

How should the Post Keynesian School define “Uncertainty”?

The O'Donnell / Davidson controversy in the light of Basel III

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Keynes's theory of uncertainty for today

Keynesian theory has fallen from a practical theory for economists to solve the problems of the Great Depression in 1929 to a historic and not-meaningful theory for today. This paper is searching for a new path to combine essential parts of the 'General Theory' (GT) with the current economic problems. From my point of view even after 80 years many parts of Keynes's theory are still very meaningful as this paper will show.

I will use Keynes's 'Wall Street-paradigm' from a banker's view who experienced the Financial Crisis 2007/09 from his office, which is quite another perspective than that of an academic observer from the campus. The Keynesian paradigm already failed in the 70s and today the Post Keynesian school has been marginalized. However, I argue that the last financial crisis has shown that many topics of Keynes's theory are still valid, especially related to uncertainty, non-neutrality of money and liquidity preference. This paper will show that Keynesian uncertainty played a significant role in the Financial Crisis 2007/09 and elaborate the different views about uncertainty according to O'Donnell vs. Davidson. The new regulations of Basel III will be compared with Keynes's meaning of uncertainty.

Some conclusions of the regularity framework (Basel III) have been made from a correct analysis, even it is questionable in how far the new regulations will be effective. I will examine three significant ratios from Basel III (Leverage Ratio = LR, Liquidity Coverage Ratio = LCR and Net Stable Funding Ratio = NSFR). Among others, these ratios will be implemented within a period of time and all participating banks will have to fulfil these requirements. I will explain in how far these three ratios are related to Keynesian theory resp. Keynesian uncertainty.

In addition the existence of an institution such as the 'Bank for International Settlements' (BIS) is not a complete Keynesian approach, but a Keynesian-like approach. It shows two aspects of Keynesian theory: 1st money is not neutral. If money would be neutral the BIS would make no sense and 2nd the economic system is transmutable. If it would be immutable, the existence of the BIS would also make no sense. The role of this institution has significantly changed over the last decades and its task of today is to regulate the international financial system and – among others - to prevent the world economy from a new financial crisis. So, in this sense the institution is not superfluous, because it sets the rules for the financial system and has a strong influence of the structure and the behaviour of the financial markets.

This paper is an attempt to connect the Keynesian theory with the financial world of today, to show the links between the GT and the new regulations of the financial markets. It will show that the last financial crisis can partially be explained by distinguishing between *ontological and epistemological uncertainty*, but it would also be too simple to reduce the whole complexity of this crisis by two different definitions, however the impact of uncertainty is not without significance.

The current discussion between O'Donnell, Rosser, and Davidson is more or less disconnected to economic reality from a banker's view and gives no practical advice for the future regulation of the financial markets, even this question is most urgent for today. Needless to say that Post Keynesian economists had no influence on Basel III even though Keynes can provide a significant theoretical framework.

In the first part of this paper the main segments of O'Donnell's article (2014/15): 'A critique of the

ergodic/nonergodic approach to uncertainty¹ will be investigated and discussed. In the second part the circumstances of the Financial Crisis 2007/09 will be investigated related to the question whether this crisis can be explained or partially explained by Keynes's 'General Theory' (GT). In the last part of this article the Basel III-regulations (which is a reaction of the last Financial Crisis in order to avoid a similar crisis in the future) will be examined from the viewpoint of a banker in financial markets.

The position of O'Donnell

The question is the foundation of Keynesian uncertainty. While O'Donnell prefers his own version of the 'epistemologically oriented human abilities and characteristics (HAC) approach'², he rejects the 'ontologically oriented/nonergodic (ENE) approach'³ according to Davidson. O'Donnell argues Davidson's 'view of causality is oversimplified; and its treatment of Keynes's philosophical work is inaccurate and tendentious.'⁴

It would be too simple to reduce the discussion to the topic 'ontological vs. epistemological uncertainty'. "The more nuanced position taken here is, first, that both approaches have ontological and epistemological dimensions, and second, that to avoid confusion it deserves note that the referent of these terms is typically *the ontology of the world being investigated*. Thus 'ontological uncertainty' relates to uncertainty deriving (ultimately) from the ontological characteristics of the investigated world and the 'epistemological uncertainty' relates to uncertainty deriving (ultimately) from the limited abilities of agents to know about the investigated world."⁵

O'Donnell divides his critique in three segments: 1st: The six key building blocks of the post Keynesian ENE, approach; 2nd: General critique of the ENE approach; 3rd Keynes-specific critique of the ENE approach; 4th HAC approach and conclusion.

1 Journal of Post Keynesian Economics/Winter 2014/-15, Vol. 37, No. 2 pp. 187-209

2 Ibid., p. 187

3 Ibid., p. 188

4 Ibid., p. 188

5 Ibid., p. 188

The Six key building blocks of the post Keynesian ENE approach according to O'Donnell

1. Knight's version of the risk/uncertainty distinction

Here O'Donnell assumes that Davidson would believe that Knight would define risk/uncertainty in the same way as Keynes.⁶ However, "Risk, for Knight, arises in the presence of numerical probabilities and uncertainty in their absence, but the ENE approach aligns risk and uncertainty with ergodicity and non-ergodicity, both of which have far more stringent criteria."⁷

2. The relative frequency interpretation

Davidson's ENE approach would be founded in the presence or absence of numerical probabilities.

3. Probability represents knowledge, never uncertainty

Probabilities are connected to knowledge, while uncertainty is disconnected to knowledge.

4. The ergodic/nonergodic distinction

This distinction would mean two ontological states. An ergodic system that generates two ontological outcomes: risk and irreducible uncertainty. Ontological certainty is related to ergodicity, whilst ontological uncertainty is related to non-ergodicity

5. The incorporation of epistemological matters

"The ENE approach connects its ontological foundations to agent behavior using three factors – learning, rationality, and survival. The underlying states of reality generate events about which intelligent humans obtain information over time by expending resources in observation or purchase. If observed relative frequency distributions match the stipulated criteria, ergodicity is present; if not non-ergodicity exists."⁸ In this sense epistemological defined uncertainty begins to appear by the implementation of human behavior and agents. Learning would eliminate epistemological uncertainty by acquiring increasing knowledge.

6. Re-framing Knight's distinction to fit the ENE framework

O'Donnell argues Davidson would have adopted an "incorrect epistemological stance on risk and uncertainty. Risk, for Knight, arises in the presence of numerical probabilities and uncertainty in their absence, but the ENE approach aligns risk and uncertainty with ergodicity and non-ergodicity..."⁹

6 Journal of Post Keynesian Economics/Winter 2014/-15, Vol. 37, No. 2, p.189

7 Ibid., p. 191

8 Ibid., p. 190

9 Ibid., p. 191

The ergodic/nonergodic distinction

O'Donnell argues that an infinite time process would be necessary to distinguish between ergodic/nonergodic processes. "And since the underlying reality is either entirely independent of us (ergodic) or entirely unpredictable (nonergodic), we cannot impose any (preferred) forms on how it undertakes convergence or non-convergence."¹⁰

According to Davidson ergodicity/non-ergodicity is related to a mutability or immutability world. While in an ergodic world the past governs the future, the future is immutable, in a non-ergodic world the past does not govern the future.

