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*Crises, confidence, and animal spirits:
exploring subjectivity in the dualism of
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Abstract: This paper will explore the nuanced epistemological status of the economic subject in Keynes' work, alongside the physiology of the human subject in Descartes' *Passions of the Soul* and *Treatise on Man*. In both instances 'animal spirits' serve as an indicator of dualism within the subject. In Descartes, the spirits mediate between the soul and the body, between the rational and non-rational, by their effect on the pineal gland. In Keynes, animal spirits push up against a certain form of economic rationality and represent a non-rational impulse inherent to human nature that is often opposed to economic reason. While Keynes' conception of economic subjectivity extends well beyond the rationalism of many of his predecessors, the dualism presented in his work by means of the animal spirits is worth considering in philosophical terms. Ultimately this paper will conclude that Keynes' work contains an element of what Gilbert Ryle (1949) has termed the 'intellectualist legend,' that is, the philosophical assumption that we must think first, and then act, relegating spontaneous action to the realm of the 'animal' or the 'non-rational.'

Keywords: animal spirits, economic rationality, dualism, long-term expectation, epistemological subjectivity

Introduction

There has been a rise in interest in the Keynesian notion of *animal spirits* following the 2007-8 global financial crisis. This curious characteristic of human nature, what Keynes identified as 'a spontaneous urge to action rather than inaction' (161) in the face of uncertain future investments, appears to be once again relevant in the decade-long wake of volatile and uncertain markets. In particular, George Akerlof and Robert Shiller's *Animal Spirits: How Human Psychology Drives the Economy*,

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and *Why It Matters for Global Capitalism* (2009), considers how changes in human psychology effect changes in the economy. They argue that 'to understand how economies work and how we can manage them and prosper, we must pay attention to the thought patterns that animate people's ideas and feelings, their animal spirits. We will never really understand important economic events unless we confront the fact that their causes are largely mental in nature' (1). While Akerlof and Shiller ultimately pay little attention to the subtleties of economic subjectivity as it is presented in Keynes' work, the point that economic change represents a change in human thought and behaviour is increasingly relevant in complex and volatile markets. The era of president Trump, for example, has ushered in a new wave of popular commentary on the stability of the future politically, but also on the fate of the future economy. In January of 2017, for example, Lawrence Summers, a former economist at the IMF, former advisor to Presidents Clinton and Obama, former President of Harvard University, among many other prestigious and publicly powerful positions, used the term to describe the post-election optimism surrounding the prospective of a Trump presidency. CNBC reported that:

Summers, a former Obama economic advisor, did admit that 'animal spirits,' emotional feelings of optimism, have been 'running high' since Trump won the presidency. 'There's a sense of new energy in business. Some of that is a welcome corrective to what probably was some feeling that it had become a bit overly punitive in some sectors,' Summers acknowledged. 'But there's also a deep concern about populist policy, particularly populist nationalist policy that lurks into protection. And that's a very real risk hanging over the global economy,' he warned. (January 18, 2017).

Thus, while the term in its contemporary phrasing (Akerlof and Shiller 2009, Summers 2017) appears to stand for optimism toward investment, or human emotions surrounding the state of the economy, the historical use of the term is in fact much richer and holds profound implications for how economic subjectivity is conceived in relation to the rationalism inherent to the subjects (i.e. people) presented in neoclassical models. For this historical picture one must turn back to the work of Keynes and explore the way in which animal spirits relate to a business convention and the organization of market behavior, on the one hand, and to the uncertainty of the investor in the face of the future on the other.

These recent invocations of the term animal spirits are not the beginning of the debate on the nature and use of animal spirits in Keynes' work over which there has been an extensive and spirited debate. Many have given historical accounts of

its lineage from Aristotle to Hume (Matthews 1991, Glynn 1999, Barends 2011), and others have entered into a debate on the origin of the concept for Keynes himself. There is no scholarly consensus on the source that Keynes drew upon to first integrate the notion of 'animal spirits' into his thought. Roger Koppl (1991) has given perhaps the most convincing historical explanation of the genesis of the idea in Keynes' thought. He argues that Keynes was using a version of the Cartesian concept of animal spirits because 'in both Descartes' physiology and Keynes' economics, animal spirits lead people to act independently of reason or even contrary to it, and they may lead to error' (209). While one can trace the term back to Greek physiology of the second century, the pinnacle of the concept came with Descartes' *Passions of the Soul* and his *Treatise on Man*. Indeed, Galen (129-216 AD) used the concept of animal spirits to explain both sensation and movement, while Descartes went further in order to give these spirits a central role in the mediation between mind and body.

With reference to available historical evidence of Keynes' familiarity with Descartes' notion of animal spirits, some note that Keynes collected a significant number of rare editions by Descartes as he was writing the *General Theory*. D. E. Moggridge (1992) references notes that Keynes took in his first year of undergraduate study at Cambridge in J.E. McTaggart's philosophy lectures that contained a reference to the concept as defined in Descartes' *Passions of the Soul* and had 'unconscious mental action' (208) written in the marginalia. Specifically, Moggridge cites Keynes' notes on Descartes: 'The body is moved by animal spirits – the fiery particles of the blood distilled by the heat of the heart. They move the body by penetrating and moving the nerves and the muscles; animal spirits are always in motion – the will only directs them' (208). Both Anna Carabelli (1988) and Don Patinkin (1990) also use this same evidence as a link between Keynes and Descartes.

Several scholars, however, have different accounts of the origin of this term in Keynes' work. Some have argued that *animal spirits* is in fact not much more than a colloquial term used to describe enthusiasm and energy. Hans Visser (1992) has shown how the use of the term was popularized through literature such as Fielding's *Tom Jones*, Defoe's *Robinson Crusoe* and Austen's *Pride and Prejudice*. Terutomo Ozawa (1992) takes us to a surprising connection with the work of Karl Marx, for whom he argues that animal spirits 'lead to the heightened efficiency of each individual workman through emulation when workers are organized for action' (210). Indeed, it appears that the debate which began in the correspondence of the *Journal of Economic Perspectives* in 1992 persists in the debate over the origin

and meaning of Keynes' animal spirits, while at the same time the term has gained contemporary usage among mainstream Keynesians to describe waves of market psychology. Akerlof and Shiller, for example, write that 'in modern economics, *animal spirits* has acquired a somewhat different meaning: It is now an economic term, referring to a restless and inconsistent element in the economy. It refers to our peculiar relationship with ambiguity or uncertainty. Sometimes we are paralyzed by it. Yet at other times it refreshes and energizes us, overcoming our fears and indecisions' (4).

