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# The problems of the the Co-Ordination problem

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***Abstract:** This paper is focused on the Hayekian understanding of the operation of the market as the continuous solution of a co-ordination problem in a decentralised decision-making system. The aim is to show the reasons why the solution of this problem is imperfect. These reasons lie, on the one hand, in deficiencies in the mechanisms to which Hayek ascribes the task of solving the co-ordination problem and, on the other hand, in the implications of the Keynesian view on expectations and the workings of the market process. In this regard, the problem of co-ordination in a Hayekian world would have different implications if Keynes's theory were taken into consideration and the possibility of mistakes in an uncertain world were not underestimated.*

## **1. Introduction**

Within the ongoing debate between Austrian and Post Keynesian economists, comparisons of the Hayekian and Keynesian theories of expectations have come to be a prolific source of controversy. So much so that it has been claimed that some of these comparisons force Keynes's thought to fit in Hayek's theoretical framework and, as a consequence, the former is not only diluted in the latter, but it seems more precariously founded (Carabelli and De Vecchi, 2001a). Among these controversial comparisons, the Butos & Koppl paper of 1997 occupies a particularly relevant place. Their aim in comparing these theories is to draw a conclusion regarding which of them holds water. Unsurprisingly, their conclusion is that Hayek's theory of expectations is the more general: 'a Hayekian theory is needed to understand a Keynesian world' (1997, p. 329).

In order to show the lack of sound foundations to this conclusion, Carabelli & De Vecchi have followed a strategy primarily grounded in rejecting the characterisation as subjectivist which Austrian authors such as Butos & Koppl have made of Keynes's view on expectations.<sup>2</sup> They,

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<sup>2</sup> In this regard, Böhm has even stated that 'Keynes, in his insistence of the rôle of expectations, may turn out to be the "master of subjectivism"' (1989, p. 61). Nevertheless, note that, in his 'Post-Keynesian Economics: Towards Coherence', a Post Keynesian author as Arestis has described 'what Keynes labelled as profit expectations of the business community' as 'a purely subjective concept which is not susceptible to probabilistic manipulation' (1996, p. 124).

accordingly, have restated the objective and rational nature of expectations in the Keynesian conception (see Carabelli & De Vecchi, 2001a, 2004; Butos & Koppl, 1993, 1997, 2004). In a parallel debate focused on Butos & Koppl's paper too, Burczak, in contrast to the objectivist thesis, has adopted Davis's (1994) view of Keynes as the architect of an intersubjectivist understanding of expectations. On this basis, his main criticism against the Hayekian theory of expectations is that the relative stability of circumstances is a sine qua non of the self-regulatory capacity of the market which this theory predicts.

As a contribution to these discussions, this paper develops an argument which follows a different path. This path is not based on any concrete conception of the nature of expectations, but attempts to use critically any possible way of conceiving them. In particular, the discussion will be set up in terms of a 'Hayekian world' in which the market is understood as an exchange network in which a great number of individuals are interacting with each other. Once this view of the operation of the market has been chosen as the framework of reasoning, the aim will be to show why, in spite of the Hayekian theory of expectations which Butos & Koppl have developed, the solution of the co-ordination problem among the actions autonomously adopted by the participants in the exchange network is imperfect. That is, why intertemporal co-ordination can take place at a low level and on occasion, during economic crises, at a clearly precarious level. The reasons for this lie in the deficiencies in the mechanisms and institutions to which Hayek ascribes the task of solving the co-ordination problem. In addition, they are to be found in Keynes's conception of the workings of the market and in his conception of expectations. That is, in contrast to what Butos & Koppl state (1997, p. 329), it can be said that the magnitude of the co-ordination problem in a Hayekian world can only be fully grasped if the possibility of mistakes in an uncertain world is not underestimated and Keynes's theory is taken into consideration. For this theory is able to explain discoordination, unemployment or mistaken planned actions in an 'unhampered market' without 'Big Players'.

In this vein, the starting point of the argument adopted in this paper is Hayek's conception of the market as a co-ordination problem. The end-point is what cannot be explained by the Hayekian theory of expectations which Butos & Koppl have proposed—particularly, the scarcity of investment decisions in economic crises. In between, the aim is to show how imperfect the solution of the co-ordination problem brought about by market forces is.

The argument is developed as follows: in Section 2, the Hayekian understanding of the market process as a co-ordination problem and the features of the solution of this problem are expounded. In Section 3, the operation of the mechanisms and institutions which, according to Hayek, solve the co-ordination problem is described. In Section 4, the reasons why these mechanisms and institutions only imperfectly solve this problem are discussed. In Section 5, Keynes's view on the logic of the market and the nature of expectations is used to show why the forces of the market might bring about an unsatisfactory solution to the co-ordination problem.

## **2. Social order as a succession of correspondences between supply and demand**

The main concern of any discipline which deals with human matters should be, according to Hayek (1983 [1973], p. 37), the question of how an orderly coexistence among the mass of individuals which constitute society is possible. In his attempt to answer this, Hayek develops a theoretical conception which is built around the concept of 'spontaneous social order'. Particularly, the spontaneous social order brought about by 'the anonymous and seemingly irrational forces' (Hayek, 1980 [1948], p. 24) on which the free market operation is based. These forces take shape in the interrelation among the actions autonomously undertaken by the members of the social whole in the attempt to reach their aims (see Hayek, 1978, pp. 71-97; 1983 [1973], pp. 36-8).

The relevance of spontaneous order in Hayek's theoretical system stems from the fact that he ascribes to spontaneous social forces the capacity to generate an order which—given the known decision-making systems—is the relatively best adapted to circumstances. Moreover, the

chain of collective results endogenously engendered is not only adapted to particular circumstances, but to the flux of changing circumstances. The order which emerges from these spontaneous forces is not, therefore, an end-point. It is a permanent state of order spontaneously altered and constantly adapted to the continuously changing circumstances of the social process.

The reason why the market is able to generate this level of adaptation is grounded in its institutional framework's capacity to solve in the relatively most efficient way the economic problem of society, which, for Hayek, 'is a problem of the utilization of knowledge' (1980 [1948], pp. 77-78). In this regard, the main feature of the market's institutional framework is that individuals have a protected sphere of liberty in which they freely and autonomously decide how to use their particular knowledge of time and place in the attempt to achieve their own aims. This decentralised nature of the market's decision-making process enables the potential use of all the dispersed knowledge of time and place, which is individually possessed and cannot be collected and processed in its totality by any individual or collective agent (Hayek, 1979 [1952], p. 117; 1980 [1948], p. 77).

