleck, Ludwik. 1979. *Genesis and Development of a Scientific Fact*. edited by Thaddeus J. Trenn and Robert K. Merton. Chicago, IL.: University of Chicago Press (First published in German, 1935).

Fourcade, Marion. 2009. *Economists and Societies: Discipline and Profession in the United States, Britain, and France, 1890s to 1990s*. Princeton University Press.

Fox, Justin. 2014. "Will Economics Finally Get Its Paradigm Shift?" *Harvard Business Review Blog -April 28*.

Frey, Bruno S., and Matthias Benz. 2004. "From Imperialism to Inspiration: A Survey of Economics and Psychology." Pp. 61–83 in *The Elgar companion to economics and philosophy*, edited by John B. Davis, Alain Marciano, and Joachim Runde. Elgar.

Friedman, Milton. 1953. "The Methodology of Positive Economics." Pp. 3–43 in *Essays in Positive Economics*. Chicago & London: University of Chicago Press.

Fullbrook, Edward. 2003. "Real Science Is Pluralist." Pp. 118–24 in *The Crisis in Economics*, edited by Edward Fullbrook. London & New York: Routledge.

Fuller, Steve. 2000. *Thomas Kuhn: A Philosophical History for Our Times*. Chicago: University of Chicago Press.

Giocoli, Nicola. 2005. "In the Sign of the Axiomatic Method: Mathematics as the Role Model for Neoclassical Economics." Pp. 9–12 in *Blanqui Lecture, European Society for the History of Economic Thought, Ninth Annual Conference, Stirling, June*.

Goodfriend, Marvin, and Robert King. 1997. "The New Neoclassical Synthesis and the Role of Monetary Policy." *NBER Macroeconomics Annual 1997, Volume 12* 12(January):231–96.

Goodwin, Craufurd D. 1998. "The Patrons of Economics in a Time of Transformation." *History of Political Economy* 30(S1):53–81.

Gordon, Donald F. 1965. "The Role of the History of Economic Thought in the Understanding of Modern Economic Theory." *The American Economic Review* 55(1/2):119–27.

Gowan, Peter. 2009. "Crisis in the Heartland: Consequences of the New Wall Street System." *New Left Review* 55(2):5–29.

Greenspan, Alan. 2008. "Testimony to House of Representatives Committee on Government Oversight and Reform." *Stenographic Minutes* October 23.

Greenwald, Bruce C., and Joseph E. Stiglitz. 1993. "New and Old Keynesians." *Journal of Economic Perspectives* 7(1):23–44.

Haering, Norbert. 2014. “George Soros’ INET: An Institute to Improve the World or a Trojan Horse of the Financial Oligarchy?” *real-world economics review* (67):90–96.

Hahn, Frank. 1973. *On the Notion of Equilibrium in Economics: An Inaugural Lecture*. Cambridge: Cambridge University Press.

Hands, Wade D. 1997. “Conjectures and Reputations: The Sociology of Scientific Knowledge and the History of Economic Thought.” *History of Political Economy* 29(4):695–739.

Hands, Wade D. 2001. *Reflection without Rules: Economic Methodology and Contemporary Science Theory*. Cheltenham, UK: Edward Elgar Publishing.

Hands, Wade D. 2003. “Reconsidering the Received View of the ‘Received View’: Kant, Kuhn, and the Demise of Positivist Philosophy of Science.” *Social Epistemology* 17(2/3):169–73.

Hands, Wade D. 2007. “The Future of Economics?” *Regester Lecture - University of Puget Sound, November 15* Tacoma, WA.

Hands, Wade D. 2009. “Economics, Psychology and the History of Consumer Choice Theory.” *Cambridge Journal of Economics* 34(4):633–48.

Harcourt, Geoffrey. 2011. “The Crisis in Mainstream Economics.” *real-world economics review* (53):47–51.

Harrison, Glenn W. 2010. “The Behavioral Counter-Revolution.” *Journal of economic behavior & organization* 73(1):49–57.