This essay will depart from both the historical speculation of the origin of the term animal spirits in Descartes, and the colloquial usage of the term which does not engage with its subtlety or nuance. Instead, a substantive and exegetical approach will be employed, such that the nature of animal spirits as they are presented in Descartes and Keynes comes to the fore. Koppl has already convincingly argued that animal spirits for both Descartes and Keynes represent a form of non-rational action. [1]

In this paper, the analysis will go further to explore the nuanced epistemological status of the economic subject in Keynes' work, alongside the physiology of the human subject in Descartes' *Passions of the Soul* and *Treatise on Man*. In both instances, animal spirits serve as an indicator of dualism within the subject. In Descartes, the spirits mediate between the soul and the body, between the rational and non-rational, by their effect on the pineal gland. In Keynes, animal spirits come up against a certain form of economic rationality, and represent a non-rational impulse inherent to human nature that is often opposed to economic reason.

Descartes' use of animal spirits in a mechanistic explanation of human physiology to illuminate mind-body dualism is particularly significant when compared with Keynes' account of the non-rational component of an otherwise rational economic subjectivity. While there can be no doubt that Keynes' conception of economic subjectivity extends well beyond the facile rationalism of many of his predecessors, the dualism presented in his work by means of the animal spirits is worth considering in philosophical terms. Ultimately this paper will conclude that Keynes' work perpetuates an element of what Gilbert Ryle (1949) has termed the 'intellectualist legend,' that follows from Cartesian dualism, that is, the philosophical assumption that we must think first, and then act, relegating spontaneous action to the realm of the 'animal' or the 'non-rational.' More specifically, in Keynes' theory of expectations there is a divide between the rational

and the non-rational, and it is the rational component of this theory that commits the intellectualist fallacy.

While some economists might argue that we ought to focus on the empirical components of Keynesian thought with the aim of theorizing crisis and recovery from crisis, stressing the practical over philosophical inquiry, Keynes himself saw the importance of economic subjectivity otherwise. In 1937 he wrote that:

Perhaps the reader feels that this general, philosophical disquisition on the behaviour of mankind is somewhat remote from the economic theory under discussion. But I think not. Tho this is how we behave in the market place, the theory we devise in the study of how we behave in the market place should not itself submit to market place idols. I accuse the classical economic theory of being itself one of those pretty, polite techniques which tries to deal with the present by abstracting from the fact that we know very little about the future. (215)

Thus, in this essay the argument will proceed in three parts. First, animal spirits as they appear in the *Treatise on Man* will be explored with particular attention to the mechanistic presentation of human physiology – or, to the body as 'machine.' I will explore the parallels between the laws which govern mind and body in the dualism of Descartes. Finally, an extensive examination of Keynes' animal spirits will reveal the link between ghost (economic rationality in the minds of knowing investors) and machine (the 'Economy' or economic body [2]) that acts without thinking, creating a dualism between the rational and the optimistic (non-rational) self. While establishing a causal historical connection between the work of Descartes and that of Keynes is not the goal of this essay, the useful connections between the Cartesian subject of the *Passions of the Soul* and the *Treatise on Man* and the Keynesian subject in states of uncertainty, crisis and confidence in the face of future investment will be illuminated.

The Cartesian spirit

Rene Descartes' *Passions of the Soul* (1649) is the most immediate place to find his discussion of animal spirits, spirits that serve within his philosophy as a point of contact between the mind and body, between soul and machine. Before turning to his last philosophical work, however, it is fruitful, to begin with Descartes' *Treatise on Man* [3] where our animal spirits not only appear but where we can also come to glimpse the mechanical science which underlies the formation of Descartes' subjects.

From the outset the *Treatise on Man* introduces us to very specific men: 'These men will be composed, as we are, of a soul and a body' (99). The model for these men, is an archetype that was set out in an earlier (now lost) portion of the text, and 'their description is intended to cast light on the nature of men in the same way that the description of a 'new world' in *The World* is intended to cast light on the real world' (ibid.). If we pursue Descartes' definition further, we see that 'I suppose the body to be nothing but a statue or a machine made of earth, which God forms with the explicit intention of making it as much as possible like us' (ibid.). Thus man in this treatise is an abstraction which casts light on reality, and it is constructed, clearly, with a variety of metaphors and comparisons, by means of a mechanical analogy. Of course, this mechanical analogy is still crude, and utilizes a variety of images: 'We see clocks, artificial fountains, mills and other such machines which, although only man-made, have the power to move of their own accord in many different ways. But I am supposing this machine to be made by the hands of God, and so I think you may reasonably think it capable of a greater variety of movements than I could possibly imagine in it, and of exhibiting more artistry than I could possibly ascribe to it' (99).

While the description of men as machines may appear to us today to have been novel in the seventeenth century, Des Chenes (2001) explains otherwise:

Cartesian animals are self-moving machines, *automata* in the usual sense of the word. To call them machines was not new. The novelty was to combine the animal-machine with a new philosophy of nature, in which the actions of agents inferior to humans not only might, but must be explained without reference to any 'form' but an extension or to any qualities but the modes of extension. Descartes had the formidable task of showing that the vegetative and sensitive powers of plants and animals are nothing other than the actions they exhibit by virtue of the 'disposition' of their parts. He had also the less visible, but (as later events would show) crucial task of not allowing that demonstration to endanger the human soul. (13)

While still maintaining the mechanical analogies (the clock, artificial fountains, mills, and later the looser analogies of church organs and ships) throughout his illumination of the nature of man, Descartes sets out to show how the soul interacts with the machine.