General critique

Can agents obtain certain knowledge of the states of reality?

O'Donnell argues an observer can only know the true ontological state at infinity before knowledge of ergodicity or non-ergodicity is acquired.

Could agents obtain probable knowledges of the states of reality?

Here O'Donnell just repeats his argument that a distinction between ergodic and nonergodic time series as is always uncertain due to the fact that an unlimited process would be needed. "But there is no way the required information can be obtained."¹¹

Can limited observations of convergence/non-convergence help identify states?

"The convergence/non-convergence that matters occurs at infinity, a never-arriving destination in time and space... Over time, convergence to ergodicity might be 'extremely fast' (within 10,000 years or 'slightly fast' (within 10,000 billion years)."¹² Again O'Donnell repeats and outlines the argumentation that only over an infinite time series a distinction between ergodic and nonergodic systems would be possible.

The incoherence of ENE learning and rationality stories

"Correct knowledge of the presence or absence of objective probability distributions has to be rapidly acquired so that rational agents can adopt state-appropriate strategies for economic survival."¹³

It is impossible to gain complete knowledge of an ontological state. O'Donnell neglects the dynamics of economic systems over time periods. Economic states are always changing. Learning from the past (One can never learn from the presence, because if one learns something, the presence has already passed.) may have no meaning for decision making in the future, because the acquired knowledge from the past is not appropriate for future decisions in a changed environment. The economy of today has changed significantly related to the economy of 1999, 1987, 1936, 1929, or 1850. In other words: "To ask today's regulators to save us from tomorrow's crisis using yesterday's

10 Ibid., p. 192

11 Journal of Post Keynesian Economics/Winter 2014/-15, Vol. 37, No. 2, p. 195

12 Ibid., p. 195

13 Ibid., p. 198

toolbox is to ask a border collie to catch a frisbee by first applying Newton's Law of Gravity."¹⁴ O'Donnell assumes that agents would be rational and could obtain certain knowledge for making the right decisions for the future. It is the function of the "*homo oeconomicus*", which Keynes clearly rejected in the GT by implementing 'animal spirits' for decision making.

However, Keynes claims general social and institutional problems for 'making the right decisions'. In institutions agents have to justify their decisions to the supervisory board or any other controlling instances of these institutions. Keynes was aware of the problematic circumstances of such procedures when he wrote: "For it is in the essence of his behavior that he should be eccentric, unconventional and rash in the eyes of average opinion. If he is successful, that will only confirm the general belief in his rashness; and if in the short run he is unsuccessful, which is very likely, he will not receive much mercy. Worldly wisdom teaches that it is better for reputation to fail conventionally than to succeed unconventionally."¹⁵ Rationality including these implications according to Keynes has its own scheme which often might not lead to survival but to failure.

Even if Keynes limits psychology or animal spirits in the GT, Keynes gives more value to psychology than to rationality: "We should not conclude from this that everything depends on waves of irrational psychology. On the contrary, the state of long-term expectation is often steady, and, even, when it is not, the other factors exert their compensation effects. We are merely reminding ourselves that human decisions affecting the future, whether personal or political or economic, cannot depend on strict mathematical expectation, since the basis for making such calculations does not exist; and that it is our innate urge to activity which makes the wheels go round, our rational selves choosing between the alternatives as best we are able, calculating where we can, but often falling back for our motive on whim, sentiment or chance."¹⁶

If agents would be rational they would know, that they cannot learn from the past. It is not the distinction whether rational agents can identify non-ergodic from ergodic processes, it is the fact that the economy is permanently evolving and not pre-determined. Ergodic processes can only appear in closed systems, while non-ergodic processes appear in open and dynamically changing systems. Ergodicity is a phenomena described in closed physical systems as for example the Brownian movement. The Brownian movement might not be a Brownian movement, because the observer has to watch the process for infinity by following the argumentation by O'Donnell. The sun also might not rise tomorrow. However, for a rational agent it would make sense to anticipate that the sun will also rise tomorrow. Based on infinite time series it should be certain that the sun will not rise again at any time, but it might be generally accepted that the sun will rise tomorrow for the next five million years.

At this point it makes no sense to follow all other arguments constructed by O'Donnell, because they are all based on the assumption that one cannot distinguish between ergodic/nonergodic processes due to the impossibility of observation of infinite time series.

By assuming infinity no hypothesis can be valid, because all hypothesis could be tested as 'false' at any time in the future.

Indeed, Boltzmann's validity of the Ergodic Hypothesis is very difficult to prove. "Boltzmann himself attempted to give a proof by considering different paths of energy (from which the term

14 Haldane, Andrew G, Madouros, Vasileios: "The dog and the frisbee", Bank of England, Speech given at the Federal Reserve Bank of Kansas City's 36th economics policy symposium, "The Changing Policy Landscape", Jackson Hole, Wyoming, 31 August 2012, p. 24

15 John Maynard Keynes, General Theory, BN Publishing, Breinigsville, 2010, p. 102

16 John Maynard Keynes, General Theory, BN Publishing, Breinigsville, 2010, p. 105

ergodic was derived) on a surface of constant energy, now known as a micro canonical ensemble. He reasoned that if these paths were to cover the surface densely, it might be equivalent to doing on time averaging. For these paths to fill this surface, clearly it would take a very long time, which effectively says that the time averaging must be taken over an infinitely long time, at least very long compared with some characteristic times of a system... Although Boltzmann did not succeed, his idea has since attracted many followers especially in mathematics. The subject has grown in an active mathematical branch, known as ergodic theory, a study in measure theory and topology. In spite of many efforts expanded over the years, the basic difficulties have remained a challenge. Gradually the focus has become shifted to quasi ergodic theory, therewith removing itself further away from the original physical problem concerning the equality or equivalence between the two averages.”¹⁷

However, one modern leading cosmologist and mathematician of today for example has serious doubts about infinity. Gauss already rejected the idea that infinity would have anything to do with reality. Max Tegmark, cosmologists at the MIT, outlines that infinity became a mainstream in mathematics and physics in the last century, because infinity is a very comfortable approximation to which we have no comfortable alternatives. According to Tegmark we have no indications for infinity and we also would not need it to deal with physics. In conclusion Tegmark means that we have to question infinity and at least he would bet that we have to abandon infinity.¹⁸

It becomes clear now, what kind of problems appear, if a mathematical or physical approach enters into an economic theory: The economic theory is endangered to loose competence due to the facts that it loses contact to the actual developments in physics or mathematics or it might be not completely transferable to a social science like economics. It might not be up-to-date in the current time or the future. There are also problems to transfer laws of natural science or mathematics into a moral science like economics. My suggestion is to define an economic ENE approach detached from physics and/or mathematics. I will explain my suggestion at the end of this article.

