



Working Paper No. 918

Investment Decisions under Uncertainty

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December 2018

*The author thanks Cambridge Political Economy Society Trust for a research grant that helped to collect materials for this paper.

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ISSN 1547-366X

ABSTRACT

Divergent trends, as observed, between growth in the financial and real sectors of the global economy entail the need for further research, especially on the motivations behind investment decisions. Investments in market economies are generally guided by call-put option pricing models—which rely on an ergodic notion of probability that conforms to a normal distribution function. This paper considers critiques of the above models, which include Keynes’s *Treatise on Probability* (1921) and the *General Theory* (1936), as well as follow-ups in the post-Keynesian approaches and others dealing with “fundamental uncertainty.” The methodological issues, as can be pointed out, are relevant in the context of policy issues and social institutions, including those subscribed to by the ruling state. As it has been held in variants of institutional economics subscribed to by John Commons, Thorstein Veblen, Geoffrey Hodgson, and John Kenneth Galbraith, social institutions remain important in their capacity as agencies that influence individual behavior with their “informational-cognitive” functions in society. By shaping business concerns and strategies, social institutions have a major impact on investment decisions in a capitalist system. The role of such institutions in investment decisions via policy making is generally neglected in strategies based on mainstream economics, which continue to rely on optimization of stock market returns based on imprecise estimations of probability.

KEYWORDS: Uncertainty; Probability; Weights; Investment; Keynes; Institutional Economics

JEL CLASSIFICATIONS: B25; E02; E12; E22; G01; G11

I. THE BACKGROUND

Divergences between growth in the financial and real sectors of the world economy call for further enquiries, both into the framework that is currently influencing the alternate channels of investments in markets and into the institutions that shape the policies promoting such decisions.

With the proliferation of high finance failing to deliver proportionate growth rates in the real economy, especially in advanced economies—which have been subject to stagnation over some time—the dissimilar growth rates between the real and financial sectors have similarly surfaced in the emerging economies. Statistics on the slow GDP growth rates indicate that it was around 2.1 percent on average in the advanced economies during 2015–17, indicating downslides from the precrisis rate in 2007 of 2.6 percent. As for emerging and developing Asia, which includes China and India, the average growth rate has been at 6.6 percent over the 2015–17 period, representing a considerable drop from the 8.3 percent average between 2009–11 (IMF 2018).

However, it needs to be pointed out that the sluggish GDP growth rates as noted above stand in sharp contrast to the boom in the financial sector, both in advanced and emerging economies. With global banks—namely, those recognized by the International Monetary Fund (IMF) as “systematically important”—almost doubling their assets from \$27 trillion in 2005 to \$51 trillion by 2016 (IMF 2017, 7), and with the trading of outstanding exchange-traded and over-the-counter (OTCs) stocks, respectively, at \$105.5 trillion (March 2018) and \$531.9 trillion (second half 2017) (BIS 2018, 261), the fact that financial transactions moved at a much faster pace as compared to the real economy remains beyond doubt. As indicated by data from the Bank for International Settlements (BIS), the notional value of outstanding OTC derivative contracts at end of 2014 was more than eight times the value of global output for the year (BIS 2018, 261).

A scene as described above prompts us to inquire as to how investment decisions are made by agents operating in the deregulated global and domestic financial markets. An attempt is made in the present paper to identify and critically assess the principles that guide investment decisions of agents in markets. It is relevant in this context to point out that deregulation of

financial markets has generally been responsible for the relatively higher rates of return on financial assets as compared to those backed up by real assets (Sen 2003, 30–1).

Section II of the paper offers an enquiry into the business practices behind the current investment decisions in the market, followed by a critical overview of the methodology used to arrive at such decisions. A reference is made here to call-put option pricing models, as based on the much-acclaimed Black-Scholes framework of stock pricing, drawing attention to the model's application of a numerical probability calculation on an objective basis to estimate option pricing. In effect, the method relies on ergodic notions of probability, which, as assumed, are subject to a normal distribution function.

In reviewing the practice described above, we draw attention to Keynes's (1921) critique in the *Treatise on Probability* of the utilitarian Benthamite version of probability calculation and his follow up by an alternate subjective approach in his *General Theory* (1936), which relied on probability under uncertainty. The above has been followed up in the literature by what can be described as contributions in post-Keynesian traditions, especially by linking it to the notion of probability under "fundamental uncertainty."