It is in the mind-body connection that Descartes famously introduces the pineal gland as seat of the soul in the human body. From basic anatomical mechanics we thus move to that which distinguishes man from animals and which maintains the primacy of the will over the reactions of the body. First, however, Descartes presents

animal spirits as prime mover within the body: 'the parts of the blood which penetrate as far as the brain serve not only to nourish and sustain its substance, but also and primarily to produce in it a certain very fine wind, or rather a lively and pure flame, which is called the *animal spirits*' (100). The purpose of this flame (note the relation between heat and machine) is to give life (movement) to the body, and it extends throughout the limbs, yet is centered in the pineal gland [4]:

For it must be noted that the arteries which carry blood to the brain from the heart, after dividing into countless tiny branches which make up the minute tissues that are stretched like tapestries at the bottom of the cavities of the brain, come together again around a certain little *gland* situated near the middle of the substance of the brain, right and the entrance to its cavities. The arteries in this region have a great many little holes through which the finer parts of the blood can flow into this gland... These parts of the blood, without any preparation or alteration except for their separation from the coarser parts and their retention of the extreme rapidity which the heat of the heart has given them, cease to have the form of blood, and are called 'animal spirits.' (100)

These animal spirits are what move, in a web throughout the body, limbs and muscles of man. The animal spirits are thus what *animate* the machine, just as water animates a fountain: 'similarly, you may have observed in the grottos and fountains in the royal gardens that the mere force with which the water is driven as it emerges from its source is sufficient to move various machines, and even to make them play certain instruments or utter certain words depending on the various arrangements of the pipes through which the water is conducted' (ibid.). But given this mechanical analogy, do animal spirits simply animate men in a manner predetermined by their anatomy? Are they destined to play the instruments or utter the words that their physical form demands? At first glance, the complexity and coherence of the organism tells us it could be so, that the function of the body automatically follows a certain continuous course as the spirits animate it: 'breathing and other such activities which are normal and natural to this machine, and which depend on the flow of the spirits, are like the movements of a clock or mill, which the normal flow of water can render continuous' (101).

And yet it is the rational soul which creates the distinction between 'man as machine' and machines proper, as this soul sits watch over machine. 'When a *rational soul* is present in this machine it will have its principal seat in the brain, and reside there like the fountain-keeper who must be stationed at the tanks to which the fountain's pipes return if he want to produce, or prevent, or change their movements in some way' (ibid.). The body may have a number of mechanistic

functions, but the driver, so to speak, is still the rational soul, who by means of the animal spirits penetrates the very depths of the body, while still remaining an entity apart, maintaining the dualism necessary to keep the epistemological order of *cogito ergo sum* in place.

The tension between a quasi-automated mechanism – which is supposed to be simply illustrative and yet becomes fundamental to the Cartesian system – and the role of the imagination within cognition plays itself out throughout his *Treatise on Man*. Galison (1984) has convincingly demonstrated this tension:

Descartes's early efforts at grounding mathematics, physics and physiology on a firm base thus pushed him in two directions. On the one hand, he demanded that propositions about the perceptible world be mediated through a process of mechanical projection from macroscopic object to macroscopic pattern in the brain. On the other hand, from 1618 on he espoused a corpuscularism involving imperceptible particles. This tension is at the root of Descartes's use of comparison, which came to link his micromechanism with his theory of perception. (321-2)

Indeed, the *Treatise on Man* is above all a theory of perception – and throughout Descartes uses mechanical comparisons to show the connection between the perceptible and imperceptible. Several metaphors serve this function: animal spirits are likened to the force of water in grottos or fountains, to air pushing through the church organ, and to the wind which moves a sailing ship. Each metaphor is aimed at giving life to invisible and imperceptible processes, processes that direct the limbs and body and perception, as if automatically, but in fact in a manner which might be controlled should the rational soul, as fountain keeper, or organist, or sailor, require it.

And yet in the final instance Descartes insists upon the automated mechanism of the human body:

I should like you to consider that these functions [of the human body] follow from the mere arrangement of the machine's organs every bit as naturally as a clock or other automaton follow from the arrangement of its counterweights and wheels. In order to explain these functions, then, it is not necessary to conceive of this machine as having any vegetative or sensitive soul or any other principle of movement and life, apart from blood and its spirits, which are agitated by the heat of the fire burning continuously in the heart – a fire which has the same nature as all the fires that occur in inanimate bodies. (108)

How might the consideration of *animal spirits*, as fine winds that animate the rather automated human body, one which functions akin to a pendulum clock, relate to economic phenomena? While the pendulum clock is a metaphor which has been used to describe the relationship between components of the economy as a sort of automated machine (Defoe 1710, 1732; Gale 1784; Joplin 1838), the link to animal spirits is not immediately as clear. In order to demonstrate the link let turn us explore the use of animal spirits in Descartes' *Passions of the Soul* and in Keynes' theory of investment and market psychology.

The Ghost in the Machine

While the *Treatise on Man* reveals the first function of animal spirits quite well, namely, to animate the machine that is the human body, the second function, which is to provide a direct connection between mind and body, via the pineal gland, is better developed in his *Passions of the Soul*. In part this is because the text was written for Princess Elizabeth of Bohemia, who asked Descartes in a letter from June 20, 1643, to explain 'the manner of the [soul's] actions and passions in the body' (Descartes, 325), after she was not satisfied with Descartes' previous assertion that the soul causes the body to be moved by an 'union' between soul and body.

In his previous work it can be seen that the animal spirits manifest physically as fine parts of human blood. But in *Passions of the Soul* Descartes provides more detail:

For what I am calling 'spirits' here are merely bodies: they have no property other than that of being extremely small bodies which move very quickly, like the jets of a flame that come from a torch. They never stop in any place, and as some of them enter the brain's cavities, others leave it through the pores in its substance. These pores conduct them into the nerves, and then to the muscles. In this way the animal spirits move the body in all the various ways it can be moved. (331-2)

The spirits have a material existence, like bodies, but Descartes is careful to distinguish them from anything fixed, perhaps because he had no evidence of these bodies except by means of their effect. They are thus bodies always in motion, and they move quickly, serving the function of effecting the movements of the human body. They are not the machine, nor the mind, but rather the spirits which animate the machine in correlation with the soul. Neither solid nor ephemeral (neither body nor soul), they push up against the pineal gland and provide a connection between the two. Descartes describes the role of the pineal gland as house to the soul: 'Let us,

therefore, take it that the soul has its principal seat in the small gland located in the middle of the brain. From there it radiates through the rest of the body by means of the animal spirits, the nerves and even the blood, which can take on the impressions of the spirits and carry them through the arteries to the limbs' (341). So, the gland may be moved by the soul just as the spirits may move the gland. The interrelation described here is thus the linchpin in the theory of mind-body relation requested of Descartes by Princess Elizabeth of Bohemia [5].