As Keynes said, that we are all dead in the long run, we practically have to make a decision in an observable time frame. The objection now would be, that in these circumstances an identified ergodic time series could appear as non-ergodic later and vice versa.

O’Donnell clearly lines out: “Neoclassicals may assume reality is completely ergodic, extreme post Keynesians might assume complete non-ergodicity, and moderate post Keynesians might assume some combination of the two in which non-ergodicity dominates ergodicity. But all such knowledge is impossible in advance of infinity, so that these are unfalsifiable assertions.”¹⁹

O’Donnell puts the ENE approach into Popper's methodology of falsification. However, this methodology limits new insights by squeezing this theorem into the straitjacket of Popper’s falsification criteria. The problem is that economics is not a natural science but a moral science. One cannot test an economic hypothesis or a moral science-hypothesis in an experiment like in natural science. These limitations have already been analysed by Paul Feyerabend.²⁰

Hicks wrote about the difference of economics and natural science: “I find that all experimental sciences are, in the economic sense 'static'. They have to be static. Since they have to assume that it

17 M. Howard Lee: “Boltzmann’s Ergodic Hypothesis: Time Averaging and Dynamic Mechanisms“, in: American Institute of Physics, 2002, p. 143.

18 Max Tegmark: „Unendlichkeit“ in: Welche wissenschaftliche Idee ist reif für den Ruhestand?, Fischer, 2016, pp. 77-81

19 Journal of Post Keynesian Economics/Winter 2014/-15, Vol. 37, No. 2, p. 201

20 Paul Feyerabend: Against Method, Verso, 2010

does not matter at what date an experiment is performed. There do exist some economic problems that can be discussed in those, but there are not many of them. The prestige of scientific method has led economists to attach importance to them, for this is the field where economics appears to be most 'scientific'. The more characteristic economic problems are problems of change, of growth and retrogression, and fluctuation. The extent to which these things are happening, things which have not happened before – at the most they are rather like what has happened before. We need a theory that helps us with these problems, but it is impossible to believe that it can ever be a complete theory. It is bound, by nature, to be fragmentary... as economics pushed beyond 'statics', it becomes less like science, and more like history.”²¹

Related to O'Donnell's argumentation of infinite time series there is another example which makes this objection questionable: “There is an apocryphal story about Frederick Mosteller, a famous professor of statistics at Harvard University. Sometime in the 1950s, a student of Mosteller's was unconvinced that a six-sided die had a precise 1/6 chance of landing on any of its six sides, so he collected a bunch of (cheap) dice and tossed them a few thousand times to test his professor's theory... Evidently, according to said (bored) student the numbers five and six appeared more frequently than the numbers one through four. Professor Mosteller's unsurprising response was that the student had not tossed the dice enough times. 'Rest assured', the student was told, the law of large numbers would 'kick in' and everything would (eventually) converge to 1/6. Undeterred, the student continued rolling a few thousand more times, but the fives and sixes were still showing up way too frequently. Something fishy was afoot. It turns out that the observed frequencies were not quite 1/6 because the holes bored into dice – to represent the numbers themselves – shift the centers of gravity toward the smaller numbers, which are opposite the numbers five and six. Ergo, the two highest numbers were observed with greater frequency.”²²

This example shows, that ergodic processes need ideal conditions. To show the validation of ergodicity by an experiment, all factors which have an influence on the system must be constant and must not disturb the observed experiment.

However, even under ideal conditions statistical time series often have no direct logical explanation. Murphy's law for example was tested in a scientific experiment, which showed that a falling toast being buttered more frequently falls with its butter-side from the table to the floor.²³ The reason for this deviation was the height of the table, which gave the toast a lesser chance to turn completely.

The other question is in how far an open system like the world economy of today with transnational markets and daily worldwide exchanges can be described as 'ergodic'. Another aspect is that ergodic systems do not allow spontaneity in the sense of modifying or disrupting the conditions and rules. However, the history of economics shows spontaneity and disrupting processes in the markets all the time.

O'Donnell argues that Keynes and Knight would define risk and uncertainty in the same way. Risk as a quantifiable probability and uncertainty as a non-quantifiable risk. However, O'Donnell misses the point that there is a difference between Knight's and Keynes's definition of uncertainty. “The practical limitation of knowledge, however, rests upon very different grounds. The universe may not be ultimately knowable... but it is certainly knowable to a degree so far beyond powers of dealing with it...”²⁴ That means according to Knight that the information exists, but is not available due to

21 John Hicks: Causality in Economics, Basil Blackwell, Oxford, 1979, preface, p xi

22 Moshe A. Milevsky in: Financial Analysts Journal®, Volume 72, No. 2, pp. 9-10

23 Robert A. Matthews: “Tumbling toast, Murphy's Law and the fundamental constants”, in: European Journal of Physics, 16 (1995) p. 172-176.

24 Knight, Frank H. (2006 [1921]) in: Risk Uncertainty and Profit, Mineola, New York. Dover Publications, p. 210

human limitations of consciousness.

Knight proceeds: “As we have repeatedly pointed out, an uncertainty can by any method be reduced to an objective, quantitatively determinate probability can be reduced to complete certainty by grouping cases... with the result that when the technique of business organization is fairly developed, measurable uncertainties do not introduce into business any uncertainty whatever.”²⁵

In conclusion that means uncertainty according to Knight is *epistemological* in the sense that the information exists, but it is hidden due to complexity. So, the appropriate technique must be found to decode the information and to transform uncertainty to a probability or to complete certainty. It is epistemological in the same sense as the German Enigma-code in WW II was decoded by Turing.

In contrast Keynes describes a type of uncertainty which can be defined as *ontological*, because Keynes rejects the possibility to reduce uncertainty to a probability or complete certainty by computational methods. “... we have to admit that our basis of knowledge for estimating the yield ten years hence of a railway, copper mine, a textile factory, the goodwill of a patent medicine, an Atlantic liner, a building in the City of London amounts to little and sometimes to nothing; or even five years hence. In fact those who seriously attempt to make any such estimate are often so much in a minority that their behavior does not govern the market.”²⁶

In the result there is a significant difference in between the meanings of uncertainty in the sense of Keynes and Knight. While Knight defines uncertainty as a non-quantifiable risk, which can be reduced to a probability by computational methods (*epistemological uncertainty*), Keynes definitely excludes such a possibility (*ontological uncertainty*). This is the main difference between both definitions of uncertainty (Keynes vs. Knight), which O'Donnell has not realized.²⁷

Also Sheila Dow states: “It is explored here how limited these Knightian treatments of uncertainty are compared with Keynesian 'fundamental' uncertainty in terms of explaining the role played by uncertainty in the emergence of the crisis. A critical difference is the endogenous nature of Keynesian uncertainty, such that it evolves with the structural and behavioural changes designed to mitigate uncertainty.”²⁸

There might be differences in the definition of ontological and epistemological uncertainty between Davidson and O'Donnell which could lead to misunderstandings. O'Donnell writes “The risk / uncertainty distinction is the reframed as one between ontological certainty (ergodicity) and ontological uncertainty (non-ergodicity).”²⁹ O'Donnell proceeds: “The corollary is that epistemological uncertainty (derived from limitations in human knowledge or ability) is confined to the short run where only learning issues are relevant. Overtime learning eliminates epistemological uncertainty as agents come to know whether the ontological state they inhabit is ergodic or nonergodic.”³⁰

In contrast Stephen P. Dunn objects such a conclusion: “The discussion is underpinned by a distinction between ontologically 'certain' (closed immutable systems) and ontologically 'uncertain'

25 Ibid., p. 231-232

26 John Maynard Keynes, *General Theory*, BN Publishing, Breinigsville, 2010, p. 97

27 Stefan Voss: “When Keynes and Minsky meets Mandelbrot”, in: *Keynes's General Theory for Today*, Edward Elgar, Cheltenham, 2012, pp. 114-117.