The present paper, pointing out the limitations of using an ergodic approach to probability in current investment practices brings to the fore the relevance of the above alternate formulations in the Keynesian tradition. As is pointed out, those critiques are relevant in understanding the recurrence of the financial boom, as well as the related turbulences and the real stagnation we currently witness. Contributions of the present paper also include an important point in Keynes's (1921) *Treatise on Probability*, indicating that added information (or data) does not necessarily enhance the degree of probability. The point, rather neglected so far, needs attention, especially in assessing the validity of the rather mechanical econometric tests that rely on time-series or cross-section data. In my view, the matter—along with the critique of the method for probability calculation in the option pricing models of the Black-Scholes variant—constitutes the present paper's original contributions to the available literature on probability and its assessment under uncertainty. The other contribution of this paper lies in linking up policies and methodologies, at levels of agents and institutions, as pointed out below.

Section III of the paper connects the issues raised in this paper to the contemporary policy issues and institutions in market economies. This brings the paper to the role of institutions that, as held in institutional economics of the old variant, shape decisions of individuals in the economy. By influencing business concerns and strategies, institutions exercise a major role in investment decisions under capitalism. Depending on the business environment and the principles guiding such institutions, prescriptions that follow as official policies do shape the patterns of investments in the market, having consequences that are often unpredictable in markets. As pointed out in the present paper, the related changes that emerge, in essence, chart out a path that can be identified as one of “fundamental uncertainty,” with concentric or overlapping waves of activities in the market tending to reinforce each other.

II. THE METHODOLOGY BEHIND INVESTMENT DECISIONS: A CRITICAL ASSESSMENT

To start with, in this section the standard theories that currently guide investments decisions in market economies are identified. This is followed by an account of the alternate positions, largely in the Keynesian tradition, critiquing the basic assumptions that underlie the conventional theories in their attempted calculations of future probabilities.

Investment decisions in stock markets often rely on the call-put option pricing formula,¹ which in mainstream economics is recommended as a tool for deciding on investments in short- or long-run projects. Assuming “rational choice” on the part of economic agents in free markets, this model rules out uncertainty in the decision-making process (Thompson and William 1999–2000, 248). Named after Fischer Black, Myron Scholes, and Robert Merton (1973), Noble Prize winners in economics, the model (henceforth BSM) has remained a popular tool in investment

¹ We may recall here the formula for call (buy) options as: $C_0 = S_0 N(d_1) - X e^{-rT} N(d_2)$, where S_0 is the call option price; X is the exercise price; r is the risk-free interest rate; T is time span; σ is the standard deviation of log-returns; and d_1 as well as d_2 , respectively, are the positive and negative functions of volatility (σ) where $N(x)$ is the cumulative probability function for a standardized normal variable where $d_1 = [\ln(S/X) + (r + \sigma^2/2)T] / \sigma\sqrt{T}$ and $d_2 = [\ln(S/X) + (r - \sigma^2/2)T] / \sigma\sqrt{T} = d_1 - \sigma\sqrt{T}$.

Note that σ is the volatility of the stock price, which is measured in terms of the standard deviation of the past stock prices based on the assumption of a standard normal distribution.

decisions by agents in markets (Thompson and William 1999–2000, 247). In terms of the assumptions underlying the formula for call-put (or buy-sell) options in terms of the BSM model, agents operating in markets rely on an ergodic probability function, which in turn makes the future intractably linked to the past, while weights attributed to past events continue to determine the probabilities of future outcomes.

It is clear from the above that an essential aspect of the BSM model is the assumed ability of the agents to *calculate* probability, which therefore rules out uncertainty. With investment decisions in the current period resting on what happened in past, few surprises are thus expected by the investors in terms of the predictions under the stock-option pricing formula. As predicted in models like the one described above, prices of the options are pitched higher with higher volatility (the standard deviation) of the stock prices in the market. Also described are the “underlying” assets whose value is considered to determine the cash flows of the call options. It needs to be noticed here that the formulation arrived at to calculate the standard deviation for the log-normal of stock prices obviously bases itself on an assumed normal distribution function of such prices over time, which is untenable.