While these assertions, outside of medieval physiology, bear little interest in terms of truth value, the role of the spirits within the passions of the soul, in general, represents a system in which the rational and the non-rational are brought into contact within the body of man. Within the system of the passions, Descartes explains that the actions of the soul (apart from the body) are *thoughts*, which can be categorized either as volitions or voluntary imaginings. Here are the *will* and the *imagination*, therefore, which are both key to Descartes' conception of mind and cognition. In a general sense, therefore, the passions of the soul can be defined as *perceptions*. In this context, the link between mind and body becomes clear, because perceptions can either be caused by the soul – what Descartes terms *perceptions of volition* – or by the body. He argues that 'after having considered in what respects the passions of the soul differ from all other thoughts, it seems to me that we may define them generally as those perceptions, sensations or emotions of the soul which we refer particularly to it, and which are caused, maintained and strengthened by some movement of spirit' (338-9).

Within the Cartesian edifice the soul bears primacy as the defining element of human subjectivity, particularly its epistemological capacity. In this sense the animal spirits are particularly strange insofar as they indicate that the soul may not have full control over the body, and that the primacy of the will (as volition of the soul) at times may recede. Descartes explains that

there is one special reason why the soul cannot readily change or suspend its passions, which is what led me to say in my definition that the passions are not only caused but also maintained and strengthened by some particular movement of the spirits. The reason is that they are nearly all accompanied by some disturbance which takes place in the heart and consequently also throughout the blood and the animal spirits. (345)

A physical disturbance is that which defines the effect of the animal spirits on the soul through the pineal gland. Of fundamental importance is the idea that the opposition between body and soul is tantamount to the distinction between non-

reason and reason. The spirits are the non-rational force which in their ephemeral, semi-physical, state manage to engage both sides. But they are not controllable or rational in and of themselves. Further, Descartes explains that the soul itself is unique; 'there is within us but one soul, and this soul has within it no diversity of parts: it is at once sensitive and rational too, and all its appetites are volitions.' (346). Instead of seeking to categorize different components of the soul, which, he argues, is an endeavour resulting from a poor differentiation between the functions of the soul and the functions of the body, we ought to recognize that 'it is to the body alone that we should attribute everything that can be observed in us to oppose our reason' (ibid.). Despite the connection which the animal spirits establish by pushing on or being pushed by the pineal gland, the dualism between mind and body is teleologically absolute [6], made so by the very clear distinction in the function of the soul and the function of the machine.

Before we turn to the way in which animal spirits function in the work of Keynes, Gilbert Ryle's critical unpacking of the legacy of Cartesian dualism (Ryle, 1949) provides a useful means by which to explore the role of animal spirits in both the theoretical systems of Descartes and Keynes. What Ryle explains, throughout his text, is that the dualism with which bodies and minds are treated not only in Descartes but in the history of Western philosophy subsequent to Descartes, is a dogma with rather spurious foundations. What he terms the dogma of the Ghost in the Machine 'maintains that there exist both bodies and minds; that there occur physical processes and mental processes; that there are mechanical causes of corporeal movements and mental causes of corporeal movements' (23). The philosophical assumption that lies beneath oppositions between the public, knowable, mechanical body and the private, unknowable mind (or, the 'bifurcation of two lives,' the life of the body and the life of the mind) goes as follows:

It is assumed that there are two different kinds of existence or status. What exists or happens may have the status of physical existence, or it may have the status of mental existence. [...] It is a necessary feature of what has physical existence that it is in space and time; it is a necessary feature of what has mental existence that it is in time but not in space. What has physical existence is composed of matter, or else is a function of matter; what has mental existence consists of consciousness, or else is a function of consciousness. (13)

Thus, two fields emerge in much post-Cartesian thought, that of material objects, and that of mental objects that exist in the 'mind.' Physical objects may make contact with one another and be known to one another through a material

relationship, whereas the happenings within minds are not knowable in the same way. According to Descartes, the mind (soul) is located within the pineal gland, but this physicality is a black box within which we do not know what occurs and of which we cannot differentiate in either substance or function. In essence, the soul is invisible and unknowable deep within the brain; it is the ghost within the human machine.

Ryle postulates that the problem in the dualism between the body that exists in space and time, and the mind which only exists in time, is in fact a category mistake: 'the dogma of the Ghost in the Machine is [...] a category mistake. It represents the facts of mental life as if they belong to one logical type or category (or range of categories), when they actually belong to another. The dogma is therefore a philosopher's myth' (15-16). Ryle is referencing a long legacy in Western philosophy that he terms the 'Cartesian tradition' instead of referring specifically to the historical Descartes, but if we turn specifically to Descartes, recalling in particular the 'machine' that is the body from the *Treatise on Man*, the Ghost in the Machine is particularly apt. In the wake of Galileo's persecution by the Church, this mechanistic understanding of human physiology indeed posed a problem for Descartes: 'As a man of scientific genius [Descartes] could not but endorse the claims of mechanics, yet as a religious and moral man he could not accept, as Hobbes accepted, the discouraging rider to these claims, namely that human nature differs only in degree of complexion from clockwork. The mental could not be just a variety of the mechanical' (Ryle, 19). The theological danger present here was evident in the decision not to publish *The World* which contained the *Treatise on Man*, in which man was closely identified in his anatomy to a machine. But, at the same time, in this text and in the *Passions of the Soul* the mental is kept separate from this machine, linked only subtly through animal spirits, in order to maintain 1) the primacy of the mental (the ghostly soul in the machine), and; 2) the religious autonomy of the soul from the 'merely mechanical' laws of bodies (celestial or otherwise). Ryle argues that Descartes and others thus created an escape route by means of a para-mechanical hypothesis. In other words, the mental is not mechanical, but it follows laws (albeit non-mechanical laws) just like the mechanical: 'since mechanical laws explain movements in space as the effects of other movements in space, other laws must explain some of the non-spatial workings of minds as the effects of other non-spatial workings of minds' (19). Mind and body exist in a dualism that demands, because of this category mistake, a sort of parallelism:

As thus represented, minds are not merely ghosts harnessed to machines, they are themselves just spectral machines. Though the human body is an engine, it is not quite an ordinary engine, since some of its workings are governed by another engine inside it – the interior governing engine being one of a very special sort. It is invisible, inaudible and it has no size or weight. It cannot be taken to bits and the laws it obeys are not those known to ordinary engineers. Nothing is known of how it governs the bodily engines. (Ryle, 20)

The mind must operate by means of laws – non-mechanical laws – just as the human body and all physical bodies are subject to mechanical laws. Within the laws of the mind, furthermore, we will begin to see the emergence of the privilege of a certain form of reasoning, one which is distanced by its proponents from the spontaneity of bodies in the physical world. This will be addressed as we turn to what Ryle terms the intellectualist legend, and explore how it plays out in the Keynesian explanation of investor activity in the face of uncertainty and market volatility.