Harwood, Jonathan. 1986. “Ludwik Fleck and the Sociology of Knowledge.” *Social Studies of Science* 16(1):173–87.

Hausman, Daniel M., ed. 2008. *The Philosophy of Economics: An Anthology*. 3rd ed. Cheltenham, UK: Edward Elgar Publishing.

Heilbroner, Robert L. 1973. “Economics as A‘ value-Free’ science.” *Social Research* 40(1):129–43.

Heilbroner, Robert L. 1999. *The Worldly Philosophers: The Lives, Times and Ideas of the Great Economic Thinkers*. Simon and Schuster.

Hempel, Carl G., and Paul Oppenheim. 1948. “Studies in the Logic of Explanation.” *Philosophy of science* 15(2):135–75.

Henrich, Joseph et al. 2005. “‘Economic Man’ in Cross-Cultural Perspective: Behavioral Experiments in 15 Small-Scale Societies.” *Behavioral and brain sciences* 28(06):795–815.

Herfeld, Catherine. 2012. “The Potentials and Limitations of Rational Choice Theory: An Interview with Gary Becker.” *Erasmus Journal for Philosophy and Economics* 5(1):73–86.

Heukelom, Floris. 2014. *Behavioral Economics: A History*. Cambridge MA & London: Cambridge University Press.

Heukelom, Floris, and Esther-Mirjam Sent. 2010. “The Economics of the Crisis and the Crisis of economics:Lessons from Behavioral Economics.” *KRISIS - Journal for*

contemporary philosophy 26–37.

Hobsbawm, Eric J. 1997. *On History*. New York: The New Press.

Hodgson, Geoffrey M. 2009a. "After 1929 Economics Changed : Will Economists Wake up in 2009 ?" *real-world economics review* (48):273–78.

Hodgson, Geoffrey M. 2009b. "The Great Crash of 2008 and the Reform of Economics." *Cambridge Journal of Economics* 33(6):1205–21.

Hoffman, Elizabeth, Kevin McCabe, and Vernon L. Smith. 1996. "Social Distance and Other-Regarding Behavior in Dictator Games." *The American Economic Review* 86(3):653–60.

Hoover, Kevin D. 1994. "Econometrics as Observation: The Lucas Critique and the Nature of Econometric Inference." *Journal of Economic Methodology* 1(1):65–80.

Hoover, Kevin D. 2001. *The Methodology of Empirical Macroeconomics*. Cambridge MA: Cambridge University Press.

Hoover, Kevin D. 2010. "Idealizing Reduction: The Microfoundations of Macroeconomics." *Erkenntnis* 2008(May).

Hoover, Kevin D., and Warren Young. 2013. "Rational Expectations: Retrospect and Prospect: A Panel Discussion with Michael Lovell, Robert Lucas, Dale Mortensen, Robert. Shiller and Neil Wallace." *Macroeconomic Dynamics* 17(05):1169–92.

Van Horn, Robert. 2009. "Reinventing Monopoly and the Role of Corporations: The Roots of Chicago Law." in *The Road from Mont Pelerin*, edited by Philip Mirowski and Dieter Plehwe. Cambridge, MA: Harvard University Press.

Hoyningen-Huene, Paul. 2002. "Paul Feyerabend and Thomas Kuhn." *Journal for general philosophy of science* 102–14.

INET:Conversation on the State of the Economy. 2012. "Krugman and Stiglitz: What's the Future of Economic Thinking?" *Video* (November 1st).

Jakóbik, Witold. 2011. "Theory of Economy as the Original Cause of the World Crisis." *Contemporary Economics* 5(2):4–15.

Jensen, Michael C. 1978. "Some Anomalous Evidence Regarding Market Efficiency." *Journal of financial economics* 6(2):95–101.

Johnson, L. E. 1983. "Economic Paradigms: A Missing Dimension." *Journal of Economic Issues* XVII(4):1097–1111.