While the BSM formula has been questioned in recent times—especially on grounds of its limiting assumptions, which include the ergodic probability subject to a normal distribution function—the possible calculation as such of probabilities had been subject to criticisms much earlier. The early debates date back to the 1920s when Keynes (1921), in his book *Treatise on Probability* (henceforth the *Treatise*), attacked the utilitarian and cardinal (or statistical) notions in the prevailing frequency theories of probability (Bateman and Davis 1991, 55). His main contention in the *Treatise* was that probability is not the outcome of statistical frequencies, but a *logical and rational-objective relation*, one that marked a significant departure from the relative frequency theories of probability. Keynes’s position on probability in the *Treatise* was considerably influenced by G. E. Moore ([1903]1933), the contemporary philosopher who contested “utilitarianism” (which was the most influential school of thought in his time). However, Keynes refused to go by the Moorian ethics of the “good” and the “rules,”² because

² As pointed out by Moore, not all goods desired by people can be “good.” The “good,” as held by him, could only be discovered by following “rules of conduct” based on the relative probability of the “good” being obtained.

he found hidden therein a frequency approach for discovering “good” performance (Bateman and Davis 1991, 58).

Probability relations as defined by Keynes in the *Treatise* spelled out the “degree” of belief (α) on actual observations (a), the latter relying on knowledge (h). This was formulated as $\alpha = a/h$ (Keynes 1921). The “logical-objective” relation of probability (α) as above is also considered to be based on a *rational* degree of belief under “objective” conditions and “...not subject to human ‘caprice’” (Bateman and Davis 1991, 58).

A major departure took place in Keynes’s notion of probability by the 1930s when the famous mathematician-philosopher F. P. Ramsay (1931)³ questioned Keynes’s information-theoretic (and objective) notion of probability in the *Treatise*. Ramsay was finally successful in changing Keynes’s notion of probability to a subjective one (Ramsay 1989, 219–22).

It can be noticed that while Keynes had already switched to a subjective point of view of probability relations by the early 1930s,⁴ the change finally led to the major alternative formulation of probability relations, which came up in his new book, *The General Theory of Employment, Interest and Money* (1936) (hereafter, the *General Theory*).

Before dwelling on the significance of alternative formulations, as in the *General Theory* and in later formulations (especially for investment decisions under uncertainty and their macroeconomic consequences), this paper deals with the following important contribution in Keynes’s *Treatise*, hitherto rather unnoticed. This relates to the “probability relation” ($\alpha = a/h$) and its link to knowledge (h). As claimed in the *Treatise*, the *availability* of additional evidence (h_1) while supplementing the prevailing evidence (h) does *not* necessarily *add* to probability. To quote, “The magnitude of the probability of an argument ... depends upon a balance between what may be termed the *favourable and the unfavourable evidence*; ... a new piece of evidence

³ In Ramsay’s book, *Truth and Probability* (written in 1926 but published posthumously in 1931), foundations were laid for the first time for a *theory of subjective probability*.

⁴ As it has been pointed out by Bateman and Davis (1991, 58), “... Youthful Keynes (1921) of *Treatise on Probability* still believed in reliable, rational people contemplating the ‘good’ resulting from their actions and the degree they believed that it could occur. For mature Keynes (1931), he faced people who are pursuing a plethora of ends (good, bad, etc.) and using subjective degrees of belief regarding outcomes.”

which leaves the balance unchanged, also leaves the probability of the argument unchanged. ... As the relevant evidence at our disposal increases, the magnitude of the probability of the argument may *either decrease or increase*, according as the new knowledge strengthens the unfavourable or the favourable evidence” (Keynes 1921, 71; italics added). Keynes, citing Pierre Simon Laplace (a French mathematician of the previous century), pointed out that “[...] probability is affected partly by our ignorance and partly by our knowledge” and as a justification, it is mentioned that “[...] this theory tells us what further rational belief, certain or probable, can be derived by valid argument from our direct knowledge” (Keynes Papers, Kings College Archive, Cambridge, TP/D/6). As Keynes (1921, 315–16) emphasized very clearly, mathematical expectations are not always numerically measurable.

Incidentally, it is in the above context that Keynes drew the distinction between the “weight” of the evidence as contributed by *additions* to knowledge (say h_1) and its impact on the probability relation (α), and that the two are not necessarily linked. He explains this by the fact that the new pieces of evidence, if found as “relevant,” while adding to the “weight” *may or may not* contribute to the probability relation (α) of the argument. However, he also adds that situations where such additional evidence is “irrelevant[,] the weight may remain unchanged.” Thus for situations where the evidence is “relevant,” “... the weight ... measures the sum of the favourable and unfavourable evidence, [while] the probability measures the *difference*” (Keynes 2013, 77–78, 84). As for the role of “weight” in the assessment of probability relations, Keynes (1937) made the statement later in his *Quarterly Journal of Economics* article that in case the “weight” happened to be unavailable, uncertainty was irreducible and probability could not be ascertained (Bateman and Davis 1991, 82).