28 Sheila C. Dow: “Addressing uncertainty in economics and the economy”, in: *Cambridge Journal of Economics* 2015, 39, pp. 33-47

29 *Journal of Post Keynesian Economics/Winter 2014/-15*, Vol. 37, No. 2 p. 190

30 Ibid.: p. 190

(open transmutable systems) environments. Models based on an ontologically 'certain' view of the world, such as rational expectations models (both New Classical and New Keynesian) make knowledge (epistemological) claims regarding the information sets that agents are assumed to possess in order to obtain their short-run policy implications. Models that suggest the future is not completely known but can be learned, that is agents are subject to bounded rationality, invoke epistemological 'uncertainty' but eschew a creative and transmutable ontology. They are not, however, founded on a creative and ontological open-system view of uncertainty."³¹ Dunn outlines that "In an open nonergodic world *sensible* agents will recognize that the future is one that can significantly differ from the past experience and present expectations. In a nonergodic world, where statistical distributions of the past provide a limited guide to the course of future events agents are truly uncertain, as there currently *does not exist information* that will enable them to discover the future."³²

Davidson would not agree to O'Donnell's definition. There is no human interference possible to 'eliminate epistemological uncertainty' by learning.

"The primary difference between risk and uncertainty for Knight is that uncertainty exists only because of the failure of human's 'actual powers' to process the information 'knowable' about the programmed economic cosmos."³³ Davidson concludes his article: "In conditions of true uncertainty, people often realize they just do not, and cannot, possess a clue as to what rational behavior should be."³⁴

The next crux is that Davidson does not link ergodicity to the real economic world but to all (economic) models created by the assumption of ergodicity:

"Unfortunately all mainstream economic theorists, ..., still require their theories to be based on the ergodic axiom so that immutable objective probability distributions govern past as well as future events."³⁵ Davidson proceeds: "We live in an economy with an irrevocable past and an uncertain future."³⁶

The rejection of the ergodic axiom was a critique against Samuelson's neoclassical synthesis: "Furthermore, in an article published in 1969, Samuelson argued that the 'ergodic hypothesis [axiom]' is a necessary foundation for his general theory."³⁷

The ergodic approach is also used by the *Chicago School*, which developed mathematical models to express uncertainty as quantifiable risks, which is labelled as *Modern Financial Theory* (MFT). The MFT offers a wide range of mathematical approaches to calculate risks, derived from uncertainty (*Value at Risk, Markowitz's portfolio theory, Black Scholes Option Price Model etc.*)

It is no surprise that MFT came under severe pressure of legitimation since 2007/09 due to the fact that these risk models were inappropriate to prevent the world financial system from its biggest

31 Stephen P. Dunn: "Bounded Rationality is not fundamental uncertainty", in: *Journal of Post Keynesian Economics*, Vol. 23, No. 4 (Summer, 2001), pp. 578-579, footnote no. 20.

32 Stephen P. Dunn: "Bounded Rationality is not fundamental uncertainty" in: *Journal of Post Keynesian Economics*, Vol. 23, No. 4 (Summer, 2001), p. 579

33 Paul Davidson: "Black swans and Knight's epistemological uncertainty: are these concepts also underlying behavioral and post-Walrasian theory?", in: *Journal of Post Keynesian Economics/Summer 2010*, Vol. 32 No. 4 p. 569

34 *Ibid.*, p. 570

35 Paul Davidson: *Post Keynesian Theory and Policy*, Edward Elgar Publishing, Cheltenham, , 2015, p.21

36 *Ibid.*: p. 31

37 *Ibid.*: p. 48

failure since WW II.

An article of the Journal of Banking & Finance gives a good example: “The experience from the global financial crisis has raised serious concerns about the accuracy of standard risk measures as tools for the quantification of extreme downward risks. A key reason for this is that risk measures are subject to a model risk due, e. g. to specification and estimation on uncertainty... Recent crises have laid bare the failures of standard risk models... It is as if the risk models got it wrong in all states of the world.”³⁸ Instead of questioning the whole assumptions of these models (ergodicity) the authors of this article come to the conclusion that “... we explicitly adjust risk forecasts for model risk by their historical performance, so that a risk model learns from its past mistakes.”³⁹ These models are based on the assumption of epistemological uncertainty which could be reduced by learning as also O’Donnell suggests.

These models of epistemological uncertainty Davidson criticizes include not only all (ergodic) economic models but also all risk models according to the MFT. If uncertainty could be reduced to probabilities, liquidity preference would have no meaning, because uncertainty could be transformed to quantifiable risks and consequently every risk could be insured by computational methods without the costs of liquidity.

M. G. Hayes correctly outlines that “Liquidity has value only because the future is unknown, and its value increases with our fear of what might happen, that we cannot prevent or insure against. In the *General Theory*, money is *the* liquid asset and dominant store of value, as well as the standard of value, and money’s liquidity is the foundation of its non-neutrality.”⁴⁰

Davidson says that “Economists and market participants (in the case of the last financial crisis; explanation by the author) had forgotten Keynes’s liquidity preference theory (hereafter LPT) and, instead, swallowed hook, line and sinker the belief that the classical efficient market theory (hereafter EMT) is the useful model for understanding the operation of real world financial markets.”⁴¹ And again Davidson outlines that: “Keynes LPT can provide the explanation. LPT presumes that the economic future is uncertain... EMT is not applicable to real world financial markets. LPT presumes that the economic future is uncertain... In a nonergodic world, current or past probability distribution functions are not reliable guides to the probability of future outcomes.”⁴²

These ideas are not just theoretical or esoteric views, they are also confirmed by practical economists like Mervyn King, the former Governor of the Bank of England: “Radical uncertainty refers to uncertainty so profound that it is impossible to represent the future in terms of a knowable and exhaustive list of outcomes to which we can attach probabilities. Economists conventionally assume that 'rational' people can construct such probabilities. But when business invest, they are not rolling dice with known and finite outcomes on the faces; rather they face a future in which the possibilities are both limitless and impossible to imagine... The essential challenge facing everyone living in a capitalist economy is the inability to conceive of what the future may hold. The failure to incorporate radical uncertainty into economic theories was one of the factors responsible for the

