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”...everything that has been said about animal spirits
through more than fifteen centuries is mere conjecture.“
Thomas Reid (1710-1796),
Essays on the Intellectual Powers of Man, 1785

Introduction

The recent global financial crises has caused renewed interest in the economic theories of John Maynard Keynes. In the general public and parts of academe Keynes is seen as the one economist who had very clear knowledge of the instability of markets, the volatility of economic activity and the reasons why these dreadful possibilities become reality – knowledge that mainstream economic theory allegedly has lost in the last decades. In discussions about alternatives to failed mainstream economics the notion (or phrase) “animal spirits” takes centre stage. Sometimes “animal spirits” even are set against the “invisible hand” of Adam Smith as an alternative (and realistic) vision of the working of capitalist economies (Akerlof/Shiller 2010, xxiii). This role of “animal spirits” in present-day discussions has been magnified by the publication of a book that sets itself the goal of rewriting economic theory under the heading of Keynes’s “animal spirits” that allegedly pervade all economic activity (ibid.).

Keynes used the phrase “animal spirits” only in three passages of *The General Theory of Employment, Interest and Money*, short passages that do not reveal their meaning immediately or easily. The following remarks try to clarify the meaning, relevance and source (or sources) of Keynes’s use of this phrase. The remarks start with a very short sketch of the origin and development of the concept of “animal spirits” from ancient physiology to modern philosophy. The analytical structure of the *General Theory* will be discussed in order to understand the relevance of “animal spirits” for Keynes’s critique of the orthodox economics of his day. The next section will then analyse the three passages in which Keynes made use of the concept of “animal spirits”. The penultimate section addresses the potential source (or sources) of Keynes’s use of “animal spirits”. The final section draws some sceptical conclusions.

Origin and Development of „Animal Spirits“

The notion of “animal spirits” (or “*spiritus animalis*”) can be traced back for more than 2500 years. Erasistratus of Chios (310–250 B.C.) researched human anatomy and physiology and was trying to solve the two problems of the perception of outward objects and the control of body movements (Ochs 2004, 22ff). He assumed the existence of various “spirits” that moved through the veins, arteries and nerves of the body and between themselves were responsible for perception, sensation and motor control. The *spiritus naturalis*, produced in the liver and flowing through the veins, nourishes the body and its organs; the *spiritus vitalis* enters the body through its respiratory organs, moves through the heart and the arteries, and secures the functioning of the body organs. Within the brain this *spiritus* is refined into the *spiritus animalis* (or *pneuma psychikon*). Here the *spiritus animalis* carries out higher brain functions and mental activities; moving through hollow channels within the nerves it is responsible for sensory activities and movements of the body. The next advance in anatomy and experimental physiology was made in the second century A.D. (Ochs 2004, 26ff). Erasistratus’s ideas, whose writings have not survived, have been preserved in the writings of Galen of Pergamon (129-216), who therefore is sometimes considered to be the source of the tri-partition of spirits (Akerlof/Shiller 2009, 177n3; 2010, 178n3). The next important step in the history of “animal spirits” comes with the writings of Descartes (1596-1650). In the centuries before Descartes the exact number of *spiritus* together with their precise role was an important of controversy; the understanding of the spirits underwent changes, being interpreted as subtle winds or flames, a thin vapor, a fiery fluid, vibrating particles, and so on (Ochs 2004, 215). Finally the problem of the interaction between mind and matter moved into the foreground. With Descartes the discussion of "animal spirits" finally moved beyond the realm of medical research and became the central aspect of the body-soul-problem. And it was this author who discarded the distinction between three different *spiritus* and only spoke of "animal spirits" (*esprits animaux*). This soon became the accepted phrase and in his writings, especially his *Treatise on Human Nature* (1739), Hume (1711-1776) followed Descartes in using "animal spirits" in this sense. In what follows, these meanings will be referred to as the *technical* meaning of "animal spirits".

Berkeley (1685-1753) summarised the different aspects of this understanding of "animal spirits" succinctly:

> "Animal spirits ... are the messengers, which, running to and fro in the nerves, preserve a communication between the soul and outward objects" (Berkeley 1732/1820, 38).

The end of the scientific career of the notion of "animals spirits" came in the first half of the 19th century with improvements in the understanding of these "messengers". It was marked by the discovery of neurons and by du Bois-Reymond's proof of the electrical nature of nerve impulses carrying information through the nerves (action potential) (Bennett 1999, Glynn 1999, Ochs 2004, 123).