Coming back to the point raised above, it is apparent that information that provides additional evidence in any estimation, while necessarily adding to weight, may actually contribute to reduced levels of probability, especially when laden with facts that are unfavorable to the argument. It can be observed here that despite relying on rational-objective relations, probability, as mentioned in the *Treatise*, connects to the domain of uncertainty. This is by dealing with the imponderables of unforeseen events. The approach distinctly relates to uncertainty and its ramifications in Keynes’s *General Theory* (1936), and also to what has been described by the post-Keynesians as “fundamental uncertainty.”

The point highlighted above relating to the contribution of additional evidence on probability relations provides an important *counterpoint* to the standard mainstream models of probability estimations that are based on cross-section or time-series data. It thus turns out that an extension of the series to a wider time span or higher number of observations does not necessarily result in a more accurate probability estimate.

Sidelining the critiques offered by Keynes and the latter-day formulations by the post-Keynesians, the majority of businesses today continue to rely on mainstream forecasting models for their probability calculations. The essence of those “rational expectation models” at any future date comes out as the “... statistical shadow of past and current market data” (Davidson 2003, 230–31). Conclusions derived from such a framework do not stand up to scrutiny if applied to guiding investment decisions in a world that is assumed to be bereft of uncertainty. As Keynes (1936, pviii) commented in the *General Theory*, “Human decisions affecting the future cannot depend on strict mathematical expectation, since the basis for making such calculations does not exist.”

To get back to the alternate interpretation for investment decisions, as in the *General Theory*, it goes with “animal spirits,” as “... the spontaneous urge for action rather than inaction and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative averages” (Keynes 1936, 161–62). The “caprice” of the *Treatise* (Keynes 1921), transformed into “animal spirits” in the *General Theory* (Keynes 1936), turns out to be rational, or at least reasonable, given the rather limited state of knowledge. We do not, however, enter into the debates in the literature as to whether there was a break or continuity between the *Treatise* and the *General Theory* on the question of probability in his theoretical position (Runde 2003). Incidentally, Keynes consistently treated individuals as rational, not irrational, in both the *Treatise* and the *General Theory*.

Attempts are there in the literature to indicate that the limits of mainstream analysis (Simon 1961; see also Dunn 2001) are due to “bounded rationality.” The notion is interpreted as “... a whole range of limitations on human knowledge *and* human computations that prevent the economic actors in the real world from behaving in ways that approximate the predictions of classical and neoclassical theory” (Dunn 2001, 569–70; italics added). The concept of “bounded

rationality,” according to Simon (1961), refers to behavior “... that is intendedly rational but only limitedly so,” thus amounting to *cognitive* limitations that fail to agree with the notion of the rationality of actors, as prevails in the forecasting models (Dunn 2008, 98).

Bounded rationality has also been compared to what is described as the post-Keynesian synthesis of “fundamental uncertainty,” a position that has been open to debates (Dunn 2001, 567–87). As pointed out, the problems faced in predicting the future are neither due to the cognitive limitations of the agents nor to a lack of their capacity to handle or access technology. Rather it is because of the fact that the future itself keeps changing and gets shaped by the actors’ own actions (Dunn 2001, 578). Thus, the “agent does not choose from a given list of possibilities, but actually creates the list” (Carvalho 1989, 66–81). More precisely, and as pointed out: “Decisions taken in the light of expectations or conventions in today’s short-period equilibrium are continually bringing into being a new short-period situation which is no nearer to equilibrium than yesterday’s ... as Kalecki pointed out, the level of investment itself is a major influence on the current level of profits ... to develop an analysis which throws light in reality it is necessary to get rid of the concept of equilibrium and substitute historical time, in which the ever-moving present separates an irrevocable past from an uncertain future” (Robinson 1974).

Arguments as above pertain to what has been described in the literature as “fundamental uncertainty” which relates to “... the un-knowability of the future, to creative human agency and the unique nature of unfolding time” (Dunn 2008, 96). Thus the notion amounts to a “...lack of determinacy as an ontological property of the universe with imprecise knowledge as an epistemic property of agents in that universe” (Brandolini, Marzetti, and Scazzieri 2011, 73). A picture of what remains as yet unknown also prevails in the distinction between ergodic from and nonergodic time (which is the same as those between mutable and transmutable entities) (Dunn 2001, 568). As put by Davidson (2003, 234), Keynes’s concept of uncertainty reflects the future as “transmutable or creative in the sense that future economic outcomes may be permanently changed ... by the actions today of individuals, groups and/or governments, often in ways that are not even perceived by the creators of change.” The above agrees with what Keynes famously interpreted as “uncertain knowledge,” by which, “I do not mean merely to distinguish what is known for certain from what is probable About these matters there is no

scientific basis on which to form any calculable probability whatever. We simply do not know” (Keynes 1937, 235–36).