Jones, Evan. 1994. "The Tyranny of A Priorism in Economic Thought." *History of Economics Review* 22(Summer):24–69.

Kahneman, Daniel. 2003. "Maps of Bounded Rationality: Psychology for Behavioral Economics." *American Economic Review* 93(5):1449–75.

Khalil, Elias L. 1987. "Kuhn, Lakatos, and the History of Economic Thought." *International Journal of Social Economics* 14(3/4/5):118–31.

Kindleberger, Charles P., and Robert Z. Aliber. 2005. *Manias, Panics and Crashes: A History of Financial Crises*. Basingstoke: Palgrave Macmillan.

King, Lawrence, Michael Kitson, Sue Konzelmann, and Frank Wilkinson. 2012. "Making the Same Mistake Again—or Is This Time Different?" *Cambridge*

Journal of Economics 36(1):1–15.

Kirman, Alan P. 2009. "Economic Theory and the Crisis." *real-world economics review* (51):80–83.

Kirman, Alan P. 2010. "The Economic Crisis Is a Crisis for Economic Theory." *CESifo Economic Studies* 56(4):498–535.

Kobayashi, Keiro. 2009. "Some Reasons Why a New Crisis Needs a New Paradigm of Economic Thought." *RIETI Report no.108* July 31.

Kornai, János. 1971. *Anti-equilibrium:On Economic Systems Theory and the Tasks of Research*. Amsterdam & London: North-Holland Publishing Co.

Krugman, Paul. 1996. "What Economists Can Learn from Evolutionary Theorists." *A talk given to the European Association for Evolutionary Political Economy*. Retrieved (http://web.mit.edu/krugman/www/evolute.html).

Krugman, Paul. 2009a. "A Dark Age of Macroeconomics (Wonkish)." *NYTimes.com (February 27)*. Retrieved (http://krugman.blogs.nytimes.com/2009/01/27/a-dark-age-of-macroeconomics-wonkish/).

Krugman, Paul. 2009b. "How Did Economists Get It So Wrong?" *The New York Times (September 6)*. Retrieved May 20, 2013 (http://www.nytimes.com/2009/09/06/magazine/06Economic-t.html).

Krugman, Paul. 2010. "The Instability of Moderation." *Paul Krugman Blog - November 26*. Retrieved March 24, 2014 (http://krugman.blogs.nytimes.com/2010/11/26/the-instability-of-moderation/).

Krugman, Paul. 2011. "The Profession and the Crisis." *Eastern Economic Journal* 37(3):307–12.

Krugman, Paul. 2012. "Economics in the Crisis." *NYTimes.com - March 5*. Retrieved March 29, 2014 (http://krugman.blogs.nytimes.com/2012/03/05/economics-in-the-crisis/?pagemode=print).

Krugman, Paul. 2014. "Paradigming Is Hard." *Paul Krugman Blog, April 28*. Retrieved June 19, 2014 (http://krugman.blogs.nytimes.com/2014/04/28/paradigming-is-hard/).

Kuhn, Thomas S. 1962. *The Structure of Scientific Revolutions (with Postscipt, Original of 1962)*. 3rd ed. Chicago and London: University of Chicago Press.

Kuhn, Thomas S. 1970. "Reflections on My Critics." Pp. 231–78 in *Criticism and the Growth of Knowledge: Volume 4: Proceedings of the International Colloquium in the Philosophy of Science, London, 1965*, vol. 4, edited by Imre Lakatos and Alan Musgrove. London & New York: Cambridge University Press.

Kuhn, Thomas S. 1974. "Second Thoughts on Paradigms." Pp. 459–77 in *The Structure of Scientific Theories*, vol. 73, edited by Frederick Suppe. Urbana, Ill.: University of Chicago Press.

Kuhn, Thomas S. 1977. *The Essential Tension. Selected Studies in Scientific Tradition and Change*. 3rd ed. Chicago: University of Chicago Press.

Kurz, Heinz D. 2010. "On the Dismal State of a Dismal Science?" *investigación económica* 23(274):17–41.