From her sphere of freedom, the individual, in the attempt to achieve her material aims, would give others what they want in return for what she wants. As a result of the constant repetition of these mutual transactions, a dense exchange network would be created and the social aggregate would be continuously being constructed and reconstructed. Indeed, following von Mises (1949, p. 301), Hayek asserts that 'the only ties which hold the whole of a Great Society together are purely "economic"' (1976, p. 112).<sup>3</sup>

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<sup>3</sup> As Campbell and Klaes (forthcoming) discuss and Hayek himself (1976, p. 112) states, there exist numerous networks of other economic relations—such as those regarding firms' internal organisation. However, as far as the idea of society as a whole is concerned, exchange relations are, in accordance with Hayek, what holds society together in a free-market economy.

How could the concept of ‘social order’, then, be defined? Throughout his writings Hayek has provided different definitions and occasionally has discussed how it relates to equilibrium (see Hayek, 1980 [1948], p. 41; 1983 [1973], p. 36). Although Hayek did not explicitly put forward the way in which the notion of ‘social order’ will be defined in this paper, this definition is in tune with his conception of the market process and, particularly, with the idea that ‘the cash-nexus’ is the bond which unites individuals into society (Hayek, 1976, p. 112). Moreover, it is a conceptual possibility especially well suited to help reconstruct what Vaughn (1999) has called the ‘implicit economics’ of Hayek’s later writings.

In accordance with the Hayekian transformation of the market into an exchange network and with the identification of social links with exchange relations, social order can be said to consist in the correspondence between supply and demand. This correspondence is not an end-point or a balance of forces, but a state of order which, although maintained through time, is constantly modified. For it is the result and the expression of the interrelation among the actions undertaken by individuals in their attempt to satisfy their own aims and to adapt to the continuous flux of changing circumstances. In other words, it is a state of order made up of an infinite succession of what Snippe (1991 [1987], pp. 301-306) has referred to as ‘momentary equilibria of demand and supply’. In his later writings, however, Hayek mentions explicitly his preference for the use of the term ‘social order’ instead of ‘equilibrium’ (see Fleetwood, 1996):

Economists usually ascribe the order which competition produces as an equilibrium—a somewhat misfortune term, because such an equilibrium presupposes that the facts have already been discovered and competition therefore has ceased. The concept of an ‘order’ which ... I prefer to that of equilibrium, has the advantage that we can meaningfully speak about an order being approached to various degrees, and that order can be preserved throughout a process of change .... This order manifests itself in the first instance in the circumstance that the

expectations of transactions to be effected with other members of society ... can be mostly realised (1978, p. 184).

Nevertheless, in order to show the sense of this identification between the state of social order and the correspondence between supply and demand, two qualifications are worth considering. First, the constant flux of changing circumstances, to which each participant in the exchange network tries to adapt her actions, is formed—other facts independent of human agency aside—by the rest of participants' actions and the interrelation among them. That is, by the individual supplies and demands, and how they relate to each other in the exchange network. Accordingly, the actions undertaken by a certain individual might trigger a succession of adjustments in the actions of some of the other participants. Any of these adjustments, also, could be the starting point of a new chain of alterations and adjustments, which, in a spreading process, would produce new possible rearrangements, and so on.

Second, grounding the definition of the state of social order in the correspondence between supply and demand does not imply that each and every individual planned supply (demand) will have a corresponding demand (supply); i.e., the correspondence does not refer to an 'ex ante' match, but to an 'ex post' result where unsuited planned supplies and demands would be expelled from the market. To base Hayek's concept of 'social order' on such an interpretation of the correspondence between supply and demand could be considered as controversial. Nevertheless, as one of the sections in Chapter 10 of *The Mirage of Social Justice* is entitled, '[t]he correspondence of expectations is brought about by a disappointment of some expectations' (see, also, Hayek, 1978, p. 180; 1983 [1973], p. 103). Therefore, given that Hayek explicitly assumes that some expectations will be disappointed, the succession of correspondences between supply and demand on which his concept of 'social order' is grounded can be understood as a chain of 'ex post' results. Indeed, most of the 'implicit economics' of Hayek's writings after 'Economics and Knowledge' could be interpreted as an attempt to find and explain the means by

which the ‘ex post’ level at which supply and demand meet is raised. For increasing this ‘ex post’ level would entail that it gets closer to that hypothetical ‘ex ante’ correspondence between supply and demand at which the ‘plans which [] individuals ... have made for action in time are mutually compatible’ (Hayek, 1980 [1948], p. 41).

Moreover, even in the improbable case that the plans made up by all the participants in the exchange network were successful, the correspondence between supply and demand would not become an endless state of rest. For new possibilities to make a profit would immediately arise. There would always be an opportunity for Shackle’s ‘process of creation’ (see Böhm 1989, p. 77). Indeed, ‘[w]e act in the world precisely to change the course of events’ (Koppl & Butos, 2001, p. 84). As a result of these actions capable of modifying events, the market process would be restored to its normal condition as a continuous flux of changing circumstances. In this environment of constant modifications, ‘some individuals will always be discovering new facts, and [since] we want them to make use of this new knowledge, it is clearly impossible to protect all expectations’ (Hayek, 1983 [1973], p. 103).

Therefore, in accordance with the way in which the correspondence between supply and demand has been depicted, the state of social order does not involve, in traditional economic terms, full employment of available resources or the absence of (temporary) overproduction. It just entails a succession of ‘ex post’ correspondences between supply and demand, at whatever level they are taking place. In fact, given that the achievement of individuals’ aims depends on other individuals’ actions, society’s orderly operation can be understood in terms of a problem of co-ordination among the demand and supply decisions freely adopted by individuals. The question which stems from what Hayek called ‘the problem of the utilisation of knowledge’ and constitutes the heart of his ‘implicit economics’ would be, consequently, the following (see Caldwell, 2004, p. 303): what mechanisms and institutions characteristic of the endogenous workings of the market might help the level at which supply and demand meet to rise?



### **3. Institutions and mechanisms which help solve the co-ordination problem**

The Hayekian ‘constitutionally ignorant individual’ (Barry, 1979, p. 9) hardly knows anything about what happens beyond her immediate context. Hence, in order to improve the fitting of individuals’ actions into the flux of circumstances of the exchange network and to raise the point at which supply and demand meet, ‘the individual on the spot’ needs more knowledge (Hayek, 1980 [1948], p. 144).