Finally, fundamental uncertainty of the Keynesian variant, as put by Sheila Dow (2015), “allows analysis of differing degrees of uncertainty and the cognitive role of institutions and conventions. Keynes used the term ‘ignorance’ to refer to lack of evidence relative to availability of evidence, i.e., it is a matter of degree.” This is because while risk is calculable with certainty, uncertainty is generated by ignorance, which amounts to a “lack of evidence *relative to availability of evidence*” (Dow 2015; italics added). To repeat, uncertainty is a matter of degree.

From above it does not require much to conclude that, in the *General Theory*, Keynes was much in line with the notion of fundamental uncertainty, which, under nonergodic conditions, rules out precise predictions of the future. This goes with the fact, as mentioned above, that with “creativity” of actions by investors, new realities come up as “potential surprises” (Rosser 2008, 547).

It is relevant in the above context to notice that investment decisions by individual agents, inevitably influenced by the prevailing business sentiments in the market, are considerably shaped by actions on the part of *others* who operate in a similar manner. The pattern is akin to Keynes’s metaphor of a “beauty contest,” where opinions are formed on the basis of what others (judges) consider to be most beautiful. The average view that emerges in the process can be described as “convention,” with the actual reliance on the part of the investor influenced by the subjective confidence (or weight) attributed to such conventions.

III. MAINSTREAM ECONOMIC THEORY, INSTITUTIONS, AND INVESTMENT STRATEGIES

How, then, are investment decisions in the market made in practice when the future is subject to fundamental uncertainty and changing probabilities that cannot be assessed in advance?

Looking at the prevailing market decisions on investments, one notices that those are largely guided by the stock-option pricing models that rely on calculations of probabilities relating to the future. Notwithstanding the issues raised in the literature on their limitations—both in terms of the conceptual as well as the policy applications—mainstream doctrines have continued to remain center stage in terms of their guidance on investment decisions in the market. Thus investment decisions in the market often rely on the BSM model, mentioned earlier in this paper, for calculating the best stock-option pricings in the market.

Shifting expectations in the market often lead agents to rely on available risk-management methods (Rosser 2008, 547). As mentioned at the beginning of this paper, the demands for such tools have led to a proliferation of financial innovations, including derivatives. Use of instruments as above often entails leveraged financing, for example, asset-based securitizations (ABSs), credit-default swaps (CDSs), and “margins” for transactions on future contracts. Credit advanced for the above relies on the readiness of financial institutions to provide liquidity, which rests on the respective assessments of the returns expected under uncertainty. While investments such as initial and risk-managing varieties are all subject to an uncharted course under uncertainty, in practice the operations continue with the prescriptions of the mainstream formula for calculating probability on an objective basis.

This brings us to the role of social institutions, which, as held by Thorstein Veblen, Geoffrey Hodgson, and John Kenneth Galbraith,⁵ influence business concerns and strategies. As a

⁵ In the literature there are two schools of thought on the interpretation of institutions and their role in an economy. In terms of the “New Institutional Economics” approach subscribed to, among others, by Ronald Coase and Douglas North, individuals are capable of exercising their preferences and choices in shaping institutions. Thus, restraints, if any, as imposed by institutions are considered to be based on mutual consent and as such are endogenized within the system. The position is closely related to the mainstream doctrine of utility maximization. Opposed is the view in “Old Institutional Economics” (held by Commons, Veblen, Hodgson, and J. K. Galbraith, among others) that considers individuals to be susceptible to (or molded by) the influence of the prevailing

consequence, institutions continue to exercise a major role in investment decisions in market economies. Depending on the business environment and the direction of change in the prevailing institutions, the impact can be stabilizing or disruptive in terms of the effects of investment decisions.

Let us recall what was mentioned earlier in this paper as the role of conventions, with investors often falling back on such conventions when there is too much uncertainty in the market. Conventions, especially those covering contracts, indicate the disciplining capacity of official institutions, which includes the regulatory authorities. In particular, for situations where uncertainty is subject to grading in terms of “more” or “less” uncertainty, “...government action may reduce it and thereby increase confidence” (Rosser 2008, 547). The opposite can be (and has been) the situation when institutions, by facilitating speculation in the market, become responsible for rise of instability therein.