Lagadec, Patrick. 2009. “A New Cosmology of Risks and Crises: Time for a Radical Shift in Paradigm and Practice.” *Review of Policy Research* 26(4):473–86.

Laudan, Larry et al. 1986. “Scientific Change: Philosophical Models and Historical Research.” *Synthese* 69(2):141–223.

Lawson, Tony. 2003. *Reorienting Economics*. London & New York: Routledge.

Lawson, Tony. 2006. “The Nature of Heterodox Economics” edited by Edward Fullbook. *Cambridge Journal of Economics* 30(4):483–505.

Lawson, Tony. 2009. “Contemporary Economics and the Crisis.” *real-world economics review - Sept.8* (50):122–31.

Lawson, Tony. 2013. “What Is This ‘school’called Neoclassical Economics?” *Cambridge Journal of Economics* 37(5):947–83.

Lee, Frederic S. 2008. “Heterodox Economics.” *The Long Term View: A Journal of Informed Opinion* 7(1):23–30.

Lee, Frederic S. 2009. *A History of Heterodox Economics: Challenging the Mainstream in the Twentieth Century*. Routledge.

Lee, Frederic S. 2011. “The Pluralism Debate in Heterodox Economics.” *Review of Radical Political Economics* 43(4):540–51.

Leijonhufvud, Axel. 2009. “Out of the Corridor: Keynes and the Crisis.” *Cambridge Journal of Economics* 33(4):741–57.

Levine, David K. 2009. “An Open Letter to Paul Krugman.” *The Huffington Post - September 18*. Retrieved (http://www.huffingtonpost.com/david-k-levine/an-open-letter-to-paul-kr_b_289768.html).

Lipsey, Richard G. 2001. “Successes and Failures in the Transformation of Economics.” *Journal of Economic Methodology* 8(2):169–201.

Lucas, Robert Jr. 1972. “Expectations and the Neutrality of Money.” *Journal of economic theory* 4(2):103–24.

Lucas, Robert Jr. 2001. “Professional Memoir: A Lecture given in the Nobel Economists Lecture Series at Trinity University, San Antonio, Texas.” (April 5).

Lucas, Robert Jr. 2009. “In Defence of the Dismal Science.” *The Economist - August 6th*. Retrieved February 21, 2014 (http://www.economist.com/node/14165405).

Mankiw, N. Gregory. 2006. “The Macroeconomist as Scientist and Engineer.” *National Bureau of Economic Research* (May).

Mankiw, N. Gregory. 2009. “Freshman Economics Won’t Be Quite the Same.” *The New York Times (May 23)*.

Maskin, Eric. 2010. “On Economic Theory and Financial Crisis, Interview by Sophie Roel, July 4.” *The Browser*. Retrieved (http://fivebooks.com/interviews/eric-maskin-on-economic-theory-and-financial-crisis).

Maskin, Eric. 2013. “Interview to Jean Tirole.” *The TSEconomist (Toulouse School of Economics Ics Students’ Magazine) - April 7*.

Masterman, Margaret. 1970. “The Nature of a Paradigm.” Pp. 59–89 in *Criticism and the Growth of Knowledge: Proceedings of the International Colloquium in the*

Philosophy of Science, edited by Imre Lakatos and Alan Musgrave. Cambridge: Cambridge University Press.

McCombie, John, and Maureen Pike. 2013. "The End to the Consensus in Macroeconomic Theory? A Methodological Inquiry." *American Journal of Economics and Sociology* 72(2):497–528.

Meltzer, Allan. 2012. *Why Capitalism?* Oxford & New York: Oxford University Press.

Meltzer, Allen. 2007. "Let 'em Fail." *Wall Street Journal (July 21, A6)*.

Milken, Michael. 2009. "The Nobel Roundtable." *The Milken Institute Review* (Third Quarter):51–57.