In this regard fluctuations of relative prices would provide individuals with additional knowledge concerning the degree of relative scarcity of the goods which are related to their respective demands and supplies (see *ibid.*, p. 84). This is the reason why Hayek defines the relative price system as a ‘telecommunication system’. It makes individuals aware of new possible opportunities which might enable them to better satisfy their aims by using the exclusive advantage which the knowledge of their respective ‘here’ and ‘now’ provides to them. But it also enables them to better fit their supplies and demands into the continuously modified circumstances of the market process, achieving, this way, a rise of the level at which the correspondence between supply and demand takes place.

Besides, current norms of conduct, while they are respected, establish a basic pattern of conduct to which individuals adapt their actions, so that they produce what could be considered a certain similarity in individuals’ immediate contexts. As Carabelli & De Vecchi state, individual’s knowledge ‘is a ‘knowledge by acquaintance’ because some of the rules in terms of which he acts are followed by those whose actions he interprets’ (2001a, p. 275). As a result, norms help to mitigate the uncertainty inherent to the activities of the members of society, and, therefore, contribute to a greater mutual compatibility among individuals’ planned actions. Norms, in brief, provide the individual with a certain extra amount of knowledge. Thus, they help the level at which demand and supply meet to rise.

Norms, nevertheless, are not only one of the means by which the expectations of the participants in the exchange network acquire greater certainty. In addition, norms which have

emerged spontaneously are, for Hayek, ‘a repository of knowledge’ (Vaughn, 1999, p. 135) (see, also, Fleetwood, 1996, pp. 741-746). The reason why spontaneous norms of behaviour can be conceived of this way lies in the fact that they are the result of a selection process whose essence is the idea of trial and error. That is, pioneering individuals, being more or less aware of the meaning of their actions, would search for and try to develop innovative ways of acting which better satisfy their aims. If these pioneers are rewarded with success, those new ways of acting would become, by means of a process of imitation or whatever other spontaneous means, a spread regularity of behaviour—i.e., a norm (see Hayek, 1960, pp. 28-29). Therefore, the ways of acting which have overcome this selection process and hence have been retained would contain all the knowledge accumulated as a ‘result of a past process of tentative exploration’ (Hayek, 1976, p. 9).

As repositories of knowledge, spontaneously-emerged norms would be means which help participants in the exchange network to solve the problem created by their freedom of deciding. For the tacit stock of knowledge which inherited norms convey will tell individuals how to achieve what they want. If the individual is successful, the reason is ‘because his thinking and acting are governed by rules which have by a process of selection been evolved’ (Hayek, 1983 [1973], p. 11); that is, norms of conduct ‘are patterns of behaviour individuals have found generally useful’ (Butos & Koppl, 2004, p. 243). As regards the co-ordination problem, what this norm-grounded success means is that the ways of acting which have been spontaneously selected would help the individual to better fit her planned action into the flux of demands and supplies of the exchange network. Moreover, assuming a dependence relationship between norms and expectations, Butos & Koppl state that the selection process generates norms which entail co-ordinating expectations: ‘[e]xpectations ... are embodied in the rules governing action ... [which] are a product of social ... evolution. In this evolutionary view, ... [e]xpectations ... have a tendency toward coherence and coordination’ (1997, p. 355). Norms emerged through a spontaneous

process of trial and error would be, thus, another means which help to improve the resolution of the Hayekian problem of co-ordination.

Nevertheless, although current norms of behaviour and relative price fluctuations help to rise the level at which the correspondence between supply and demand takes place, they do not prevent some individuals from undertaking courses of action which do not fit into the exchange network. On these unadapted courses of action, the effects of the selection mechanism of competition would be felt. As a result, only those individuals who possess the knowledge adjusted to the circumstances configuration and use it in a right way—or just those who behave luckily—can be successful. In Hayek's words: 'the generally beneficial effects of competition must include disappointing or defeating some particular expectations or intentions' (1978, p. 180). In this sense, if the spheres of liberty are the means to accomplish the aim of putting the maximum amount of knowledge of the 'here' and 'now' in a situation of being potentially used, competition would be in charge of determining what knowledge will be really used. It could be said, thus, that competition's duty is to give the go-ahead only to mutually compatible plans of action, expelling decisions unadapted to the circumstances from the marketplace (see Snippe, 1991 [1987], p. 303). As a result, competition is the mechanism which ensures, in the last resort, the continuous resolution of the co-ordination problem. This task will be accomplished by the mechanism of competition regardless of the level at which the 'ex post' correspondence between supply and demand takes place at each moment of time, and bearing in mind that, far from being a static situation, the solution of this problem is a succession of correspondences which gives rise to a state of order continuously and spontaneously modified. Competition, therefore, always solves the co-ordination problem—no matter how many expectations are disappointed.

#### **4. Problems with the institutions and mechanisms which help solve the co-ordination problem**

In a free market economy à la Hayek, therefore, the knowledge that can be potentially used is determined by spheres of individual freedom and the individual's capabilities to take advantage of the opportunities for action which their protected domains offer them. The knowledge that does actually become spread throughout the exchange network depends in the last resort on the selective mechanism of competition. In between, price fluctuations and norms of behaviour would act like funnels which try to approximate the amount of knowledge which is being attempted to be poured into the bottle of the exchange network to what is really getting inside. In this section, the aim is to show why the imperfect operation of the funnels might spill from the bottle more knowledge—that is, more planned actions—than Hayek suggested.

#### **4.1. The price system and the succession of 'ex post' correspondences**

As regards the relevance which Hayek attributes to the price system in relation to the solution of the co-ordination problem, relative price fluctuations could be conceptualised as 'a method for detecting error[s] ... when they are perceived' (Vaughn, 1992, p. 267) and, in particular, for revealing how relative scarcities are being altered and not accurately satisfied. Conceiving the relative price system this way implies, in accordance with the 'ex post' nature of the correspondence between supply and demand, that 'price adjustment ... entails trading at "false prices" [in a Walrasian sense]. Because exchanges are made at disequilibrium prices, production projects are begun that, in the nature of the situation, cannot possibly be completed' (Lavoie, 1991 [1986], p. 216) (see, also, Desai, 1994, p. 43; Lachmann, 1976, p. 55). That is to say, despite the price system, mistaken courses of action are not only quite possible. They are a logical consequence drawn from realising that there exists no possible recontracting process orchestrated by a fictitious Walrasian auctioneer. Indeed, many planned actions which reveal themselves as mistaken will be discovered only after they have occurred or are being developed. The price system, therefore, does not prevent some individuals' demands from not being met or that certain supplies will not be purchased. Moreover, in spite of the price system's capacity for improving

the match between planned supplies and demands, the correction of errors based on price fluctuations is far from perfect and does not imply that new mistaken actions will not be planned and undertaken. In other words, it does not involve a process which progressively corrects current errors and ends when no mistakes remain. For current price fluctuations refer to current changing scarcities, but there is no experience of the future, i.e., of either future shortages or abundances. At the same time that some previous errors are being corrected new errors are being made.