Norms and prescriptions offered by institutions can thus be responsible for the varying responses on the part of those who invest in markets. These positions show a valid recognition of both the dependence of institutions upon individuals and the molding of individuals by institutions. As mentioned earlier in this paper, the changes describe a pattern that describes a situation of fundamental uncertainty, with concentric or overlapping waves of activities in the market reinforcing each other.

Investments made under situations of fundamental uncertainty are often subject to the policy prescriptions advanced by the prevailing institutions, including (despite their limitations) measures to liberalize the markets and promote the stock-option strategies, as well as the use of risk-management devices by investors.

The above arguments on the role of institutions can be substantiated by looking at the patterns of the global financial crisis and the related institutional reforms since the 1930s. One can

institutions and cultural situations. Thus, institutions are considered to be important agencies that influence individual behavior with their “informational-cognitive” functions. However, in terms of one interpretation, the causation can be in either direction, with “individuals creating and changing institutions, just as institutions constrain and mold individuals” (Hodgeson 2000, 317–19; see also Coase [1988] and North [1990]).

remember the Great Depression of 1929–30 and the rise of Keynesianism with President Roosevelt’s New Deal in United States as an institutional response to revamp the economy. This, along with the implementation of the Glass-Steagall Act (1933)—in which the United States separated banking activities from the security markets—saved the economy from further rounds of instability. The Act, however, proved unsuccessful over time in limiting speculation on the part of banks and other financial institutions, as was evident by the late 1990s. Pressures, presumably from the lobby controlled by vested interests in United States, led to a reversal of the regulatory devices instituted under Glass-Steagall by replacing it with the Gramm-Leach-Bliley Act (1999), which reintroduced universal banking and the proximity between banks and securities markets. In the United Kingdom, a major deregulatory step in financial markets (referred to as the “Big Bang”) had, by 1987, already removed the barrier between banks and securities markets. As pointed out, “On 27 October 1986, a series of reforms swept through the London Stock Exchange—banks, brokers, and jobbers merged; trading moved off the market floor; and new measures were brought in to oversee a thoroughly modernised industry” (Snyder 2006). Such institutional changes in the advanced economies led the way to the proliferation of hedging activities with derivative instruments, with banks readily providing liquidity for such activities as off-balance-sheet or OTC operations. One notices here the reversed role of institutions in a disruptive capacity, apparently in the interest of the so-called efficient market lobby in the financial markets, which, in turn, being subject to fundamental uncertainty, failed to reach its predicted outcome of financial stability.

Such changes in prevailing financial regulations in the major advanced economies had a major impact on the pattern of investments therein, by sharply pushing up the rates of return on financial assets relative to those on assets that are held against physical activities. A beginning of the process, as predicted much earlier by Keynes in *General Theory*, was the rise of joint stock companies and the stock exchanges, with separation between ownership and management of investible assets. Commenting on the major institutions in industrialized economies at the end of the Great Depression in the 1930s, Keynes (1936, 150–51) pointed out, “with separation between ownership and management which prevails today and with development of organized investment markets, a new factor of great importance has entered—which sometimes facilitates investment but sometimes adds greatly to the instabilities of the system.” Investment decisions, as mentioned in the *General Theory* in the chapter titled “State of Long-term Expectations,”

refer to the role of the “enterprise” (owning capital) vis-à-vis the speculators (operating in stock markets) who facilitate financial investments by raising the prices of stocks (Keynes 1936, 150–51). The situation thus described included joint stock companies and stock markets as major institutions in advanced capitalist countries, both of which, according to Keynes, were responsible for many of the financial crises in his time. The revaluation of financial assets (shares) in stock exchanges provided augmented yields that often exceeded the initial returns on physical investments. Much of this was due to institutional changes and their impact on investment behavior. Changes in the governance of institutions have been increasingly popular in recent times, such as seen with money manager capitalism under securitization. As pointed out, “the problem is money manager capitalism—the economic system characterized by highly leveraged funds seeking maximum total returns in an environment that systematically underprices risk,” while aiming at returns via yields as well as capital appreciation (Wray 2011; see also Minsky 1986).

To continue, a typical example of destabilizing expectations under fundamental uncertainty is provided by the subprime crisis in United States, which spread to the rest of the world economy by the end of 2008. Use of ABSs and CDSs, along with other derivative instruments like options and swaps, had a lot to do with the proliferation of the crisis, while much of the decisions on financial investments continued to be guided by the standard recipes of the call-put options of mainstream doctrines. Recognizing the role of institutions in the process, concerns were there on the state of speculation and the related damages. These and other developments intended to provide some relief led to efforts by the US federal government, such as introducing the Volcker Rule, the Dodd-Frank Wall Street Reform, and the Consumer Protection Act by 2010—all last-ditch attempts to curb speculative activities in the market.