Milonakis, Dimitris. 2009. "Debating Pluralism and Heterodoxy: A Response to David Colander." *Paper presented at the annual conference of the European Association for Evolutionary Political Economy (EAEPE), Amsterdam, November 6–8, available from author*.

Milonakis, Dimitris. 2012. "Neoclassical Economics." Pp. 246–51 in *The Elgar companion to Marxist economics*. Cheltenham, UK: Edward Elgar Publishing.

Milonakis, Dimitris, and Ben Fine. 2009. *From Political Economy to Economics: Method, the Social and the Historical in the Evolution of Economic Theory*. London & New York: Routledge.

Mirowski, Philip. 2006. "Coming to Terms with Neoliberalism-About Dieter Plehwe, Bernhard Walpen & Gisela Neunhoffer, Eds, Neoliberal Hegemony: A Global Critique." *European Journal of Sociology* 47(03):461–63.

Mirowski, Philip. 2010. "The Great Mortification: Economists' Responses to the Crisis of 2007-(and Counting)." *The Hedgehog Review* 12(2 Summer).

Mirowski, Philip. 2013. *Never Let a Serious Crisis Go to Waste: How Neoliberalism Survived the Financial Meltdown*. Cheltenham, UK: Edward Elgar Publishing.

Morgan, Mary S. 2001. "The Formation of ' Modern ' Economics : Engineering and Ideology. Working Paper." *London School of Economics, Dept. of Economic History Working paper 62/01*. 1–43.

Mößner, Nicola. 2011. "Thought Styles and Paradigms—a Comparative Study of Ludwik Fleck and Thomas S. Kuhn." *Studies in History and Philosophy of Science Part A* 42(2):362–71.

Mulligan, Casey B. 2009. "Is Macroeconomics off Track?" *The Economists' Voice* 6(10).

Myerson, Roger B. 2012. "A Model of Moral-Hazard Credit Cycles." *Journal of Political Economy* 120(5):847–78.

Negru, Ioana. 2013. "How Reflexive Have Economists Been in the Wake of the Crisis:'the Times They Are A–changin'?" *Post Keynesian Economics Study Group - WP1306*.

Nickles, Thomas. 2003. "Introduction." in *Thomas Kuhn*. Cambridge and New York: Cambridge University Press.

Nik-Khah, Edward, and Robert Van Horn. 2012. "Inland Empire: Economics

Imperialism as an Imperative of Chicago Neoliberalism." *Journal of Economic Methodology* 19(3):259–82.

Nitzan, Jonathan, and Shimshon Bichler. 2009. *Capital as Power: A Study of Order and Creorder*. Cheltenham, UK: Edward Elgar Publishing.

Ormerod, Paul. 2010. "The Current Crisis and the Culpability of Macroeconomic Theory." *Twenty-First Century Society* 5(October):1–16.

Ortiz, Guillermo. 2012. "Conventional Wisdom Challenged? Monetary Policy after the Crisis." Pp. 15–23 in *In the Wake of the Crisis: Leading Economists Reassess Economic Policy*, vol. 1, edited by Olivier Blanchard, David Romer, Michael Spence, and Joseph Stiglitz. Cambridge MA & London: MIT Press.

Palley, Thomas I. 2011. "America's Flawed Paradigm: Macroeconomic Causes of the Financial Crisis and Great Recession." *Empirica* 38(1):3–17.

Palley, Thomas I. 2012. *From Financial Crisis to Stagnation: The Destruction of Shared Prosperity and the Role of Economics*. Cheltenham, UK: Edward Elgar Publishing.

Palley, Thomas I. 2013. "Gattopardo Economics: The Crisis and the Mainstream Response of Change That Keeps Things the Same." *European Journal of Economics and Economic Policies: Intervention* 10(2):193–206.

Palma, José Gabriel. 2009. "The Revenge of the Market on the Rentiers. Why Neo-Liberal Reports of the End of History Turned out to Be Premature." *Cambridge Journal of Economics* 33(4):829–69.

Phillips-Fein, Kim. 2009. *Invisible Hands: The Making of the Conservative Movement from the New Deal to Reagan*. New York: W.W. Norton.