In this sense, current scarcities, as reflected by the relative price system, are the result of yesterday's expectations and the actions based on them. By means of these actions based on yesterday's expectations, a certain number of individuals are able to satisfy their aims today—in some cases, due to pure chance. However, today's success does not ensure that these 'correct' actions will be undertaken tomorrow. They could be unique actions. Or individuals who have undertaken them today might not want to undertake them again tomorrow—for instance, because they expect that the conditions which they think that have made these actions successful today might not remain or might not be so advantageous tomorrow. To put it in Burczak's terms, these decision-makers who have been successful today might come to realise that 'past profitable performances are no indication of future successes' (2001b, p. 89). As a result of these possible changes in individuals' successful decisions, today's scarcities would be different from tomorrow's scarcities and, therefore, today's relative prices might lead to mistaken planned actions. However, what is even more evident is that a part of the actions based on yesterday's expectations proves wrong today; that is, these current actions do not suit other individuals' demands and supplies. Today's scarcities, therefore, depend not just on correct decisions which might not be taken again tomorrow, but also on actions unadapted to the exchange network circumstances. Since these unadapted actions, in principle, will not still be undertaken by individuals tomorrow, the current scarcities which they contribute to creating will not exist tomorrow. Therefore, individuals who plan their future actions on the basis of today's

scarcities—as shown by current relative prices—might discover tomorrow that their planned actions are mistaken. As Snippe has stated, ‘[t]he adjustments induced [by current prices], which today seem to be in the right direction, given present scarcities, may tomorrow turn out to be a dramatic failure’ (1991 [1987], p. 302).

Thus, the relative price system, as Hayek stated, helps to solve the problem of co-ordination created by a decision-making system in which many individuals plan their actions autonomously. However, it does not prevent individuals forming mistaken expectations and adopting courses of action which are not adapted to the flux of demands and supplies which characterises the market process. That is, it does not transform the solution of the co-ordination problem from an ‘ex post’ correspondence between demand and supply to an ‘ex ante’ correspondence.

#### **4.2. Norms of behaviour and the succession of ‘ex post’ correspondences**

As far as norms of behaviour are concerned, unadapted courses of action will be undertaken by some individuals despite the similarity among individuals’ immediate contexts they contribute to create. Norms rarely define each and every detail of the behaviours grounded in them. What they do is to establish a sort of basic substratum of conduct which can give rise to a range, within certain limits, of differentiated specific behaviours. The possibility of error in individual’s norm-based expectations concerning other individuals’ actions cannot, therefore, be completely ruled out. As Hayek himself pointed out, ‘rules serve to provide information for the decision of individuals, and thus help to reduce uncertainty, but they cannot determine what use individuals can make of this information and therefore also not eliminate “all” uncertainty’ (1976, p. 123).

Besides, whether they have been explicitly called ‘norms of behaviour’ or not, there is a certain type of norm which is particularly interesting as regards the co-ordination problem. These

norms of conduct are those to which economic theory—particularly, that of Hayek and Keynes—has referred as the means which agents use in order to predict other individuals' behaviour or future outcomes. However, before proceeding, note that the aim is not to discuss whether a certain theoretical conception of the expectation-forming process is right or wrong, or which norms real economic agents actually follow. Such an aim exceeds the purposes of this paper. The reason why these norms deserve attention is, by contrast, to show how precarious is the basis for forming adequate expectations on which to ground mutually compatible actions.

1. In this sense, let us start considering those norms mentioned by Keynes—although he calls them 'conventions' or 'conventional judgements'—which guide individuals' behaviour in what Davidson (1991) has called a 'true uncertainty environment'; that is, in situations in which 'there is no scientific basis to form any calculable probability whatever. We simply do not know' (Keynes, 1973b [1937], p. 114).<sup>4</sup> In these circumstances, it could be said that '[u]ncertainty favors the formation of conventional expectations rather than of reasonable expectations' (Carabelli & De Vecchi, 2001b, p. 232) as a means by which individuals cope with and rationalise their ignorance of the future. Among the norms to which individuals might resort to form their expectations in these situations, Keynes refers to the convention of assuming 'that the existing state of affairs will continue indefinitely, except in so far as we have specific reasons to expect a change' (Keynes, 1973a [1936], p. 152). As Keynes (1973b [1937], p. 114) himself suggested, the mistaken actions to which this norm might lead would be shown by any 'candid

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<sup>4</sup> For the meaning of the Keynesian statement 'we simply do not know' in relation to the use of conventions, see the discussion between Butos & Koppl (1997, 2004) and Carabelli & De Vecchi (2001, 2004). Besides this, for a comparison between the Post Keynesian concept of 'uncertainty' and the neoclassical, probabilistic approach to situations in which perfect knowledge is not assumed, see Davidson (1991). For a critique of the Austrian conception of uncertainty from a Post Keynesian view, see Davidson (1989, pp. 475-480).

examination' of how serviceable a guide to the present past experience has been. Indeed, on those occasions in which this norm is followed, we would do so despite the fact that 'we know that the present will not be replicated, even stochastically' (Dow, 2003, p. 210). As far as the possibility of a stochastic replication of the present is concerned, the occurrence of this replication would entail that economic reality is ergodic in Davidson's sense, i.e., that the economic future is a statistical reflection of the past. In this regard, as he has been at pains to show, if there are certain decision-making areas in which true uncertainty prevails, 'then at least some economic processes are such that expectations based on past probability distribution functions can differ persistently from the time averages that will be generated as the future unfolds' (Davidson, 1991, p. 133). Therefore, if the individual is faced with a process which will prove nonergodic, but she assumes its ergodicity as a result of a conventional judgement under uncertainty, she might be expelled from the market as future events become past. This conventional judgement might be helpful for individuals in their need to act, to avert paralysis. However, since this entails that individuals are assuming a statistical similarity between past and future which might not occur, this cannot prevent mistakes. That is, it cannot be avoided that some planned actions will not form part of the 'ex post' correspondence between demand and supply.