But in the meantime, beside this scientific use, "animal spirits" came to be used in ordinary language (at least of the learned classes of English society) and by novelists like Daniel Defoe, Jane Austen, Henry Fielding, Benjamin Disraeli as well. Here "animal spirits" (or "spirits" for short) had a variety of similar meanings like ebullience, natural exuberance, natural gaiety of disposition, nerve, physical courage, or vivacity arising from physical health and energy (COED 1991; Visser 1992; Trumble/Stevenson 2002, MWCD 2003; Safire 2008, 21; 2009). In this understanding the "animal spirits" could be high or low causing the respective feelings of gaiety or sadness. This understanding will be referred to as the *literary* meaning of "animal spirits". Hume used the notion of "animal spirits" in this literary sense at least once. In his autobiographical essay *My Own Life*, prepared in 1776 shortly before his death, he writes:

"I have suffered very little pain from my disorder; and what is more strange, have, notwithstanding the great decline of my person, never suffered a moment's abatement of my spirits..." (Hume 1776/1888, xxxii; see as well Hill 1888, 49, 112, 214, 298, 339).

The Analytical Structure of the *General Theory of Employment, Interest and Money*

As any reader of Keynes's *General Theory of Employment, Interest and Money* will very soon realise, excessive volatility of economic activity or instability of markets are not the central themes of this book. Quite to the contrary, it was precisely the solution to a problem of instability Keynes was confronted with just after the publication of his *Treatise on Money* that started him on a path that eventually would lead him to the *General Theory*. When taken to its logical conclusion, his banana parable (JMK CW V, 158-60; XX, 76-8) implied that the full employment long-period equilibrium position that served – in quite orthodox fashion – as the point of reference for all of Keynes' analysis of monetary theory and monetary policy in the *Treatise on Money* was unstable. Even a slight increase in savings (decrease in aggregate demand) would result in a downward spiral of production and employment that would only end in zero production and starvation of the entire population (Barens 1989).

Keynes's solution to this impending danger of instability of the full employment long-period equilibrium position was, of course, the notion of a marginal propensity to consume less than one: the downturn of production and employment could then work as an equilibrating mechanism adjusting savings to investment demand after any disturbance. But this mechanism not only restored the stability of the long-period equilibrium position – it changed its essential quality! Starting from the orthodox full employment long-period equilibrium position, an increase of savings would spark off the downward equilibrating movement of production and employment eventually resulting in a new long-period equilibrium position at less than full employment. So no longer would there be one unique equilibrium level of employment, full employment, but employment could settle at any level up to full employment, depending on the level of aggregate demand (Principle of Effective Demand, JMK CW VII, 23ff).

Keynes explicitly expresses this notion on the very first page of the *General Theory*:

> "I shall argue that the postulates of the classical theory are applicable to a special case only and not to the general case, the situation which it assumes being a limiting point of the possible positions of equilibrium." (JMK CW VII,3)

While Ricardo held that demand was regulated by production (Ricardo 1952, 163-4), Keynes had now arrived at exactly the opposite view. Demand may be limited by production (full utilisation of productive capacity), but in general production and employment will be regulated by demand. The notion of a spectrum of possible positions of equilibrium, of which orthodox theory only takes into consideration the *limiting* point of equilibrium may be influenced by Keynes's reading of Malthus. Malthus criticised Ricardo for confusing the "principle of regulation" with the "principle of limitation" in the theory of the rate of profits and emphasized:

> "But limitation is essentially different from regulation" (Malthus 1836, 275-6, Barens 1987, 83-101).

If the employment level in long-period equilibrium depends on aggregate demand, how is this level to be determined? Aggregate demand is made up of demand for consumption goods and demand for investment goods. Via the marginal propensity to consume and the multiplier relation demand for consumption goods passively depends upon demand for investment goods. Demand for investment goods, in turn, depends on expected profits and the rate of interest.

> „Ricardo and his successors overlook the fact that even in the long period the volume of employment is not necessarily full but is capable of varying, and that to every banking policy there corresponds a different long-period level of employment; so that there are a number of positions of long-period equilibrium corresponding to different conceivable interest policies on the part of the monetary authority" (JMK CW VII, 191; XXIX,55).

In the final end, the rate of interest and therefore the level of employment depend on the quantity of money:

> "Thus, even on the assumption of a constant stock of money, this assumption merely determines which of the large number of conceivable positions of long-period equilibrium corresponding to the different levels of output will be actually occupied by the economic system or towards which the economic system will tend" (JMK CW XXIX, 57; XIII, 408-9).