Pludwin, Steven. 2011. "Rogue Traders, Suspect Citizens and the Invisible Hand: Crisis in the Theater of Responsibility." *New Political Science* 33(4):465–77.

Posner, Richard A. 2008. "The Financial Crisis: Why Were Warnings Ignored?" *The Becker-Posner Blog (12 October)*. Retrieved March 10, 2016 (http://www.becker-posner-blog.com/2008/10/the-financial-crisis-why-were-warnings-ignored--posner.html).

Posner, Richard A. 2009a. *A Failure of Capitalism: The Crisis of '08 and the Descent into Depression*. Cambridge, Mass.: Harvard University Press.

Posner, Richard A. 2009b. "Economists on the Defensive: Robert Lucas." *The Atlantic (August 9)*. Retrieved (http://www.theatlantic.com/business/archive/2009/08/economists-on-the-defensive-robert-lucas/22979/).

Posner, Richard A. 2009c. "How I Became a Keynesian: Second Thoughts in the Middle of a Crisis." *The New Republic - September 23*.

Posner, Richard A. 2009d. "Shorting Reason. A Review of George Akerlof and Robert J. Schiller Animal Spirits." *The New Republic (April 15)*.

Prescott, Edward C. 1986. "Theory ahead of Business Cycle Measurement." *Quarterly Review* (Fall):9–22.

Rabin, Matthew. 2002. "A Perspective on Psychology and Economics." *European*

Economic Review 46(4):657–85.

Rajan, Raghuram G. 2006. "Has Finance Made the World Riskier?" *NBER Working Paper 11728* 12(4):499–533.

Reder, Melvin W. 1982. "Chicago Economics: Permanence and Change." *Journal of Economic Literature* 20(1):1–38.

Redman, Deborah A. 1993. *Economics and the Philosophy of Science*. Oxford: Oxford University Press, USA.

Reuten, Geert A. 1996. "A Revision of the Neoclassical Economics Methodology." *Journal of Economic Methodology* 3(1):39–68.

Robbins, Lionel. 1935. *An Essay on the Nature and Significance of Economic Science*. 2nd ed. London: Macmillan [1945].

Rodrik, Dani. 2009. "Blame the Economists, Not Economics." *Project Syndicate*. Retrieved August 22, 2014 (https://www.project-syndicate.org/commentary/blame-the-economists--not-economics).

Roth, Alvin E. 2002. "The Economist as Engineer: Game Theory, Experimentation, and Computation as Tools for Design Economics." *Econometrica* 70(4):1341–78.

Rothschild, Kurt W. 2000. "Economic Imperialism." *Analyse & Kritik* 30(1):723–33.

Rouse, Joseph. 2003. "Kuhn's Philosophy of Scientific Practice." Pp. 101–21 in *Thomas Kuhn*, edited by Thomas Nickles. Cambridge MA: Cambridge University Press.

Sachs, Jeffrey D. 2009. "Rethinking Macroeconomics." *Capitalism and Society* 4(3):1–9.

Sachs, Jeffrey D. 2010. "It Is Time to Plan for the World after Keynes." *Financial Times - June 8*.

Saint-Paul, Gilles. 2010. "There Will Be Adjustments but No Paradigm Shift." *The Economist - Sept.17* 2–3. Retrieved (http://www.economist.com/node/21010889/print).

Sargent, Thomas J. 2010. "Macroeconomics Under Attack, Interview to Art Rolnick." *Region* (September).

Schrecker, Ellen. 1986. *No Ivory Tower: McCarthysim and the Universities*. New York and Oxford: Oxford University Press.

Sent, Esther-Mirjam. 2006. "Pluralisms in Economics" edited by Stephen H. Keller, Helen E. Longino, and C. Kenneth Waters. *Netherlands Institute for Advanced Study in the Humanities and Social Sciences (NIAS) Working paper* 80–101.