2. According to Keynes's idea that, when we know 'that our individual judgement is worthless, we endeavour to fall back on the rest of the world which is perhaps better informed' (1973b [1937], p. 114), it could be said that individuals might adopt a conventional behaviour which would fall under the category which Dequech has called 'a defensible conventional behaviour against uncertainty'. For, by following this conventional behaviour, the agent tries 'to preserve his or her position relative to other people in the relevant market, since the individual will be behaving in a manner similar to these other people, on average' (Dequech, 1999, p. 14). This conventional conduct does not necessarily entail that individuals assume that economic reality is ergodic when it is not so or when they do not know whether it is so, that is, it does not have to be interpreted in statistical terms. The possibility exists of stating that individuals,



assuming that ‘the existing state of affairs will continue indefinitely’, take average expectation as a benchmark in order to plan their courses of action; but this average expectation does not have to be a statistical value based on past realisations. As Davis has shown, average expectation could be understood as the result which stems from an intersubjective structure of expectations in which ‘each individual’s judgment is influenced by the judgment of those individuals with whom he or she interacts ... , recognizing that others do the same’ (1994, p. 139). Nevertheless, when decision-makers follow this conventional behaviour, economic decisions become ‘the product of an unstable balance between an average expectation that is invariably wrong yet accepted and each individual’s specific judgments which lack firm foundation’ (ibid., p. 129). Once again, therefore, the unsound foundations of this convention will make unavoidable, when it applies, the adoption of mistaken actions. As a result, a ‘high weight’ could be assigned to the ‘justified belief’ that at least some of the actions which have been planned on the basis of this convention will not achieve the aims for which they were undertaken.

3. The essence of the Post Keynesian view of uncertainty could be summarised in the idea that ‘economic agents’ expectations can be easily frustrated’, because ‘[m]arket forces cannot deal with the unknowability and unpredictability of the future, and therefore can only disseminate incomplete, and even misleading, information’ (Arestis, 1996, p. 117). Although Hayek would have agreed with the idea that the future is unknown and unknowable, he would have rejected the rest of Arestis’s argument. Market forces, for Hayek, make possible the best and most extensive use, discovery and dissemination of the knowledge dispersed in the exchange network.

As far as expectations are concerned, as Butos & Koppl (1997, pp. 349-350) have pointed out, Hayek did not develop a separate theory of expectations. Since he repeatedly argued that ‘the generally beneficial effects of competition must include disappointing or defeating some particular expectations or intentions’, there is no incompatibility between his conception of the co-ordination problem and understanding the solution of this problem as a succession of ‘ex post’

correspondences between supply and demand. Hayek, nevertheless, did also state that in the social order brought about by competition in a free market economy ‘the expectations of transactions to be effected with other members of society can be mostly realised’, i.e., contrary to the Post Keynesian view, expectations cannot be frustrated so easily. In this sense, Butos & Koppl (1993, 1997) have developed a theory of expectations in tune with Hayek’s ideas about knowledge and the evolution of rules. The basis of this theory, to which a brief reference has already been made, is that ‘expectations are implicit in the practices, rules, and reaction patterns governing action’ (Butos & Koppl, 1997, pp. 353-354). Expectations would share, thus, the same beneficial features Hayek ascribes to spontaneously-emerged norms of behaviour. That is, since these norms have emerged and been retained through a selective process of trial and error in which individuals ‘have with varying fortunes pushed into every nook and corner of their environment’ (Hayek, 1976, p. 9), norm-based behaviour entails circumstances-adapted planned decisions. Norms, hence, assure the individual who follows them that—to a certain extent—she will get what she wants. If expectations, as Butos & Koppl suggest, are embodied in spontaneously-emerged norms, they too would be a solid basis to plan actions adapted to the exchange network, i.e., expectations, paraphrasing Hayek, would ‘be mostly realised’. In Butos & Koppl’s own words, ‘the filter of profit and loss weeds out those whose habits tend to generate inappropriate responses to market signals, that is, those with inappropriate propensities to act. Losses tend to filter out inferior expectations’ (1997, p. 351). Butos & Koppl do not refer to the tautological argument that ‘correct expectations are correct because they are correct’. Their attempt to develop Hayek’s ideas regarding expectations aims at providing a Hayekian endogenous theory of expectations. In this sense, what losses tend to filter out are not so much inferior, particular expectations themselves, but norm-grounded ways of forming expectations. Indeed, Butos & Koppl state, right after the quotation above, that ‘[p]rofits will go to those with better ways of projecting earnings whether or not they understand why their forecasting procedures are better’ (ibid.). Their theory of expectations leads Butos & Koppl to claim, by way

of conclusion, that ‘individual’s expectations are more likely to generate perverse and incoherent outcomes’ (ibid., p. 355) when the market is dominated by what they call ‘Big Players’, which is an Austrian neologism which—at least, mainly—designates public intervention (see, also, Garrison, 1987, pp. 336-337; Koppl, 1991, p. 204; Koppl & Butos, 2001, p. 85).

This theory of expectations will be discussed below at greater length. Here, where the aim is to show why the mechanisms and institutions to which Hayek ascribes the capacity to solve the co-ordination problem do it in an imperfect way, just a brief reference will be made to it. Acquired habits and practices, as much as norms and traditions which might apply, are a basis used by individuals to form their expectations about the future in many situations, particularly, as far as routine actions are concerned. However, this does not prevent some individuals’ planned actions from being excluded from the correspondence between supply and demand. Let us take an extremely simple example for illustrative purposes. The fact that a firm follows the practice of renewing its employees’ contracts every ‘x’ weeks does not ensure that all the workers are not fired after ‘x’ weeks because the firm, for instance, has gone bankrupt, or as a result of the collapse of the employer’s expected returns. In the correspondence between demand and supply relevant to this period of time, these employees do not count. It could be argued that, although based on an established practice, these workers were not using a correct way of forming expectations. The problem is that they probably did not have another possibility. Indeed, as Davidson has shown, nominal contracts ‘are a sensible method for dealing with true uncertainty whenever economic processes span a long period of calendar time’ (1991, p. 137).