38 Boucher, Danielson, Kouontchou,Maillet: Risk models-at-risk, in: Journal of Banking and Finance, 44 (2014), p. 72

39 Ibid., p. 72

40 M. G. Hayes: “The General Theory: a neglected work?!” , in: Keynes General Theory for Today, Edward Elgar, 2012, p. 26

41 Paul Davidson: Post Keynesian Theory and Policy, Edward Elgar Publishing. Cheltenham, Northampton, 2015, p. 77

42 Ibid. p. 80

misjudgments that led to the crisis.”⁴³ Mervyn King has lost his confidence in MFT during the last financial crisis: “Only during the crisis of 2007-09 did I look back and understand the nature of the tensions between the surviving disciples of John Maynard Keynes who taught me in the 1960s, primarily Richard Kahn and Joan Robinson, and the influx of mathematicians and scientists into the subject that fuelled the rapid expansion of university economics departments in the same period. The old school 'Keynesians' were mistaken in their view that all wisdom was to be found in the work of one great man, and as a result their influence waned. The new arrivals brought mathematical discipline to a subject that prided itself on its rigour. But the informal analysis of disequilibrium of economics, radical uncertainty, and trust as a solution the prisoner’s dilemma was lost in the enthusiasm for the idea that rational individuals would lead the economy to an efficient equilibrium.”⁴⁴ King proceeds: “... John Maynard Keynes was convinced that radical uncertainty, as it has become known, was the driving force behind the behaviour of a capitalist economy.”⁴⁵

Keynes-specific critique: The erasure of the Treatise on Probability (TP)

Another objection is that Davidson would neglect the influence of the “Treatise on Probability” (TP) for the meaning of the GT. In this discussion two fractions appear in the post Keynesian school, the so called 'discontinuity-version' (Bateman, Davis) and the 'continuity-version' (Lawson, Carabelli, O'Donnell). This discussion still continues, however, fact is that Keynes made only a footnote of the (TP) in the GT⁴⁶ and did not make concrete alignments from the TP to the GT.

Gerrard, for example, mentions Ramsey’s “Foundations of Mathematics” in which Ramsey objects Keynes logical interpretation of probability to an extensive criticism, which should have had an influence on Keynes’s thinking about probability.⁴⁷ The meaning of TP for the GT might be questionable as it also might be very questionable that Keynes did not change anything of his views about probability during this long period from 1921 to 1936. It should be noted that Keynes was a mathematician before he became an economist. In a letter to Urban, the translator of the German edition of the TP, Keynes expressed his growing dissatisfaction with the TP (1926). “He believed that the ultimate theory of probability may differ considerably from the logical theory of probability and would not be surprised if the ultimate theory of probability is found to be some form of frequency theory. Keynes felt that progress in understanding probability required the further development of the partly psychological subject of vague knowledge.”⁴⁸

In addition Keynes’s article 'Professor Tinbergen’s Method (1939)' indicates that Keynes has changed his view from the TP: “Put broadly, the most important condition is that the environment in all relevant respects, other than the fluctuations in those factors of which we take particular account, should be uniform and homogeneous over a period of time. *We cannot be sure that such conditions will persist in the future, ...* (highlighted by the author).”⁴⁹

43 Mervyn King: *The End of Alchemy*, Little, Brown, London, 2016, p. 9

44 *Ibid.*, p. 12

45 *Ibid.*, p. 131

46 John Maynard Keynes, *General Theory*, BN Publishing, Breinigsville, 2010, p. 96: “By 'very uncertain' I do not mean the same thing as 'improbable'. Cf. My *Treatise on Probability*, chap. 6, on 'The weight of Arguments'.

47 Bill Gerrard: “Keynesian uncertainty -What do we know?” in: *The Philosophy of Keynes’s economics*, Routledge, London and New York, 2003, p. 243

48 *Ibid.*, p. 243

49 John Maynard Keynes: *Professor Tinbergen’s Method*, in: *The Economic Journal*, Vol. 49, No. 195 (Sep., 1939) p. 566

E. F. Schumacher's general critique of economists' methodology⁵⁰

Schumacher criticises the conventional approach of economics as 'science' and identifies seven groups of the “nature of statements or theorems put forward by economists.”⁵¹

1st: Definitions and explanations of terms, which are in frequent every-day use.

2nd: Certain logical and mathematical tautologies.

The first two groups “explanatory definitions and tautologies – belong uniquely to economics and are in no way derived from the subject matter of any other discipline. But they constitute, of course, only a minute part of what is actually being taught as economics.”⁵²

3rd: Psychological generalisations. Here E. F. Schumacher outlines that “Modern economists tend to be a bit more cautious: they qualify statements of this kind by words like 'on the whole' or 'in general'. Sometimes their psychological generalisations are about human nature *as such*, irrespective of historical settings and economic system, and sometimes they are claimed to be true only of human behaviour *within given society*.”⁵³

4th: Psychological generalisation about human behaviour within a given society.

5th: Geographical, geological, physiological, technological, organisational and other facts or situations in the 'outside world'.

6th : The use of conditional sentences in different grammatical form with phrases like 'if' , 'conditio sine qua non', resp. 'other things being equal', or 'let us assume...'

7th: Normative statements. Modern economists of today avoid the use the phrase 'ought to be' in order to be qualified as 'non-scientific'. Therefore, they use other terms with which they can hide their real intention. E. F. Schumacher explains “... they never use the word 'ought' except in connection with the word 'rational': ... but it is none the less an evasion; for the idea of rationality in economics is useless unless it relates to goals which are themselves rational.”⁵⁴

The HAC approach on the test bench

Putting together all points of Schumacher's criticism of common place economists' methods O'Donnell's HAC approach would be a good example, because it nearly fits all points E. F. Schumacher lines out.

O'Donnell argues: “In general terms, the HAC approach has three foundations: The first consists of (epistemologically oriented) facts about human condition that refer to limitations in our knowledge and abilities and that are as true, objective, and indubitable as any other facts we possess...”⁵⁵

This sentence includes the classes 1 and 2. Definitions and explanations of terms, which are in

50 E. F. Schumacher: “Does Economics Help? An Exploration of Meta-economics” in: “After Keynes”, Basil Blackwell, Oxford, 1973, pp. 27-36

51 Ibid.: p. 27

52 Ibid.: p. 27

53 Ibid.: pp. 27-28

54 Ibid.: p. 28

55 Journal of Post Keynesian Economics/Winter 2014/-15, Vol. 37, No. 2, p. 206

frequent every-day use and phrases such as 'limitations in our knowledge', 'abilities' that are as 'true', 'objective'. Furthermore, O'Donnell then claims a conditional sentence (class 6) to these expressions with the phrase 'as any other facts we possess'. This is a combination of empty definitions in combination of a condition without any meaning. What are the other facts we possess? What are the limitations of our knowledge, when we are simultaneously have abilities which are true and objective as any other facts we possess? It is a combination of the classes 2, 3 and 6 which are in the result tautologies only. There also appears class 4 because 'facts of human conditions that refer to limitations' is also a psychological generalisation.