Obviously Keynes chose the title of his book very carefully: a *general* theory, because of the spectrum of possible equilibrium positions; a general theory of *employment*, because the equilibrium level of employment will not necessarily be full employment and therefore should be the object of analysis; a general theory of employment and *interest*; because the rate of interest determines the level of aggregate demand and thus the level employment; a general theory of employment, interest and *money*; because the quantity of money, exogenously determined by the monetary authority, determines the rate of interest.

A shift from a full employment long-period position to a underemployment long-period position as the centre of gravitation of the economic system would, as Keynes was well aware, "...largely revolutionise...the way the world thinks about economic problems" (JMK CW XXVIII, 42). This can be demonstrated using one recommendation, common at the time of publication of the General Theory, how economic policy, i.e. monetary policy, should react to the problem of the trade cycle or, in modern parlance, the boom-and-bust cycle. Because the trade cycle was seen as a sequence of waves of excessive optimism and excessive pessimism monetary policy should "nip in the bud" any incipient boom by raising the rate of interest in order to deter misguided optimism (JMK CW VII, 327). This would avoid otherwise unavoidable errors of pessimism and smooth out production and employment thereby leading to *stable full employment*. But if the long-period position of the economic system entails underemployment, such a policy will only result in *stable unemployment*.

> "Thus the remedy for the boom is not a higher rate of interest but a lower rate of interest! For that may enable the so-called boom to last. The right remedy for the trade cycle is not to be found in abolishing booms and thus keeping us permanently in a semi-slump; but in abolishing slumps and thus keeping us permanently in a quasi-boom" (JMK CW VII, 322).

The long-period orientation of Keynes critique of the orthodox notion of a self-adjusting economic system had not gone unnoticed (Barens 1987). Schumpeter (1954, 327) and Lambert (1963, 81) pointed out that Keynes presented his vision of the long-period underemployment equilibrium with the help of a short-period model and Robertson (JMK CW XIII, 50) was well aware that Keynes' analysis in the *General Theory*, in contrast to his *Treatise on Money*, was no longer concerned with cyclical fluctuations around full employment output.

On the Meaning and Relevance of "Animal Spirits"

Keynes analyses the determinants of investment in Book IV of the General Theory. After introducing the novel concept of marginal efficiency of capital in chapter 11, he discusses the determination of the rate of interest in chapter 13 and the expected profits of an investment project (capital asset) in chapter 12. In this chapter, "The State of Long-term Expectation", Keynes discusses "...some of the factors which determine the prospective yield of an asset" (JMK CW VII, 147). Expectations of prospective yield can in part rely on existing facts but must also rely on "...future events which can only be forecasted with more or less confidence..." because of the "...extreme precariousness of the basis of knowledge on which our estimates ... have to be made" (JMK CW VII, 149).

Keynes makes a distinction between the (professional) entrepreneur and the professional investor (JMK CW VII, 151, 154). The entrepreneur is confronted with the decision to invest in the capital equipment of his firm and has to form long-term forecasts of the probable yield of an investment over its whole life and it is in relation to these long-term forecasts that Keynes introduces "animal spirits".

The professional investor is active on the financial markets, especially the stock exchange, and is, according to Keynes, concerned not with these long-term forecasts but with "... foreseeing changes in the conventional basis of valuation a short time ahead of the general public" (JMK CW VII, 154). Keynes applies the metaphor of a beauty contest to this situation:

> "... professional investment may be likened to those newspaper competitions in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole; so that each competitor has to pick, not those faces which he himself finds prettiest, but those which he thinks likeliest to catch the

fancy of the other competitors, all of whom are looking at the problem from the same point of view. It is not a case of choosing those which, to the best of one's judgment, are really the prettiest, nor even those which average opinion genuinely thinks the prettiest. We have reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be. And there are some, I believe, who practise the fourth, fifth and higher degrees." (JMK CW VII 156)

In chapter 12, Keynes juxtaposes the entrepreneur (or enterprise) to the professional investor (or, pushed to the extreme, speculation)
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" (JMK CW VII, 154) acting on the financial markets (financial investment); neither does he link "animal spirits" to the consumption or saving decisions of private households.

The phrase "Animal spirits" appears three times in the course of just about one single page (JMK CW VII, 161-2):

1:

"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 as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities."

2:

"Thus if the animal spirits are dimmed and the spontaneous optimism falters, leaving us to depend on nothing but a mathematical expectation, enterprise will fade and die;— though fears of loss may have a basis no more reasonable than hopes of profit had before."