However, the move was soon stalled, given the vested interests of the dominant financial institutions and rentiers in such activities (Shull 2012; Sen 2014, 128–63). With these transformations leading to instability, the institutions played a major destabilizing role, not only in advanced capitalist economies but also in the emerging economies. These countries have already faced the relatively free flow of finance, accepting the dominance of finance in the world economy and the shifting alliances between the ruling state and global finance in contemporary world.

Limits of accepted mainstream doctrines for guiding investment strategies influenced the high-powered financial institutions that were often in collaboration with the rentier class, who controlled the policies of the state (Bagchi and Dymski 2007). The consequences seem to have led the way to the prevailing undercurrents of global instability and real stagnation, which has been continuing under conditions of undeterred fundamental uncertainty in global capitalism.

REFERENCES

- Bagchi, A., and G. Dymksi. 2007. *Capture and Exclude: Developing Economies and the Poor in Global Finance*. Delhi. Tulika Books.
- Bank for International Settlements (BIS). 2018. *Statistical Bulletin*, June. Basle: Bank for International Settlements.
- Bateman, B. W. 1991. "The Rules of the Road: Keynes's Theoretical Rationale for Public Policy." In B. W. Bateman and J. B. Davis (eds.), *Keynes and Philosophy: Essays on the Origin of Keynes's Thought*. Basingstoke, UK: Edward Elgar.
- . 2003. "The End of Keynes and Philosophy?" In Runde Jochen and Mizuhara Sehei (eds.), *The Philosophy of Keynes's Economics: Probability, Uncertainty and Convention*. Oxfordshire, UK: Routledge.
- Bateman, B. W., and J. B. Davis. 1991. *Keynes's Philosophy: Essays on the Origin of Keynes's Thought*. Basingstoke, UK: Edward Elgar.
- Black, F., M. Scholes, and R. Merton. 1973. "The Pricing of Options and Corporate Liabilities." *Journal of Political Economy* 81(3): 637–54.
- Brandolini, D., S. Marzetti, and R. Scazzieri. 2011. *Fundamental Uncertainty: Rationality and Plausible Reasoning*. London: Palgrave Macmillan.
- Cardim de Carvalho, F. J. 1992. *Mr. Keynes and the Post-Keynesians*. Basingstoke, UK: Edward Elgar.
- . 1989. "Keynes on Probability, Uncertainty and Decision Making." *Journal of Post Keynesian Economics* 11(1): 66–81.
- Coase, R. 1988. "The New Institutional Economics." *American Economic Review* 88(2): 72–74.
- Commons, J. 1931. "Institutional Economics." *American Economic Review* 21: 648–57.
- David, D. 1955. "Different Views on Uncertainty and Some Policy Implications." In P. Davidson and J. Kregel (eds.), *Improving the Global Economy*. Basingstoke, UK: Edward Elgar.
- Davidson, P. 2003. "The Terminology of Uncertainty in Economics and the Philosophy of an Active Role of Government Policies." In J. Runde and S. Mizuhara (eds.), *The Philosophy of Keynes's Economics: Probability, Uncertainty and Convention*. Oxfordshire, UK: Routledge.
- Dow, S. 2015. "Uncertainty: A Diagrammatic Treatment." *Economics, the Open Access, Open Assessment e-Journal* 10(2016-3).