4. Although neither Keynes nor Hayek accepted that uncertainty could be dealt with in terms of numerical probabilities, this is the way in which neoclassical modelisation solves any situation in which perfect knowledge is not assumed. In this sense, it could be said that mainstream theory seems to assume that ascribing numerical probabilities—whether objective or subjective—to possible outcomes is the norm of behaviour followed by individuals in the

formation of expectations. A brief reference to this norm, therefore, is worth making. In relation to objective probabilities, the strict assumptions on which the ascription of this type of probability to future values rests have been expounded when discussing the stochastic replication of the past. As far as subjective probabilities are concerned, the neoclassical norm would give rise to an infinite regression. Since there is no experience of the future, any numerical distribution of probability on future events would be uncertain itself. If, for the sake of coherence, this uncertainty is transformed into risk, a certain numerical, subjective probability should be ascribed to the original distribution of probability, which would lead to ascribe another numerical, subjective probability to the former, and so on. Moreover, the original distribution of probability is as uncertain as the necessarily closed list of events or states of the world to which it is ascribed and the consequences which would be drawn from each of those events. Thus, if the individual still wants to be orthodoxly rational, new infinite regressions would be needed. Given these logical requirements, agents could hardly ‘completely dismiss the fear of tragedy because of unforeseeable changes during the time between choice and outcome’ (Davidson, 1991, p. 136) (see, also, Koppl & Rosser, 2002). To put the problem of co-ordination in probabilistic terms, if they followed the norm in question, the probability of some individuals forming wrong expectations and adopting courses of action unadapted to the exchange network would be one.

##### **5. The logic of the market and the fragility of expectations: Keynesian problems of the Hayekian co-ordination problem**

In the previous section, the deficiencies in the way in which the relative price system and the norms which govern individuals’ behaviour help to solve the co-ordination problem have been discussed in order to show why these mechanisms cannot ensure that ‘expectations of transactions to be effected can be mostly realised’. On the contrary, their contribution to the solution of this problem is imperfect. All we can ascertain, therefore, is that competition brings about a succession of ‘ex post’ correspondences between supply and demand which not only

implies an unpredictable amount of disappointed expectations and expelled-from-the-market planned actions, but does not provide the means to avoid future mistakes. For “ex ante” no criterion of success can exist’ (Lachmann, 1976, p. 59).

Nevertheless, besides these deficiencies in the providers of extra knowledge to the participants in the exchange network, there are two other reasons why the ‘ex post’ correspondence of supply and demand in a free market economy can take place at an unsatisfactory level, indeed, at a level far below what would be desirable. These reasons correspond to what Shackle (1989) called the two personalities of *The General Theory*.

The first of them has its roots in how effective demand evolves under economic growth. As a result of market logic itself, as income is increasing, if the propensity to consume is not modified, the amount spent in consumption would be increasing too, but not at the same rate as the aggregate supply price. Thus, the gap between the former and the latter would become wider. In order to have an effective demand great enough for continuing the growth of income, investment would have to grow, therefore, at rates each time greater; that is, the incentive to invest would have to be increasingly stronger. Otherwise, there will be an insufficiency of effective demand which ‘may, and often will, bring the increase of employment to a standstill “before” a level of full employment has been reached’ (Keynes, 1973a [1936], p. 30). Accordingly, if the inducement to invest is not strong enough and no measure is taken to raise effective demand, after the laws of the market have worked themselves out, the result could be ‘the public scandal of wasted resources’ (see Snippe, 1986, pp. 374-375; 1991 [1987], pp. 302-305). What this means, in terms of the correspondence between supply and demand, is a poor performance of the exchange network in its attempt to solve spontaneously the co-ordination problem.

The second reason why the solution of the co-ordination problem can take place at a clearly deficient level is due to the fragility of expectations. In Section 4.2, where references have been made to expectations, the aim was to argue that the norms which economic theory has

assumed to govern the expectation formation process could lead individuals to form mistaken expectations and, therefore, to adopt unadapted courses of action. Nevertheless, as far as the co-ordination problem is concerned, expectations are relevant due to a different reason, namely, due not to the norms which define how they are formed, but to their volatile nature; that is, to the fact that ‘the basis for ... expectations is very precarious. Being based on shifting and unreliable evidence, they are subject to sudden and violent changes’ (Keynes, 1973a [1936], p. 315).

For Keynes, leaving other variables aside, the rate of investment depends on the marginal efficiency of capital, which, at the same time, depends on the expectations of the future, i.e., on the state of confidence (*ibid.*, p. 149). Therefore, the volatility which characterises expectations is transmitted to investment through the dependence relationship of the latter on the former. As a consequence, a fall in the marginal efficiency of capital caused by pessimistic expectations would bring about a situation in which:

investments ... are expected to yield less than nothing; and the resulting collapse of new investment then leads to a state of unemployment in which the investments ... in fact yield less than nothing. We reach a condition where there is a shortage of houses, but where nevertheless no one can afford to live in the houses there are (*ibid.*, p. 322).

Whatever the profit rate of the investments which might have been made in this situation, the result is that the level at which supply and demand are equal is critically low or, at least, lower than what would be desirable and avoidable by ensuring collectively that the amount of investment—or the effective demand in general—is enough.

The fact that ‘expectations about social and economic events are embodied in our habits of action’ (Butos & Koppl, 1997, p. 350) cannot prevent the precariousness of the resolution of the co-ordination problem to which a pessimistic state of confidence would have led. Other

possible criticisms aside,<sup>5</sup> the difficulties of Butos & Koppl's theory of expectations to deal with this precariousness stems from the argument that current expectation-forming procedures are, like spontaneously-emerged norms, survivors of a competitive selection process. In their own words: 'The evolutionary selection processes at work among thoughts and actions tend to select "fit" expectations and to weed out "unfit" expectations' (ibid., p. 355). The problem is that when potential investors are overcome by a pessimistic state of confidence there is no investment action to be selected. That is, when the economy is in a recession phase, the question is not what expectations are correct and what planned actions must be selected, but the scarcity of investment decisions. In this sense, competition can select actions, but cannot, by definition, select or weed out inaction. Indeed, potential investor's inaction is itself a conscious decision to stay away from the influence of the market forces. It is a way to protect her assets against the probable, perverse effects which competition might cause in a situation where the uncertainty about the future is