Skidelsky, Robert. 2010. "What's Wrong with Economics?" *The Transatlantic, Journal of Economics and Philosophy* (10 March).

Skidelsky, Robert, and Christian Westerlind Wigstrom, eds. 2010. *The Economic Crisis and the State of Economics*. London: Palgrave Macmillan.

Solow, Robert M. 2009. "How to Understand the Disaster." *The New York Review of Books*, May, 4–7.

Stanfield, Ron. 1974. "Kuhnian Scientific Revolutions and the Keynesian Revolution."

Journal of Economic Issues 97–109.

Stigler, George J. 1959. "The Politics of Political Economists." *The Quarterly Journal of Economics* 73(4):522–32.

Stiglitz, Joseph E. 2010a. "An Agenda for Reforming Economic Theory." in *INET Conference at Kings College Cambridge (April 9) [http://ineteconomics.org/video/conference-kings/agenda-reformingeconomic-theory-joseph-stiglitz]*. Cheltenham, UK: Edward Elgar Publishing.

Stiglitz, Joseph E. 2010b. *Freefall: America, Free Markets, and the Sinking of the World Economy*. New York & London: WW Norton & Company.

Stiglitz, Joseph E. 2010c. "Needed: A New Economic Paradigm." *Financial Times FT.com - August 19*. Retrieved (http://www.ft.com/cms/s/0/d5108f90-abc2-11df-9f02-00144feabdc0.html#axzz368OQHpIg).

Stiglitz, Joseph E. 2010d. "The Non-Existent Hand." *London Review Of Books* 32(8-22).

Stiglitz, Joseph E. 2011a. "Rethinking Macroeconomics: What Failed, and How to Repair It." *Journal of the European Economic Association* 9(4):591–645.

Stiglitz, Joseph E. 2011b. "The Ideological Crisis of Western Capitalism." *Project Syndicate (July 6)*.

Taleb, Nassim Nicholas. 2010. *The Black Swan:: The Impact of the Highly Improbable: With a New section:"On Robustness and Fragility."* 2nd ed. New York: Random House.

Taylor, John B. 2010. "Does the Crisis Experience Call for a New Paradigm in Monetary Policy?" *CASE Network Studies & Analyses No.402*.

Taylor, John B. 2014a. "Causes of the Financial Crisis and the Slow Recovery." Pp. 49–65 in *Across the Great Divide: New Perspectives on the Financial Crisis*, vol. 652, edited by Martin Neil Baily and John B. Taylor. Hoover Institution Press.

Taylor, John B. 2014b. "Should Policymakers or Macro Models Be Taken to the Woodshed?" *Economics One: A blog by John Taylor - February 17*. Retrieved (http://economicsone.com/2014/02/17/should-policymakers-or-macro-models-be-taken-to-the-woodshed/).

Taylor, John B., and John C. Williams. 2008. "A Black Swan in the Money Market." *Federal Reserve Bank of San Francisco - Working Paper 2008-04*.

Thaler, Richard, and Cass Sunstein. 2008. "Human Frailty Caused This Crisis." *Financial Times (November 11)*.

The Economist, Print Edition. 2009. "Leader: What Went Wrong with Economics? Briefing: The State of Economics: The Other-Wordly Philosophers. Financial Economics: Efficiency and Beyond." *July 16th* 11–12, 68–70. 71–72.

The Post-Crash Economics Society. 2014. *Economics, Education and Unlearning: Economics Education at the University of Manchester with a Foreword by Andrew Haldane*. Manchester: the Post-Crash Economics Society at the University of Manchester.

Thoma, Mark. 2011. "What Caused the Financial Crisis? Don't Ask an Economist." *The*

Fiscal Times - August 30. Retrieved March 27, 2014 (http://www.thefiscaltimes.com/Columns/2011/08/30/What-Caused-the-Financial-Crisis-Dont-Ask-an-Economist).

Tieben, Bert. 2009. *The Concept of Equilibrium in Different Economic Traditions: A Historical Investigation*. Amsterdam: Rozenberg Academic Publishers.