3:

> "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."

The first thing to note is that Keynes does not use the term "animal spirits" in its technical meaning but in its literary meaning.

In what follows the entrepreneurial investment decision of entrepreneurs will be framed in terms of the comparison of the given supply price to the demand price of a capital asset (or an investment project) (JMK CW VII,147), as "the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities". According to the *first* quote, "animal spirits" stand for a *spontaneous urge to action rather than inaction*. This would suggest some kind of "action-bias", i.e. a tendency on part of entrepreneurs, especially when in doubt, to more often opt for action than for inaction. Thus, the reader is led to infer, if the demand price is not less than the supply price, then the entrepreneur certainly will decide in favour of the investment project. And even if "cold calculation" would recommend not to undertake the investment project, the demand price being below the supply price, because of this spontaneous urge to action rather than inaction, the entrepreneur nevertheless may decide otherwise.

But the *second* quote suggests that there may be different "intensities" of "animal spirits", i.e. they can be more or less "dimmed". If "animal spirits" are dimmed, enterprise will fade and even die due to a lack of "*spontaneous optimism*". Thus, the reader is led to believe, if "animal spirits " are "dimmed" the entrepreneur will decide against investing even if the demand price is higher than the supply price. The *third* quote quite similarly argues that "reasonable calculation" (mathematical expectation) must be "*supplemented and supported*" by "animal spirits" in order that the possibility of ultimate loss is neglected. But this raises questions of how the entrepreneur did calculate the demand price of the capital asset in the first place: at what phase the "supporting and stimulating animal spirits" do enter the decision process? Was the possibility of ultimate loss not taken in account at all while calculating the demand price? Or was a certain probability attached to the possibility of ultimate loss? The drift of Keynes's argument suggest that indeed a certain probability of ultimate loss was taken into account.

But why should the entrepreneur prefer another (lower or zero) probability of ultimate loss due to "animal spirits" after having calculated the demand price?

Finally, by allowing for the possibility that "...fears of loss may have a basis no more reasonable than hopes of profit had before...", Keynes effectively just restates the description of the trade cycle, as already mentioned above, quite common at the time, as a succession of waves of excessive optimism and excessive pessimism.

Leaving aside many other problems, one consequence of the discussion so far is that regarding the investment decision facing an uncertain future "...there may be several slips between the cup and the lip" (JMK CW VII, 173). But this discussion points towards an even more severe consequence: the investment decision seems to be entirely arbitrary insofar as there seems to be no systematic link between the decision to invest and the relation in which demand price and supply price stand to one another.

But as Patinkin (1997, 66) has pointed out, in chapter 12 Keynes does still speak of a determinate investment-demand schedule (JMK CW VII,149). Furthermore, after having discussed this "instability due to the characteristics of human nature", Keynes ends this section of chapter 12 with a warning (JMK CW VII, 162):

> "We should not conclude from this that everything depends on waves of irrational psychology."

The state of long-term expectation is often steady and even when suffers changes there are other factors that exert compensating effects (JMK CW, VII, 162-3).

> "We are merely reminding ourselves that human decisions affecting the future, whether personal or political or economic, cannot depend on strict mathematical expectation, since the basis for making such calculations does not exist; and that it is our innate urge to activity which makes the wheels go round, our rational selves choosing between the

> alternatives as best we are able, calculating where we can, but often falling back for our motive on whim or sentiment or chance."

At the beginning of the next section of chapter 12, Keynes points to some of the factors that might mitigate the effect of "our ignorance of the future" (JMK CW VII, 163). Because of compound interest the prospective yield of many investment projects is dominated by the expectations concerning the near future. The risk involved in what Keynes calls the most important class of very long-term investments, buildings, can be shared between investor and occupier, or even completely transferred from investor to occupier, by means of long-term contracts. Finally, there is a class of investment projects that are undertaken by public authorities "... without seeking to be satisfied that the mathematical expectation of the yield is at least equal to the current rate of interest" (ibid.).

As has been shown, "animal spirits" are not precisely defined by Keynes. If one takes into consideration two extreme positions concerning the linkage between "cold calculation" and the entrepreneurial investment decision – one stating that investment decisions are exclusively determined by rational calculation of the discounted value of prospective yield, the other stating that investment decisions are never determined by rational calculation, then one can conclude with some certainty only that Keynes's position lies somewhere between the two extremes. Taking Keynes's statements literally, leads to the conclusion that Keynes's position comes extremely close to denying any systematic influence of rational calculation. But his cautionary remarks contradict this conclusion - without giving a decisive and reliable answer about the influence "animal spirits" might have.