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<sup>5</sup> Burczak (2001a, p. 70) has levelled the following criticism against Butos & Koppl's theory of expectations. For an evolutionary selection process to lead to reliable and stable expectations, the economic environment itself should be relatively stable and Hayekian entrepreneurs cannot be especially creative. In their reply to Burczak, Koppl & Butos (2001, pp. 84-85) state that stability is a matter of degree. That is, any event is at the same time unique and typical, and its typicality and uniqueness have to be defined in terms of what agents know and when they know it. On this basis, 'Big Players' aside, they claim that changes in the market always occur progressively. That is, according to Carabelli and De Vecchi's interpretation of Hayek's thought, 'conventions guarantee the coordination of individual plans of action and the stability of society, because they change slowly in time' (2001, p. 279). This way, Koppl & Butos are able to restate the conclusion drawn from their theory of expectations; namely, individuals' expectations will be compatible due to their embodiment in spontaneously-emerged norms. Finally, in his reply, Burczak states that 'Post Keynesians believe that the economic process is subject to sudden and discontinuous transformations that can destabilize the existing state of confidence, possibly leading potential entrepreneurs to a flight liquidity' (2001b, p. 88).

tinged with pessimism or, at least, lack of optimism. In this situation, potential investors might prefer to keep their assets liquid. For, if '[i]nvestment is the giving of hostages to fortune', '[l]iquidity is the means of coping with "lack of knowledge of the yet non-existent"' (Shackle, 1989, pp. 54 and 49).

Butos & Koppl's statement 'that a Hayekian theory is needed to understand a Keynesian world' is unsound, therefore, because the theory of expectations which they have constructed is unable to explain generalised inaction. Unless we accept that Hayek's selection process has engendered an expectation-forming regularity of behaviour which entails something like 'not to invest when uncertainty seems to suggest that prospective returns might be rather low than high', this Hayekian theory of expectations could not explain Keynesian inaction. In particular, it would not be able to argue why and how an economic crisis can be produced as a result of a situation in which planned actions become planned inaction, making aggregate investment shrink. Resorting to 'Big Players' as the only possible cause of the shrinkage of the type of action which 'makes the wheel go round' does not seem to be too accurate. Note in this regard that the question under discussion, for the potential investor, is just a commonsensical problem of preventing failures when she has whatever kind of reasons to believe that her investment might fail. Since the purchase of new capital goods usually involves a relatively great outlay of money for firms—and, therefore, mistaken investments might cause a firm to go bankrupt—when 'the fears of loss' are stronger than 'the hopes of profits' investors would prefer inaction.

While these reasons do not disappear and 'the fears of loss' are not outweighed by 'the hopes of profits', unemployment will remain too high. Nevertheless, according to the way in which social order has been defined above, a negative shift in the state of confidence does not imply discoordination of economic activity. The rate of investment will fall and the amount of unemployed (known) resources will increase. Competition, therefore, will let its effects be felt in the planned actions of more providers of resources. As far as investment decisions are concerned, there will be less planned actions to be selected. But competition will still ensure that the solution



of the co-ordination problem is achieved, however low the level at which demand and supply meet is and no matter the amount of unemployed resources. This is the logic of the market. As Snippe has indicated in terms of equilibrium, 'we may say that Keynes's analysis assumes the economy is always in a temporary equilibrium' (1985, p. 268). What Keynes's conception entails and explains is that, besides the full employment solution, there is a whole spectrum of very likely solutions to the co-ordination problem in which known resources are unemployed, despite there still being uncovered needs, and in which expectations might not 'be mostly realised'. This type of solution is excluded by 'Hayek's faith in the efficacy of social evolution' (Butos & Koppl, 1997, p. 337).

The idea that expectations are embodied in habits and norms of conduct is not, nevertheless, unworthy of consideration. There are probably many planned decisions which rest on expectations formed, whether consciously or not, on the basis of current norms. However, in accordance with its incapacity to explain the investment inaction which characterises periodical depressions, the Hayekian theory of expectations developed by Koppl & Butos cannot be considered better grounded just because 'Keynes's approach does not leave us with much to say about "why" the state of confidence is what it is and what might change it' (Koppl & Butos, 2001, p. 86). Keynes himself pointed out that '[t]here is, however, not much to be said about the state of confidence "a priori"' (1973a [1936], p. 149). But this does not mean that the state of confidence is a 'diabolus ex machina' (Koppl, 1991, p. 204), that is, an uncaused cause on which the perverse fluctuations of the rest of variables of his theoretical system rests. What it means is that, often, the effective causes which give rise to shifts in entrepreneurial expectations when economic agents are subject to uncertainty about the future can only be ascertained 'a posteriori'. That is, when the state of confidence has already shifted or is shifting. In this sense, as Dow and Dow have suggested, 'animal spirits ... can be treated ... as exogenous, on operational rather than logical grounds' (1985, p. 58). We know that, at a certain moment, the index of entrepreneurial confidence of a certain economy reverses its upward trend and starts showing that 'the fears of

losses' are outweighing 'the hopes of profits'. In this situation, the causes of this reversal can be analysed and discussed. However, we can hardly elaborate, 'a priori', a closed list of all the facts which might influence or cause a shift in the state of confidence. The requirement of definitive, unique cause-effect relationship is more characteristic of neoclassical model building.

Keynes himself, however, points out some likely causes which might give rise to doubts about the reliability of expected profits and bring about, as a consequence, a shift in the state of confidence. In particular, under their ignorance of the future, doubts of potential investors or disinvestors might arise 'perhaps [because] the current yield shows signs of falling off, as the stock of newly produced durable goods steadily increases ... [or because] current costs of production are thought to be higher than they will be later on' (1973a [1936], p. 317). These causes do not necessarily have to do with whether the Austrian 'diabolus ex machina'—namely, 'Big Players'—is playing or not the market game. The fact, for instance, that at a certain point of the entrepreneurial process firms' finished-goods stock is increasing because demand is falling would not be necessarily precluded in an 'unhampered market' without 'Big Players'. It could be the result, for instance, of the end of the possibilities for investment opened by a technological development, or it could be due to an insufficient level of investment and, hence, of demand as income grows. What would disappear in this type of market, by contrast, is the possibility to ensure that effective demand is sufficient. These causes do not imply, either, that investors have emerged from a dark uncertainty about the future into the light. They still 'simply do not know'. The present, however, is giving hints which do not diminish their uncertainty about future events, but increase their fears. Stretching Keynes's conventional assumption 'that the existing state of affairs will continue indefinitely', it could even be said that they might fear that the current tendency to increase which finished-goods stock has shown will be maintained in the next period. If these fears inhibit investment decisions, effective demand will then be even weaker, so that more potential investment decisions will be inhibited. As a result, the preference for inactivity might spread contagiously.