Keynes' ghosts: the investor, ignorance, and the intellectualist legend

The Cartesian 'ghost' – a rational ghost who determines human subjective identity by way of its epistemological capacity – is the key player in economic thought. Prior to Keynes this Ghost often bore the name of 'rational economic man.' In the Cartesian trajectory, therefore, we have a rational economic mind, instead of a mechanical or ontologically embodied individual. This distinction is made clear in the conceptual separation of manual and intellectual labour. This is evident in the work of Ricardo (1817), for example, where the labour theory of value separates the physical creation of value by manual labour (i.e. workers), from the knowledge of capital and its systemic movement by intellectual labourers (i.e. capitalists). Differing epistemological classes of subjects emerge in classical political economy, therefore, depending on the subject's relation to and knowledge of capital (Scott, 2013). But Keynes, in the 1930s, was trying to go further, trying to deal with the possibility that human economic behaviour is not so cleanly depicted by the rationalist myths of earlier economists. This subjective complexity is particularly evident in his work on long term expectations in Chapter 12 of the *General Theory of Employment, Interest and Money*. And it is here too, while attempting to escape the purely rationalist assumptions about how economic subjects make exchange and investment decisions which underlie marginal utility theory such as that

presented by Walras, Jevons and Menger, that Keynes inadvertently perpetrates the intellectualist myth that stems from the dogma of the Ghost in the Machine. For he uses animal spirits to attempt to show how economic agents will still act even when they have no rational or intellectual ground to act upon. Uncertainty and ignorance have not stopped people from taking on economic activity, and have specifically not deterred long term investment, precisely because of an innate (i.e. unthinking) optimism in our spirits. This argument deserves careful attention, and is present in Chapter 12 – The State of Long Term Expectation – as well as in its interesting clarification in Keynes' 1937 essay 'The General Theory of Employment' where he follows up on some of the more controversial ideas from his *General Theory*.

Let us return to Ryle and Descartes for a moment, to see what precisely the intellectualist legend is, and how it follows from the fundamental category error of the Ghost in the Machine: 'To put it quite generally, the absurd assumption made by the intellectualist legend is this, that a performance of any sorts inherits all its title to intelligence from some anterior internal operation of planning what to do' (31). This legend goes back to the same para-mechanical impulse, to the desire to separate out mind from body as human is distinguished from animal. Most importantly, 'the capacity to attain knowledge of truths was the defining property of a mind,' and philosophers set out to establish our epistemological distinction from animals by the capacity to recognize truths and to understand potential connections between them. In other words, in this tradition [7], the defining feature and goal of humanity is 'to act rationally, therefore, to have one's non-theoretical propensities controlled by one's apprehension of truths about the conduct of life' (26). The intellectualist legend tells us that when we act we must first think. To act without thinking is not rational, it is not intellectual, and it is not what fundamentally defines human subjectivity. In other words, 'to do something thinking about what one is doing is, according to this legend, always to do two things; namely, to consider certain appropriate propositions, or prescriptions, and to put into practice what these propositions or prescriptions enjoin. It is to do a bit of theory and then to do a bit of practice' (29). One can see how this intellectualist legend is particularly suitable for the economist who assumes rational calculating subjects as the basis of the economic system or model. The assumption of rationality in economic terms is the assumption that the economic subject, be it the individual consumer or they who control processes of production, know something about their particular end, and understand systemically how to achieve this end. Process is thus paramount: '... even when we are concerned with their intellectual excellences and deficiencies, we are interested less in the stocks of truths that they acquire and retain than in

their capacities to find out truths for themselves and their ability to organize and exploit them, when discovered' (28). It is not fact or truth that is relevant in and of itself, but the capacity of the thinking subject to deploy this truth strategically. The intellectualist legend prioritizes the skill of the individual thinker (or actor) and his or her propensity to think before acting, rather than privileging an amassed wisdom, or ability to act spontaneously without forethought.

And yet, even Ryle sees that the intellectualist legend does not apply so well in practice to the question of investment. This small detail will become relevant in our assessment of the work of Keynes, for it is there that animal spirits appear, as an *exception* to the intellectualist legend that characterizes the subjects of economic reasoning (i.e. the subjects that economic reasoning employs to explain economic laws or tendencies). In a rare reference to economic activity Ryle explains that indeed one's skill at gambling or investment would *not* be a part of the intellectualist legend: 'we never speak of a person believing or opining *how*, and though it is proper to ask for the grounds or reasons for someone's acceptance of a proposition, this question cannot be asked of someone's *skills at cards* or *prudence in investments*' (ibid.). From this perspective, then, one could conclude that within the philosophical tradition that employs the intellectualist legend there would be no place for a theory of investment. This is because investments require an exceptional impulse, made necessary by the impossible calculus of all future possibilities and risks. Let us turn to Keynes to see how this plays out, specifically looking at the subjects in his work the state of confidence and business psychology.

In 'The General Theory of Employment,' published in 1937 to defend some of his ideas from the *General Theory* from critics and controversy, Keynes explains that investment is a fundamental exercise in uncertainty, and thus provides a challenge to earlier economic theories of pervasive rationalism and stability:

But those more recent writers [Edgeworth and Pigou] like their predecessors [Ricardo and Marshall] were still dealing with a system in which the amount of factors employed was given and the other relevant facts were known more or less for certain. This does not mean that they were dealing with a system in which change was ruled out, or even one in which the disappointment of expectation was ruled out. But at any given time facts and expectations were assumed to be given in a definite and calculable form; and risks, of which tho admitted, not much notice was taken, were supposed to be capable of an exact actuarial computation. The calculus of probability, tho mention of it was kept in the background, was supposed to be capable of reducing uncertainty to the same state of certainty as itself; just as in the Benthamite calculus of pains and pleasures or of advantage and disadvantage, by

which the Benthamite philosophy assumed men to be influenced in their general ethical behaviour. (Keynes 1937, 212-13)

We see in Chapter 12 of the *General Theory*, published the year prior, that Keynes introduces animal spirits in the context of long term investment [8]. Long term investment necessarily invokes the question of confidence and certainty (or uncertainty and ignorance, more accurately): 'The considerations upon which expectations of prospective yields are based are partly existing facts which we can assume to be known more or less for certain, and partly future events which can only be forecasted with more or less confidence' (147). When considering the profitability of investment, the question is one of confidence, and confidence is a question of formulating a course of action based upon existing information and our capacity to best deploy the information we have into the future. But, this of course is not quite the point, argues Keynes, as confidence, where stock markets are involved, is not really about the future profitability of a specific enterprise, but rather about what the confidence in this enterprise may be in the future (thus determining its price on the market). Keynes warns that 'there is, however, not much to be said about the state of confidence *a priori*. Our conclusions must mainly depend upon the actual observation of markets and business psychology. This is the reason why the ensuing digression is on a different level of abstraction from most of the book' (149).