Toulmin, Stephen. 1970. "Does the Distinction between Normal and Revolutionary Science Hold Water." Pp. 39–48 in *Criticism and the Growth of Knowledge:Proceedings of the International Colloquium in the Philosophy of Science*, edited by Imre Lakatos and Alan Musgrave. Cambridge: Cambridge University Press.

Trichet, Jean-Claude. 2010. "Reflections on the Nature of Monetary Policy Non-Standard Measures and Finance Theory." *Opening address at the 6th ECB Central Banking Conference, Frankfurt am Main - 18 November* 18. Retrieved (https://www.ecb.europa.eu/press/key/date/2010/html/sp101118.en.html).

Udehn, Lars. 2001. *Methodological Individualism:Background, History and Meaning*. London & New York: Routledge.

De Vroey, Michel. 1975. "The Transition from Classical to Neoclassical Economics: A Scientific Revolution." *Journal of economic issues* IX(3):415–39.

Ward, Benjamin. 1972. *What's Wrong with Economics?* London: Macmillan.

Whitehouse, Mark. 2009. "Crisis Compels Economists to Reach for New Paradigm." *Wall Street Journal (November 4)*. Retrieved (http://online.wsj.com/news/articles/SB125720159912223873).

Williams, Jeremy B., and Judith M. McNeill. 2005. "The Current Crisis in Neoclassical Economics and the Case for an Economic Analysis Based on Sustainable Development." *Universitas* 21:16.

Wittich, Dieter. 1981. "Ludwik Fleck: Genesis and Development of a Scientific Fact." *Science and Nature* (4):3–14.

Wolff, Richard D., and Stephen A. Resnick. 2012. *Contending Economic Theories: Neoclassical, Keynesian, and Marxian*. Cambridge MA & London: MIT Press Books.

Woodford, Michael. 2009. "Convergence in Macroeconomics: Elements of the New Synthesis." *American Economic Journal: Macroeconomics* 1(1):267–79.

Woodward, James. 2011. "Scientific Explanation." in *The Stanford Encyclopedia of Philosophy*, edited by Edward N Zalta. http://plato.stanford.edu/cgi-bin/encyclopedia/archinfo.cgi?entry=scientific-explanation.

Wray, Randall L. 2011. "The Dismal State of Macroeconomics and the Opportunity for a New Beginning." *Working paper 652 - Levy Economics Institute*.

Wren-Lewis, Simon. 2011. "Lessons From Failure: Fiscal Policy, Indulgence and Ideology." *National Institute Economic Review* 217(1):R31–46.

Wren-Lewis, Simon. 2012. "Crisis, What Crisis? Arrogance and Self-Satisfaction among Macroeconomists." *mainly macro: Comment on macroeconomic issues. (11 July)*. Retrieved (http://mainlymacro.blogspot.gr/2012/07/crisis-what-crisis-

arrogance-and-self.html).

Wren-Lewis, Simon. 2013. “Attacks on Mainstream Economics and Reforming Economics Teaching.” *mainly macro: Comment on macroeconomic issues.(November 24)*. Retrieved August 23, 2014 (http://mainlymacro.blogspot.se/2013/11/attacks-on-mainstream-economics-and.html).

Zamagni, Stefano. 2009. “The Lesson and Warning of a Crisis Foretold: A Political Economy Approach.” *International Review of Economics* 56(3):315–34.

Zingales, Luigi. 2009a. “Capitalism after the Crisis.” *National Affairs* 1:22–35.

Zingales, Luigi. 2009b. “Economist Debate: Keynesian Principles.” *Economist.com - March 10 http://www.economist.com/debate/days/view/276*. Retrieved March 1, 2016 (http://www.scam.com/showthread.php?124479-Keynesianism-ideology-to-hide-corruption-political).

Zingales, Luigi. 2010. “Learning to Live with Not-so-Efficient Markets.” *Daedalus* 139(4):31–40.