O'Donnell proceeds: "... we do not know the future; we have incomplete knowledge of the past and present."⁵⁶ This is again a combination of class 1 and 2. However it also stands in contradiction to itself when we, as previously said, have 'abilities that are as true, objective and indubitable as any other facts we possess'. So, this is not a tautology only, it is a tautology with contradictions by itself.

Again O'Donnell proceeds "...we have no means of knowing, with certainty, anything about future events or everything about past and present events."⁵⁷ In the result that might be a correct conclusion by considering all thoughts mentioned before. Self-contradicting tautologies have no means of knowing at all. This is class 1 and 2 in combination. The next input first looks like a condition (class 6) 'with certainty' and 'anything about future events or everything about the past and present events' In combination with all previous thoughts and sentences this is a pleonasm only, because, if one has 'no means of knowing' the logic presents the meaning of the rest of the expressions followed.

O'Donnell outlines "Second, the HAC approach is independent of whatever deeper stochastic or non stochastic ontology the world might happen to have."⁵⁸ This is again a combination of class 1, 2 and 6. The third point O'Donnell claims is most interesting: "... our rational strategies for dealing with these uncertainties and limitations are either probabilistic or non-probabilistic, with both seeking as much rationality as situations allow."⁵⁹

The definitions of limitations and uncertainties remain unclear (class 1 and 2), but what are the 'rational strategies' for dealing with them? Here, we come to class 7 (normative statements), because rational strategies always have a normative character and by the expression 'rational' the normative assumption is hidden effectively. 'Probabilistic or non-probabilistic' can be subsumed to classes 1 and 2, but the most clever insertion is 'both seeking as much as rationality allow'. The whole sentence is a perfect conclusion in combination of classes 1,2,3,4,5,6 and 7.

Classes 1 and 7 are already declared, 3 and 4 are psychological generalisation ('our limitations') and human behaviour in a given society ('as situations allow'), class 5 also includes external factors, because 'as situations allow' can also mean this, and it also can be subsumed to class 6, because 'as' is a conditional clause.

So, O'Donnell's form of argumentation can be criticised by E. F. Schumacher's criticism of the conventional 'method' of many economists which is no methodology in reality but only a rhetorical trick. It is a "... progression from Generalisation to Assumption to Assertion and finally, to Norm."⁶⁰

56 Ibid. p. 206

57 Ibid. p. 206

58 Ibid. p. 206

59 Ibid. p. 206

60 E. F. Schumacher: "Does Economics Help? An Exploration of Meta-economics" in: "After Keynes", Basil Blackwell, Oxford, 1973, p. 35

O'Donnell cannot be blamed for this solely, because this 'method' appears in a vast volume of economic literature of today and makes this subject in many cases so insufficient and not applicable to the real economic world of today. Or like E. F. Schumacher claims: "If economists continue to refuse to face such fundamental metaphysical – or, if you prefer the term, philosophical – questions, I cannot see that they can have any idea of what they are really teaching and what is the relationship of their teaching to truth."⁶¹

Last but not least O'Donnell's generalisations always appear in a 'given society'. There is no question about the structure of an economic system, its social structure, its history or the possibilities of a general change. O'Donnell's theory is quite static and pre-determined.

In addition O'Donnell's objections against the ENE approach are incorrect regarding the comparison of Keynes's and Knight's definition of uncertainty as equal. Using the hypothesis of infinity to reject the ENE approach is neither practical nor it stands at the forefront of the academic discussions of physics and mathematics.

The eENE approach offers a solution

The detachment of the ENE approach from pure mathematics and physics should be the solution. As elaborated, the direct linkage to mathematics, statistics and physics makes less sense in order to describe economic processes. A transformation of the ENE approach to a single economic module would offer the solution to make the ENE approach applicable for economic and financial issues of today. Further developments of the ENE approach could be set as a counterpart and an alternative to the current prevailing MFT which has become obsolete during the last financial crisis.

The ENE approach could be transformed to a model of a moral science. It could be labelled as "*economic ENE approach*" or "*eENE approach*".

It should be defined by classes as follows:

- The economy is nonergodic.
- The future is not pre-determined by any data of the past. The future is unknown and transmutable.
- Uncertainty cannot be reduced to risk by any computational methods.
- Learning from data of the past has no value for future decisions in a permanently evolving economy.
- Liquidity preference has a value due to an unknown future.
- Due to Liquidity preference money is not neutral.

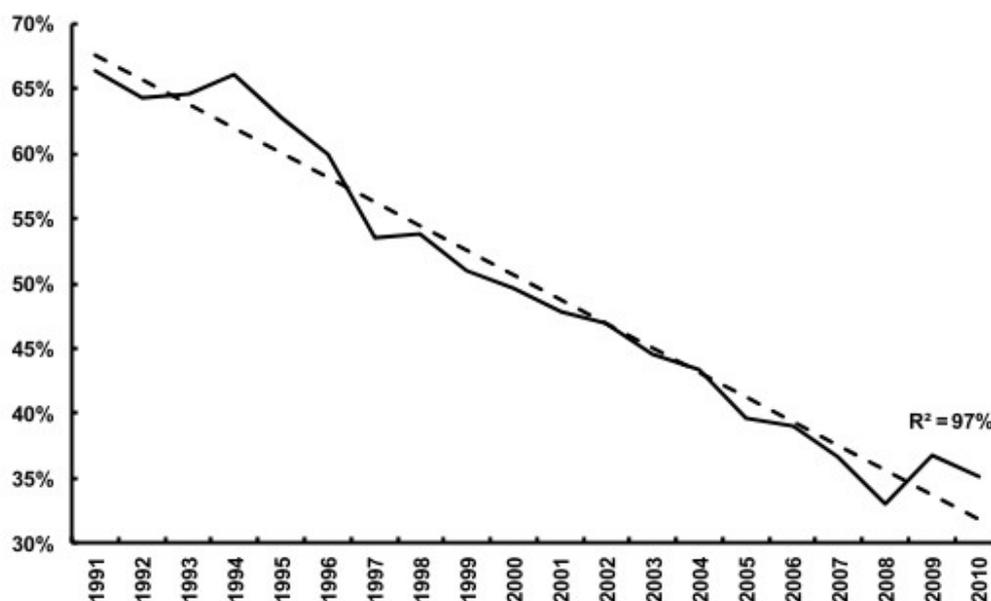
Based on these assumptions a new post Keynesian financial theory could be developed which could have a much higher level of performance than the currently prevailing MFT. Therefore, the reasons of the last financial crisis according to the regulations of Basel will be discussed.