In his digression Keynes attempts to illustrate the evolution of economic decision making by means of a comparison between 'former times' [9] and contemporary (i.e. 1930s) capitalism. Prior to contemporary market structures, 'investment depended on a sufficient supply of individuals of sanguine temperament and constructive impulses who embarked on business as a way of life, not relying on a precise calculation of prospective prospect' (150). For this reason, 'businessmen played a mixed game of skill and chance, the average results of which to the players are not known by those who take a hand. If human nature felt no temptation to take a chance, no satisfaction (profit apart) in constructing a factory, a railway, a mine or a farm, there might not be much investment merely as a result of cold calculation' (ibid.). Keynes draws a contrast between business as a way of life and business as calculation and in so doing introduces some ideas regarding the 'nature' of men. This raises the fundamental tensions that Keynes locates within human behaviour in the face of uncertainty and ignorance. The tension exists between human nature, on the one hand, and convention, on the other. Note that both are fairly well removed from the realm of rational economic calculation, because the groundwork or foundation of calculation does not exist with certainty.

The non-rational tendencies of economic agents are either harnessed by convention (following convention becomes a form of rationality, even though it is not based on mathematical calculation, there is at least the semblance or drive for working with best probabilities, best practices), or they are spontaneously exhibited in and through our animal spirits. Animal spirits are a perfectly necessary component of a rational system that contains the problem of the future, of a non-knowable future state (assuming of course, as Keynes does by this time, that the economy does not function by universal laws that allow for the prediction of future rates of profit, etc.) While Ingo Barends (2011) makes an argument about the applicability of animal spirits to economic agents in Keynes's thought – 'Keynes only speaks of 'animal spirits' in connection with the investment decision of entrepreneurs to increase the capital stock of firms (real investment). He does not link this concept to investment decisions of what he calls 'professional investors' [...]; neither does he link 'animal spirits' to the consumption or saving decisions of private households' (26) – instead we find that it is actually of significant general import in Keynes' thought. It is the emergency valve for the steam of non-rationalism, the ghost in the economic machine, just as in Descartes animal spirits provided an ephemeral and elusive link between body and soul. Here the spirits provide a link between economic rationalism and convention (the former mind, the latter economic machine) and bring the impulsive aspect of human nature to the fore. Dow and Dow (2012) bring this into focus:

Thus in Keynes's thought, animal spirits play their part in determining investment, along with the rate of interest, technological advance, and other variables. Changes in confidence, by altering investment levels, expand or contract aggregate demand and the level of income and employment. The individual is subject to the emotions of the herd. Nor is this wholly undesirable; without such psychologically determined motives for investment there would probably be inadequate private entrepreneurship as individuals recognised the significance of the uncertain hazards on which their judgements were exercised. (39)

In order to draw out this impulsive component of human nature in Keynes' thought one must first distinguish between speculation and enterprise. Keynes defines speculation as 'the activity of forecasting the psychology of the market' (158); whereas enterprise is 'the activity of forecasting the prospective yield of assets over their whole life' (ibid.). While speculation, when it occurs atop a solid foundation of enterprise, is not overly volatile or dangerous, Keynes warns that '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' (159). The problem is that rationality, in terms

which align with the of the marginal efficiency of capital, is bound to a short term liquidity preference, which does not tend to benefit enterprise but instead privileges speculation. Rationality extends only to the psychology of the individual investor himself, and not to the economic whole. In other words it is not a macroeconomic rationality but a speculative rationality: 'For the fact that each individual investor flatters himself that his commitment is 'liquid' (though this cannot be true for all investors collectively) calms his nerves and makes him much more willing to risk' (160). For Keynes the problem is thus social, as crises of confidence on the part of investors in waves pose a significant problem for the capital input into long term enterprise. The only solution he can see would be an imperative (presumably through law and regulation) against hoarding –by promoting either individual consumption or investment. This is the key to overcoming the anti-social fetish of liquidity spurred on by ignorance of an uncertain future worsened only by market volatility and the epistemological limitations of the modern investor.

With the epistemological context in mind, along with the volatility of a market structure based upon speculation at the expense of enterprise, let us turn to the four most pertinent references to animal spirits and spontaneous optimism in the *General Theory*.

1) Animal spirits are a spontaneous urge to action:

Even apart from the instability due to speculation, there is instability due to the characteristic of human nature that a large proportion of our positive activities depend spontaneous optimism rather than on a mathematical expectation, whether moral or hedonistic or economic. Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as a result of *animal spirits*, - of a spontaneous urge to action rather than inaction, and not the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities. (161)

Animal spirits, while not explained here in contradistinction to convention, are explained in contradistinction to reason. [10] They form, like in the Cartesian instance, the link between the rational and non-rational sources of investment. Like Descartes' spirits they too belong to the 'body' (i.e. the non-rational) rather than the 'mind' (the rational), and the question, for Keynes, is to figure out how this innate spontaneous urge to action affects the economic body as a whole.

When he argues that most decisions to do something positive come from a spontaneous urge, the opposing tendency is the consideration of the 'weighted

average of quantitative benefits multiplied by quantitative probabilities.' The intellectualist legend emerges as Keynes divides our economic selves in two: on the one hand there is the rational economic mind, that which calculates first and then acts. On the other hand, there is the spontaneous non-rational economic self, who cannot calculate and acts without thinking. The spontaneity of optimism is characterized by its detachment from reason for Keynes, for if it were reasoned it would not be spontaneous, it would be the result of probabilistic calculation. Within Ryle's terminology, therefore, we can see that this is the outcome of a category error. But for Keynes the point is not to make a proclamation on the nature of the economic mind in and of itself, but rather to try to reconcile a treatise on economic laws [11] with a theory, on a different plane of abstraction, of conflicted and often non-rational investment behaviour, by those who *ought*, given their economic roles, to be able to proceed rationally.