The Source of Keynes's Use and Understanding of "Animal Spirits"

No use of the term "animal spirits" besides the three instances in his General Theory can be found in Keynes's published writings. But there exist unpublished lecture (and reading) notes on a lecture on modern philosophy that Keynes attended as a young student in the academic year of 1902-03 (Carabelli 1988, Matthews 1984, Moggridge 1992, Patinkin 1997). In the section on Descartes, Keynes wrote (without giving a source) (Moggridge 1992, 208):

> “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.”

To this note Keynes appended the remark "unconscious mental action”.

Matthews (1984, 212) and Moggridge (1992, 208) point to the fact that Hume, a philosopher held in high esteem by Keynes, made use of the term “animal spirits” in his *Treatise on Human Nature*. Visser (1992) points out that “animal spirits” may have been a set phrase of the English language. Koppl (1991, 1992) conjectures that maybe Keynes alluded to Descartes, who held the view that the activity of “animal spirits” can end in moral and intellectual error and therefore in regret and repentance. Keynes, in contrast, argued that “animal spirits” could be necessary to bring positive investment into effect:

> “If Keynes intended to allude to Descartes, then we may take his use of the term to be both a joke and a lesson. The joke is that socially beneficial investment in commercial society is a mistake from a Benthamite perspective. The lesson is that in a non-Cartesian world, Cartesian reason may not promote the social good” (Koppl, 1992, 121).

But as has been shown, Keynes use of “animal sprits” seems to be closer to the literary meaning than the technical sense of this term. “Animal spirits” that are “dimmed” and endanger the investment activity of entrepreneurs can without any difficulty be translated into “low spirits”; and the “spontaneous urge to action” can easily be understood as the effect of “high spirits”. So maybe Keynes just used a common and set phrase that must have been known to him.

But why after more than three decades after the first documented use of this term? This points to another intriguing possibility: Keynes suddenly returns to this phrase in chapter 12 that was substantially written in 1934. This was a time of renewed interest in the writings of Hume and Descartes on the part of Keynes. He purchased the works of Descartes in 1934 and in 1933, with the help of his brother Geoffrey, he could acquire a copy of the extremely rare *Abstract of a Book Lately Published: Entitled a Treatise of Human Nature...*, that had been attributed to Adam Smith. Together with Sraffa, Keynes soon was convinced that the abstract was written by Hume himself and in the introduction to a facsimile reprint of the *Abstract* published in 1938 put forth their arguments (JMK CW XXVIII, 373-90). Gehrke (2010) shows convincingly that, although Keynes and Sraffa composed their introduction only after the publication of the *General Theory*, Keynes immediately took great interest in the problem of authorship in early 1934. Although the text of the *Abstract* does not contain the term "animal spirits", it is not unlikely that Keynes's "careful" reading of the "Hume pamphlet" in January 1934 (Gehrke 2010, 1) will have been supplemented by a re-reading of other works by Hume – in the course of which Keynes may have been reminded of the phrase.

So, even if Keynes only used "animal spirits" in the colloquial or literary meaning, nevertheless his (renewed?) interest in Hume (who made use of the literary meaning himself) may have led him to use this phrase after more than three decades.

Conclusion

It has been shown that Keynes's *General Theory of Employment, Interest and Money* intended to criticise the orthodox view of an self-adjusting economic system by arguing that the long-period equilibrium position towards which the economic system constantly gravitates will not be a full employment position but may, and in general will, be associated with underemployment. Therefore, problems of instability of markets or the volatility of the economic process were not at the centre of his analysis. Considering how imprecise the meaning of "animal spirits" is defined, how limited their relevance is in the *General Theory* and how little this concept has to do with the main topic of this book, the underemployment long-period position of the economic system, it seems to be no wonder that Keynes did *not* choose a title like *The General Theory of Employment and Animal Spirits* for his book.

Even if the analysis of the trade cycle indeed would have been the central topic of the *General Theory*, speaking of "animal spirits" would have been nothing more than an eloquent paraphrase of the "state of confidence", with "changes in animal spirits" substituting for waves of optimism and pessimism as the cause of cyclical fluctuations,.

In these pages no definitive answer could be given to the questions of meaning, relevance and source of Keynes's use of "animal spirits". Maybe, in the final end, one can do nothing but quote Koppl (1992, 211), and, yes, of course, Keynes as well (JMK CW XIV, 114): "We simply do not know...."

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