61 Ibid. p. 34

The meaning of the Leverage Ratio for the financial crisis

As the graph below shows the portion of risk weighted assets (RWA) to total assets (TA) of systematically important banks fell more or less constantly from close to 70% in 1991 to 35% in the immediate pre-crisis period. “The significant drop in the risk-weighted assets ratio implies that either (a) the exposures of systematically important banks were in the immediate pre-crisis period only half as risky as during the previous decade or (b) the regularity framework based on risk-weighted assets omitted a huge proportion of the actual risk exposures of systematically important banks. Given the unprecedented scale of the financial crisis, the latter alternative is far more likely.”⁶²

Figure 1. Historical development of the RWA/TA ratio of systemically important banks



Source: The Banker Database, Author's calculations and estimates, See Appendix 1. For a similar chart for selected individual banks, see Figure 14 in Blundell-Wignall and Atkinson (June 2011).

Original Source: OECD Economics Department Working Papers No. 916

The explanation for this trend is, according to this OECD paper, that 'Risk weighted regulation' leads to unintended consequences as it encourages innovation to bypass the regulatory regime rather than to serve non-financial enterprises and households.”⁶³ The Basel I accord was implemented in 1992 and gave strict regulations to the RWA. These RWA had to be covered by a specific portion of equity. So, banks were searching for unconventional business opportunities in order to bypass the regulations and increase profits. These regulations caused unintended incentives as for example to increase the amount of mortgage lending sub-prime loans to a very high level. The whole sector took advantage of the fact that “... their main profit were derived from securitisation of loans rather than from a prudent credit-risk assessment of individual loans. A major focus of systematically important banks has been to maximise profits by engineering unconventional assets, rather than making sure that each loan individually is worth the credit risk. Risk-weighted regulation shifts

62 Patrick Slovik in: “Systematically Important Banks and Capital Regulation Challenges” - OECD Economics Department Working Papers No. 916, 2012, p. 5

63 Ibid. p. 6

banks' attention and resources away from conventional lending."⁶⁴

The logic now is that the Basel III regulations have implemented a leverage ratio (Tier 1 / Exposure measure) in order to get early signals for preventing a financial crisis. "The Basel III framework requires that the leverage ratio and the more risk-based requirements work together. The leverage ratio indicates the maximum loss that can be absorbed by equity, while the risk-based requirement refers to a bank's capacity to absorb potential losses."⁶⁵

In the result the leverage ratio is a risk-neutral ratio. The Basel III regulations intend to combine a risk-ratio and a risk-neutral ratio to limit the total risks of the financial system. It implies that one part of the assets can be quantified as risks and the other part cannot be quantified. It also implies that the methodology of the MFT cannot cover all risks of bank's assets, but it implies that the RWA risks are measured correctly by the MFT. However, logically thinking, it also cannot be excluded that the MFT cannot quantify risks adequately.

"... it was not expected that for systemically important banks the share of risk-weighted assets in total assets would consequently drop from 70% to 35%. Nor was it expected at the time that the financial system would transform high-risk subprime loans into seemingly low-risk securities on a scale that would spark a global financial crisis."⁶⁶

Mervyn King has several concerns about risk weights derived from statistical studies: "For example, past data had suggested that mortgages were a relative safe asset for banks to own, and yet in the crisis they turned out to be the source of large losses... The appropriate risk weights can change abruptly and suddenly, especially in a crisis, and are an example of radical uncertainty... In the case of bank regulation, it is better to use the measure of leverage ratio rather than a ratio of capital to risk weighted assets... A Bank of England study of 116 large global banks during the crisis (of which 74 survived and 42 failed) found that the simple but robust leverage ratio was better a predicting which banks would fail than the more sophisticated risk-weighted measures of capital."⁶⁷

Skidelsky⁶⁸ makes insufficient risk models and the neglect-ion of Keynesian uncertainty highly responsible for the last financial crisis. Stiglitz⁶⁹ criticizes Skidelsky's view: "Skidelsky makes much of the distinction between risk and uncertainty... Clearly, the investment banks and rating agencies relied too heavily on flawed statistical models, as did the regulators. Those models gave them confidence that the risk of a serious problem was negligible, something that might happen once in a million years. But much of the behavior that led to the crisis (the irrational and sometimes predatory lending, the excess of leverage and other forms of risk-taking) did not depend on this distinction. More important, for instance, were the incentives, which encouraged banks to take on too much risk, and induced them not to think to deeply about the flaws in their statistical models. Flawed incentives, inadequate regulation and a lack of scruples also help explain the abusive lending practices that played so large a role in the crisis."⁷⁰

Stiglitz says that agents had no incentives for further investigations of their risks. The matter of the

64 Ibid. p. 7

65 Michael Brei and Leonardo Gambacorta: "The leverage ratio over the cycle", in: BIS Working Papers, No 471, November 2014, p. 2.

66 Patrick Slovik in: "Systematically Important Banks and Capital Regulation Challenges" - OECD Economics Department Working Papers No. 916, 2012, p. 10

67 Mervyn King: *The End of Alchemy*, Little, Brown, London, 2016, pp 138-139

68 Robert Skidelsky: *Keynes: The return of the Master*, Allen Lane, September 2009

69 Joseph Stiglitz: "The Non-Existent Hand", in: *London Review of Books*, Vol. 32 No. 8, 22 April 2010

70 Ibid. p. 2

truth is that they did not know their risks and the combination with misleading incentives led to the crisis. The statistical models were not flawed, but completely wrong. The packages of sub-prime loans offered to banks were falsely rated with a AAA-rating by rating agencies.

The failure of AIG was based on the fact that all derivative valuation models were defunct. This also happened to the Long Term Capital Management (LTCM).⁷¹ To speak frankly in Keynesian terms it was better to fail conventionally than to succeed unconventionally.

The implementation of a leverage ratio according to Basel III is a confession that the MFT is incorrect. If the MFT would be correct a leverage ratio would not be needed.

The financial crisis of 2007/09 was not a liquidity crisis primarily

The last crisis happened in conditions of deregulated financial markets and the belief that markets would be efficient. Liquidity preference according to Keynes played no role, because a lack of liquidity could be refinanced over the repo-markets or the interbank markets. When sub-prime loans began to default and systemic relevant financial institutions like AIG (which replaced its equity and liquidity by derivatives calculated by models of the MFT) began to tumble, the financial markets lost confidence. The result was that liquidity ran out, because the amount of sub-prime loans of each bank was not visible, due to the fact that these assets were put off-balance to other financial entities. The only way to prevent a total collapse of the world financial system was that central banks intervened and supplied the financial markets with sufficient liquidity. The efficient market theory proved to be a naive theory.