2) Enterprise may fade and die without animal spirits, but animal spirits alone are not enough to drive investment:

Enterprise only pretends to itself to be mainly actuated by the statements in its own prospects, no matter how candid and sincere. Only a little more than an expedition to the South Pole, is it based on an exact calculation of benefits to come. Thus if *animal spirits* are dimmed and the spontaneous optimism falters, enterprise will fade and die; though fears of loss may have a basis no more reasonable than hopes of profit had before. It is safe to say that enterprise which depends on hopes stretching into the future benefits the community as a whole. But individual initiative will only be adequate when reasonable calculation is supplemented and supported by animal spirits, so that the thought of ultimate loss which often overtakes pioneers, as experience undoubtedly tells us and them, is put aside as a healthy man puts aside the expectation of death. (162)

Enterprise requires the non-rational economic self. This relates to the 'businessman as a way of life' principle that was prevalent prior to the dominance of the Stock Exchange as means of drawing capital investment.

One can also here a connection to the bodily reactions that animal spirits effect in Descartes' *Passions of the Soul*, particularly in times of intoxication. The machine of the body, argues Descartes, is affected when the spirits are not equally and evenly pushed throughout the body. 'For when some of their parts are coarser and more agitated than others, they penetrate more deeply in a straight line into the cavities and pores of the brain, and in this way they are directed to muscles other than those to which they would go if they had less force' (Descartes 334). But whereas for

Keynes a sharpening of the mind is counteracted by the strength and (unthinking) optimism of the spirits, here, for Descartes, the dulling of the mind (by drink) leads to weakness and erratic movements of the spirits with often deleterious effects upon the body:

And this inequality may arise from the different materials of which the spirits are composed. One sees this in the case of those who have drunk a lot of wine: the vapours of the wine enter the blood rapidly and rise from the heart to the brain, where they turn into spirits which, being stronger and more abundant than those normally present there, are capable of moving the body in many strange ways. (Descartes, *ibid.*).

In the Keynesian case, animal spirits may provoke strange movements, or investments which do not necessarily stand to increase the investor's return on capital, but they nonetheless encourage the long term social benefit of supporting enterprise.

Importantly, therefore, neither animal spirits nor reason alone are enough. Reason, if driven solely by the profit-motive would often stop short of long term enterprise (which is a benefit to the social whole, generally) because of the possibility of loss. Reason can thus produce anxiety, especially when we do not have adequate grounds to determine the probability of future profit. The death analogy is particularly apt, as it invokes the way in which the subjectivity of the investor is in fact *determined* by the success of his accumulative activity. Animal spirits, on the side of optimism, are not thinking to the future, but are imbued with the optimism of life. They are not reasoned, they are not complete, and they help us put to the side the anxiety of death and loss irrespective of its relatively certain inevitability. Thus, fostering the subject, 'the businessman' who makes investments, requires a certain environment (just as the animal spirits in the human body require the forceful pumping of blood from the heart).

3) Animal spirits are contingent upon their environment:

This means, unfortunately, not only that slumps and depressions are exaggerated in degree, but that economic prosperity is excessively dependent on a political and social atmosphere which is congenial to the average businessman. If the fear of a labour government or a New Deal depress enterprise, this need not be the result either of a reasonable calculation or of a plot with political intent; - it is the mere consequence of upsetting the delicate balance of spontaneous optimism. In estimating the prospects of investment, we must have regard, therefore, to the nerves and hysteria and even the

digestions and reactions to the weather of those upon whose spontaneous activity it largely depends. (ibid.)

Now it can be seen how closely, in fact, Lawrence Summers was following Keynes' conception of animal spirits when he argued that animal spirits had been running high between the election of President Trump in November of 2016 and January 2017 (CNBC, 2017). The environment of promised deregulation, particularly the repeal of certain components of the Dodd-Frank Act, must certainly have encouraged investors to perceive that both their short term speculative gains and long term enterprise would yield less fettered gains. The metaphors that Keynes employs to describe the relationship between animal spirits and their environment are all physical – they have 'nerves,' experience 'hysteria,' have 'digestions' and 'reactions' – all physiological responses (i.e. unthinking, unreasoned) to the volatility that surrounds (or threatens to surround) them. The dualism of the intellectualist legend is intensified here when the economic environment is not conducive to the animal spirits themselves. In other words, despite the fact that animal spirits encourage investment even when there is no rational ground upon which to believe it will be profitable, the unthinking physicality of the animal spirits is only worsened by environments that do not privilege investment and the promise of an increase in the marginal utility of capital.

4) Not everything depends on waves of irrational psychology:

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 compensating effects. We are merely reminding ourselves that human decisions affecting the future, whether personal or political or economic, cannot depend upon strict mathematical expectation, since the basis for making such calculation 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, or sentiment, or chance. (162-3)

Finally, the spontaneous urge to activity, which may very well relate to spontaneous optimism insofar as it is the non-premeditated correlate to reason, and to mathematical expectation in particular, is not wholly irrational behaviour. Ultimately Keynes believes that it is justifiable to behave outside of the realm of reason in circumstances where there is no ground for reasonable calculation. In these moments the market is subject to waves of optimistic and pessimistic

sentiment, which are unreasoning and yet in a sense legitimate where no solid basis exists for a reasonable calculation' (153).

Conclusions

The intellectualist legend tells us that, fundamentally, 'to act rationally, therefore, [is] to have one's non-theoretical propensities controlled by one's apprehension of truths about the conduct of life' (Ryle, 26). And thus animal spirits exist outside of this legend, and are the link between ghost (economic rationality in the minds of knowing investors) and machine (economic body, economic bodies) that acts without thinking, creating the dualism between rational and optimistic (non-rational) selves. The category error for Keynes is not as grave as the mechanical analogy proved to be in the history of philosophy, for he does not assume that the body must operate according to a set of laws analogous to those presented by the economy (and apprehended by the rational minds functioning therein). But there is nonetheless a division of two minds. The rational mind *thinks first*, through calculation, generating mathematical expectation, conforming to the logic of the market. The non-rational mind, instead, simply acts, the spontaneous urge to action does not rely upon considered calculation or the meditations of homo economicus, but simply urges onward. The division is not absolute, of course, in Keynes, and the one (animal spirits) in fact bolsters the other (decisions to invest).