- Dunn, S. 2001. "Bounded Rationality is not Fundamental Uncertainty: A Post-Keynesian Perspective." *Journal of Post-Keynesian Economics* 23(4): 567–87.
- . 2008. *Uncertain Foundations of Post-Keynesian Economics: Essays in Explorations*. Oxfordshire, UK: Routledge.
- Galbraith, J. 1973. "Power & the Useful Economist." *American Economic Review* 63: 1–11.
- Hodgeson, M. 2000. "What is the Essence of Institutional Economics?" *Journal of Economic Issues* 34(2000): 317–29.
- International Monetary Fund (IMF). 2017. "Is Growth at Risk?" Global Financial Stability Report, October. Washington, DC: International Monetary Fund. Available at: <https://www.imf.org/en/Publications/GFSR/Issues/2017/09/27/global-financial-stability-report-october-2017>
- . 2018. "World Economic Outlook Database." Available at: <https://www.imf.org/external/pubs/ft/weo/2018/01/weodata/weoselser.aspx?a=1&c=110%2c505&t=2>. Accessed on October 6, 2018.
- Keynes, J. M. 1921. *A Treatise on Probability*. London: MacMillan & Co.
- . 1931. *Essays in Persuasion*. London: MacMillan & Co.
- . 1936. *The General Theory of Employment, Output and Money*. London: MacMillan & Co.
- . 1937. "The General Theory of Employment." *Quarterly Journal of Economics* 51(2): 209–23.
- Minsky, H. P. 1986. *Stabilizing an Unstable Economy*. New Haven, CT: Yale University Press.
- Moore, G. (1903)1933. *Principia Ethica*, Revised edition. Cambridge, UK: Cambridge University Press.
- North, D. 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge, UK: Cambridge University Press.
- O'Donnell, R. 1990. "Keynes's weight of argument and its bearing on rationality and uncertainty." In B. W. Bateman and J. B. Davis (eds.), *Keynes and Philosophy: Essays on the Origin of Keynes's Thought*. Basingstoke, UK: Edward Elgar.
- . 2003. "The Thick and the Thin of Controversy?" In J. Runde and S. Mizuhara (eds.), *The Philosophy of Keynes's Economics: Probability, Uncertainty and Convention*. Oxfordshire, UK: Routledge.

- Ramsay, F. 1931. "Truth and Probability." In R. Braithwaite (ed.), *The Foundations of Mathematics and Other Logical Essays*. London: Kegan Paul.
- . 1989. "Mr. Keynes on Probability: A Treatise on Probability by J. M. Keynes." *The British Journal for the Philosophy of Science* 40(2).
- Robinson, J. 1974. "Contribution of Keynes to Economic Theory." Joan V. Robinson Papers, JVR/iii/13.1/1. Cambridge, UK: Kings College.
- Robinson, A., and D. Moggridge. 2013. *The Collected Writings of John Maynard Keynes*, Vol. VIII (First South Asian edition). New Delhi: Cambridge University Press.
- Rosser, J. 2008. "Alternative Keynesian and Post Keynesian Perspective on Uncertainty and Expectations." *Journal of Post Keynesian Economics* 23: 545–66.
- Runde, J. 2003. "On Some Explicit Links between Keynes's *A Treatise on Probability* and the *General Theory*." In J. Runde and S. Mizuhara (eds.), *The Philosophy of Keynes's Economics: Probability, Uncertainty and Convention*. Oxfordshire, UK: Routledge.
- Shackle, G. 1974. *Keynesian Kaleidics: The Evolution of a General Political Economy*. New York: Aldine Publishing Company.
- Simon, H. 1998. "Bounded Rationality." In J. Eatwell, M. Milgate, and P. Newman (eds.), *New Palgrave Dictionary of Economics*. London: MacMillan.
- Scazzieri, R. 2011. "A Theory of Similarity and Uncertainty." In D. Brandolini, S. Marzetti, and R. Scazzieri (eds.), *Fundamental Uncertainty: Rationality and Plausible Reasoning*. London: Palgrave Macmillan.
- Simon, H. 1961. *Administrative Behaviour*, second edition. New York: The Free Press.
- Sen, S. 2003. *Global Finance at Risk*. London: Palgrave MacMillan.
- . 2014. "The Global Crisis and the Remedial Actions: A Non-Mainstream Approach." In S. Sen (ed.), *Dominant Finance and Stagnant Economies*. Delhi: Oxford University Press.
- Shull, B. 2012. "Too Big to Fail: Motives, Countermeasures, and the Dodd-Frank Response." Levy Institute Working Paper No. 709. Annandale-on-Hudson, NY: Levy Economics Institute of Bard College.
- Snyder, M. 2006. "The Challenges Ahead." In *Big Bang Twenty Years On: New challenges facing the financial services sector*. London: Centre for Policy Studies.
- Thompson, J., and E. William. 1999–2000. "A Post-Keynesian Analysis of the Black-Scholes Option Pricing Model." *Journal of Post Keynesian Economics* 22(2): 248.

Veblen, T. 1898. "Why Is Economics Not an Evolutionary Science." *The Quarterly Journal of Economics* 12(4): 373–97.

Wray, L. R. 2011. "Minsky's Money Manager Capitalism and the Global Financial Crisis." Levy Institute Working Paper No. 661. Annandale-on-Hudson, NY: Levy Economics Institute of Bard College.