The BIS claims: “During the early liquidity phase of the financial crisis starting 2007, many banks – despite meeting the existing capital requirements – experienced difficulties because they did not prudently manage their liquidity. The crisis drove home the importance of liquidity to the proper functioning of the financial markets and the banking sector. Prior to the crisis, asset markets were buoyant and funding was readily and cheaply available. The rapid reversal in market conditions showed how quickly liquidity can dry up and also how long it can take to come back. The banking system came under severe stress, which forced central banks to take action in support of both the functioning money markets, and in some cases, individual institutions.”⁷²

To avoid a new financial crisis, the Basel III framework implemented the Liquidity Coverage Ratio (LCR) for the short term availability of sufficient liquidity within the next 30 days and the Net Stable Funding Ratio (NSFR) for the long term availability of sufficient liquidity within the next 365 days under a stress scenario. The issue is to enhance the internal liquidity of financial institutions and to make them less dependent on liquidity offering markets. Unofficially, the liquidity preference theory, the non-neutrality of money and uncertainty as a non-quantifiable risks, which also cannot be quantified by any computational methods, which means that uncertainty is ontological and not epistemological, has been confirmed by the Basel Committee. 'The return of the master' (Skidelsky 2009) did not enter officially, but as a 'hidden champion' in the Basel III regulations.

In chapter 12 of the GT Keynes explains that “... it is by no means always the case that speculation predominates over enterprise. As the organization of investment markets in the world, namely, New York, the influence of speculation (...) is enormous... Speculators may do no harm as bubbles on a steady stream of enterprise. But the position is serious when enterprise becomes the bubble on a

71 Stefan Voss: “When Keynes and Minsky meets Mandelbrot”, in: Keynes General Theory for Today, Edward Elgar, Cheltenham, 2012, pp. 114-117.

72 BIS: “Basel III: the net stable funding ratio“ in: Basel Committee on Banking Supervision, October 2014, p. 1

whirlpool of speculation. When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done.”⁷³

Regarding the instability of the financial markets Keynes proceeds his analysis as follows: “Even apart from the instability due to speculation, there is the instability due to the characteristic of human nature that a large proportion of our positive activities depend on spontaneous optimism rather than on a mathematical expectation, whether moral or hedonistic or economic.”⁷⁴

It would be too simple to characterize the last financial crisis as a pure liquidity crisis. If it just would have been a liquidity crisis the world economy would have recovered sharply after the liquidity problems of the financial markets were solved. The world economy did not recover sharply and is still in vain. Keynes gives an explanation for this in chapter 22 of the GT (Notes on the Trade Cycle): “But I suggest that a more typical, and often the predominant, explanation of the crisis is, not primarily a rise in the rate of interest, but a sudden collapse of the marginal efficiency of capital... Moreover, the dismay and uncertainty as to the future which accompanies a collapse in the marginal efficiency of capital naturally precipitates a sharp increase in liquidity-preference – and hence a rise in the rate of interest... Liquidity-preference ... does not increase until *after* the collapse in the marginal efficiency of capital.”⁷⁵

The GT can explain the reason for the financial crisis 2007/09. It was not the suddenly appearing lack of liquidity, but the collapse of the marginal efficiency of capital. Due to the predominant financial speculation over the enterprise economy, market participants lost confidence in the light of a disastrous conceptualised financial market. Then the marginal efficiency of capital dropped sharply and led to a liquidity crisis. While the liquidity preference increased significantly, liquidity ran out on the repo- and interbank markets, because suddenly demand for liquidity rose up to very high levels. The efficient market hypothesis failed. The reason why the interest rates did not rise was a consequence of central banks’ policy. Central bankers did not intend to repeat the same mistakes of 1929. “To prevent a repetition of the Great Depression, central banks during 2008 and 2009 cut interest rates virtually to zero, at which point influencing the supply of money directly was the only remaining instrument.”⁷⁶ From the viewpoint of a non-ergodic model the question is whether lowering the interest rates on the deepest level of history was an appropriate action to limit the crisis. The economic world of today can deliver much more liquidity from a non-banking or shadow-banking system than in 1929.

To reduce the interest rates below zero and to declare a 'war on cash' does not increase the state of confidence of common people. Measures which were a mistake in 1929 might not be a full mistake for 2007-09. The question is in how far a small increase of interest rates might really have a contractive impact to the economy or if interest rates below zero combined with a 'war on cash' might have a stronger con-tractive influence because it flaws the state of confidence of an average businessman or consumer.

The view of Rogoff and others that negative interest rates and the deletion of cash money in order to enforce more investments is a very mechanistic view. It excludes the psychology of human beings (animal spirits) and the necessity to improve the state of confidence according to Keynes. It is more likely that this policy has an opposite effect, because it increases uncertainty: “Nonetheless, there is great uncertainty about the behaviour of individuals and institutions if rates were to decline further

73 John Maynard Keynes, *General Theory*, BN Publishing, Breinigsville, 2010, p 103

74 *Ibid.*, p. 104

75 John Maynard Keynes, *General Theory*, BN Publishing, Breinigsville, 2010, pp. 196-197

76 Mervyn King: *The End of Alchemy*, Little, Brown, London, 2016, p. 181

into negative territory or remain negative for a prolonged period. It is unknown whether the transmission mechanisms will continue to operate as in the past and not be a subject to 'tipping points'.⁷⁷

However, central banks and policymakers could not take convincing measures in order to improve the state of confidence. In the result the marginal efficiency of capital remains low and interest rates are also on a historic low level and have no sufficient impact on new investments. The Basel Committee did recognize the surface of the liquidity crisis only, but is – in contradiction to Keynes - missing a deeper analysis for the crisis.

⁷⁷ BIS Quarterly Review, March 2016, p. 42

Conclusion

The analysis of the last financial crisis shows the importance of the distinction between risk and uncertainty (ontological) in Keynesian terms in contrast to Knightian risk and uncertainty (epistemological), the liquidity preference, the non-neutrality of money and the marginal efficiency of capital for explaining the crisis. Davidson's ENE approach is profoundly linked to Keynesian theory. However due to the strong connection to mathematics and physics it is highly object-able.

The ENE approach should be transformed to an *economic* ENE approach (eENE). At this stage the eENE approach could have the potential to replace the still dominant MFT which failed several times historically. A good example is the risk-neutral leverage ratio which is in line with the eENE approach and the Keynesian phrase that it would be better to be roughly right than to be precisely wrong (as in the risk-models of the MFT).

O'Donnell's HAC approach has not recognized the difference between Knightian and Keynesian uncertainty. To describe Keynesian uncertainty as epistemological conflicts with several characterizations in Keynes's GT. The axioms of the HAC remain partially tautological and not applicable for the current economic discussion and the regularity framework of the financial markets of today.

The current controversy between Davidson and O'Donnell is symptomatic for the crisis of the Post Keynesian school. It is the lack of understanding and definition of uncertainty in economics, which is a main axiom of this school related to other schools, especially the neoclassical synthesis or the New Keynesian School. The Post Keynesian school is only discussing with itself and has missed the chance for access to policies related to the last financial crisis. This school was unable to put only one small single contribution to the actual new regulations of financial markets (Basel III) or general economic policy, because they have isolated themselves from the discussion, even though Keynes can give more profound explanations to this crisis than the prevailing economic theories or any other theories.

The Post Keynesian school still has not identified its huge potential in these times. For example the MFT could be replaced or partially replaced by a new capital risk theory according to Keynes. Further developments would be needed. This is only one example for which Keynesian theory could be made applicable. There should be many other cases too, but this school is simply missing its opportunities.

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