While it does not seem, as Marchionatti (1999) argues, that a positive theory of animal spirits would garner us greater explanatory capacity of market psychology in times of volatility, it does indeed seem quite useful to continue the analysis of the use of the term both in contemporary Keynesian discourse and in historical context. Animal spirits serve to reconcile the nature of an economic system which is ultimately unknowable in the future, but yet which purports to be discernable, at least, through calculation and prediction, to human subjects who do not so neatly fit into the dualism of being wholly rational economic agents *or* wholly spontaneous non-rational actors. This attempt at reconciliation, much like the Smithian reconciliation between individual self-interest and collective economic cooperation by means of the invisible hand, speaks to the magnitude of the epistemological difficulties for the economist, and for the subjects that the economist describes within models and systems. It could be that this difficulty was one which Keynes was just beginning to explore as he wrote his General Theory. How do we fit complicated subjects into an explanation of the economy which demands far more

perfect knowing subjects – subjects who know, who recognize their self interest through the tendencies of capital, who behave according to their knowledge. How, in other words, can the intellectualist legend be true in the economic sense when it is perfectly legitimate *not* to know how to act rationally? Animal spirits make a crack in this intellectualist legend, revealing its presence in Keynes, and in his predecessors, but do not overcome it. As economic crises continue one thing is certain: the account of economic epistemological subjectivity will have to continue to develop to include the non-rational component of human market behaviour.

Endnotes

[1] Kopp1 has posited that 'according to Descartes, the conflicts that exist between a person's lower and higher selves are conflicts between the spontaneous movement of animal spirits caused by the body's actions and the movements of the soul we like to impose on them' (1991, 209). In reference to Keynes a similar pattern emerges: the Keynesian animal spirits are 'the springs of action when individuals cannot make a rational calculation of expected values' (204).

[2] The 'Economy' is a term which I use to refer to the coherent economic totality theorized by most economists from the 1930s onwards. Its particularity lies in the fact that while ostensibly representing a measurable and observable totality, the 'Economy' is actually far more complex and difficult to contain. On the one hand, in popular conceptions of 'the Economy' we see a coherent totality replete with health, volition and an internal logic. In the popular conception the 'Economy' is its own subject, and as individuals we learn to navigate it or respond to its logic and demands. On the other hand economic conceptions of the 'Economy' will depend upon what is included within the models created for its measurement and description. Depending on how it is conceptualized, models will also be required in order to anticipate its future state (predictive models), or in order to control it by regulatory or state forces.

[3] The *Treatise on Man* was originally written from 1629-33 as part of a single treatise *The World and the Treatise on Man*. This treatise, which laid out Descartes' heliocentric understanding of the universe, was not immediately published, as he feared the same fate as Galileo in 1633. *The Treatise on Man* was published posthumously in 1664.

[4] Galison (1984), for example, explains the importance of locating the pineal gland as the seat of the soul: 'Images in the imagination are provided immediately to the understanding (or later recovered for presentation to the understanding from the memory). In either case, it is the understanding, a completely noncorporeal power, that isolates abstract qualities from specific cases in which they are instantiated. When Descartes localized the seat of the soul in the pineal gland (*conarium*), even this had a rough precedent in Neo-Galenic theory as a valve for pneuma between the third and the fourth ventricles. Because the gland is located at the fork of several arteries, it was also ascribed the role of separating blood vessels entering the brain, allowing the animal spirits to be distilled from the blood' (320).

[5] Kurt Smith (2001) attempts to deal with some of the nuances in the account of the relationship between the mind and the body. He creates a 'general theory' which aims to resolve some of the apparent contradictions in approach in Descartes' work.

[6] The relationship is characterized particularly nicely when Descartes shows that there is no conflict between the two opposing parts. 'So there is no conflict here except in so far as the little gland in the middle of the brain can be pushed to one side by the soul and to the other by the animal spirits (which, as I said above, are nothing but bodies), and these two impulses often happen to be opposed, the stronger cancelling the effect of the weaker' (346).

[7] Ryle talks about the 'official doctrine' and the tradition following Descartes without citing specific thinkers (apart from Descartes himself, of course). As his student, Daniel Dennett writes, 'Ryle set out to demonstrate the absurdity of what he calls the 'Official Doctrine' and warns at the outset: 'I shall often speak of it, with deliberate abusiveness, as 'the dogma of the Ghost in the Machine.' Who are these benighted champions of the Official Doctrine? Are there – were there – actual 'Cartesians' (or 'Hobbists') whose susceptibility to 'category mistakes' blinds them to the truth? Is this an affliction only of philosophers or do scientists or others also commit these errors of thought? One of the idiosyncrasies of the book is that there are no footnotes and no references. No thinker living in 1949 is mentioned or quoted anywhere in its pages, in spite of the fact – perhaps because of the fact? – that those rollicking pages often purport to be demolitions of contemporary confusions' (Dennett, in Ryle, ix).

[8] Chapter 12 of the General Theory is largely regarding as taking place on a different level of abstraction than the rest of the text. While some economists are dismissive of its largely psychological and philosophical considerations, others,

especially those interested in the philosophical underpinnings of Keynes' work, find it to be incredibly illuminating. Dow and Dow (2012), for example, explain the appeal of animal spirits: "Chapter 12 Keynesians' view animal spirits as being of central significance, and the epistemological problems associated with long-term expectations as being a more serious version of those facing all decision-makers. (see Loasby, 1976, ch.9). Indeed, from this view of decision-making stems the explanation for money's (non-neutral) role in the economy as the refuge of uncertainty, and, more generally, the necessity to conduct analysis within the context of historical time and thus to eschew any focus on general equilibrium. In short, this view of expectations is integral to the entire Keynesian theoretical framework' (Dow and Dow, 2012, 48).

[9] 'Former times' appear to indicate pre-corporate capitalism, 'when enterprises were mainly owned by those who undertook them or by their friends and associates' (150).

[10] Here, reason assumes a specific type of probabilistic reasoning. Keynes' *Treatise on Probabilities* (1921) provides us with the framework for this reasoning. Indeed, this text is pertinent to the question of uncertainty in the *General Theory*, and implies that probabilistic calculation be used in order to weigh our options. When this form of reasoning is not possible, then spontaneous optimism (or the failure to invest altogether) is the only recourse for investors.

[11] Or, if not laws, then at least pronounced macroeconomic tendencies, relationships predictable, calculable, that we can remedy through policy or other countervailing forces – all testaments to the epistemological authority of the economist.

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