In this vein, assuming that investors' behaviour could be understood in terms of a repeated prisoner's dilemma game in which investing is thought of as cooperating and not investing as defecting,<sup>6</sup> two particular investors would have to decide whether to invest or not in a particular move. As Axelrod (1984) has shown, in this type of repeated prisoner's dilemma, Tit-for-Tat is a strategy with survival value; that is, it is a rule of behaviour whose robust success against other rules makes it possible that, under certain circumstances, it can emerge, spread and protect itself once established spontaneously. However, uncertainty might add an unexpected element of reasoning to the decision problem. Note in this regard that taking it into consideration implies transgressing the rules of the game, but not doing so would entail turning one's back on the evidence that uncertainty pervades all decisions. In this sense, for instance, as a consequence of her uncertainty about the future, one of the investors involved in the decision problem could become pessimistically doubtful at a certain moment about her actions' payoffs. As a result, even if she had been following a Tit-for-Tat strategy up to that point, and in spite of the other investor's decision to increase her rate of investment in the previous move, she might decide not to do so in the current move. This would be just a decision adopted in order to protect her position in the face of the fear of losses. If the other agent were still following a Tit-for-Tat strategy, she would choose not to invest in the following round too. This way, the not investing decision would be spreading and hence the causes of an incipient crisis would be reinforced. In brief, a norm as Tit-for-Tat which is supposed to emerge and spread spontaneously as a consequence of its survival value might, in certain conditions, not prevent the negative outcomes produced by the fear of losses from being brought about by the interrelation among investors. Indeed, it could even help to strengthen those results.

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<sup>6</sup> I am indebted to Steve Pressman for having suggested the possibility of understanding investors' behaviour in terms of the prisoner's dilemma.

The logic of the market is that of a process which takes place in real time, and time itself implies change, uncertainty, ignorance and doubt. In order to understand the operation of the market, particularly on the downward slope of the cycle, the analysis of the range of possible causes which might raise doubts about future profits is essential. However, this analysis cannot lose sight of the fact that its conclusions can hardly be definitive ‘a priori’. For expectations are sensitive, too, ‘to factors which do not really make much difference of the prospective yield’ (Keynes, 1973a [1936], p. 154), but which can lead to an ‘error of pessimism’ (ibid., p. 322). They are as fragile as the investment decisions based on them are volatile. In brief, it is no less important to be aware that, however it arises, ‘[o]nce doubt begins it spreads rapidly’ (ibid., p. 317).

## **6. Conclusion**

If individuals could not make use of the knowledge of the ‘here’ and ‘now’ which they possess often in an exclusive way, an incalculable range of opportunities for innovation and improvement would be wasted. This is an undeniable economic reason to ensure that individuals have a protected sphere of liberty where they can decide freely how and when to achieve what they want. As a consequence of the adoption of this decentralised decision-making system, the process of the market can be understood as a co-ordination problem among the decisions of demand and supply adopted by a crowd of individuals. Competition will always, in the last resort, assure that this problem is solved. However, the mechanisms and institutions which, according to Hayek, are in charge of improving this solution can only do so in an imperfect way; that is, with the failure of a number of planned actions which is greater than what Hayek’s faith in the endogenous forces of the market led him to assume.

Moreover, Hayek’s theory of expectations cannot explain the possibility that potential investors opt for Keynesian generalised inactivity. That is, that, in certain circumstances, investors might decide to keep their assets liquid due to an insufficiency of demand or to the

volatile nature of expectations. In brief, Butos & Koppl's argument is able to deal with how competition filters out expectations which generate losses, but it cannot deal with 'the fear of losses'. In a situation in which these fears are as uncertain as 'the hopes of profits', but stronger than them, the amount of unemployed resources will increase. Leaving aside those who have decided to keep their assets liquid, the greater this amount, the greater the number of disappointed planned decisions.

This paper, however, is not intended to reject Hayek's ideas. Indeed, the understanding of the market as a co-ordination problem à la Hayek and the problems related to it could prove to be extremely fruitful. Just note how many individuals are involved in any ordinary action which is enabled by the market. All of them are co-ordinated by means of a blind process without a subject. Problems arise when crisis comes. For many of those individuals might be excluded from the correspondence between supply and demand. In the end, the order the market process brings about is just that: either whoever cannot sell what she has to sell or whoever cannot buy what she wants to buy is out of that order.

### **References**

- Axelrod, R. (1984) *The Evolution of Cooperation* (New York, Basic Books).
- Arestis, P. (1996) Post-Keynesian Economics: Toward Coherence, *Cambridge Journal of Economics*, 20, pp. 111-135.
- Barry, N. P. (1979) *Hayek's Social and Economic Philosophy* (London, The MacMillan Press).
- Boettke, P. J. & Subrick, J. R. (2002) From the Philosophy of Mind to the Philosophy of the Market, *Journal of Economic Methodology*, 9, pp. 53-64.
- Böhm, S. (1989) Subjectivism and Post-Keynesianism: Towards a Better Understanding, in: J. Pheby (Ed) *New Directions in Post-Keynesian Economics* (Aldershot, Edward Elgar).

Burczak, T. A. (2001a) Profit Expectations and Confidence: Some Unresolved Issues in the Austrian/Post-Keynesian Debate, *Review of Political Economy*, 13, pp. 59-80.

Burczak, T. A. (2001b) Response to Butos and Koppl: Expectations, Exogeneity, and Evolution, *Review of Political Economy*, 13, pp. 87-90.

Butos, W. N. & Koppl, R. G. (1993) Hayekian Expectations: Theory and Empirical Applications, *Constitutional Political Economy*, 4, 3, pp. 303-329.

Butos, W. N. & Koppl, R. G. (1997) The Varieties of Subjectivism: Keynes and Hayek on Expectations, *History of Political Economy*, 29, pp. 327-359.

Butos, W. N. & Koppl, R. G. (2004) Carabelli & De Vecchi on Keynes and Hayek, *Review of Political Economy*, 16, pp. 239-247.

Caldwell, B. (2004) Hayekian Evolution Reconsidered: A Reply to Hodgson, *Cambridge Journal of Economics*, 28, pp. 301-305.

Campbell, D. & Klaes, M. (forthcoming) The Principle of Institutional Regulation: Coase's Regulatory Critique of Interventionism, *Cambridge Journal of Economics*.

Carabelli, A. & De Vecchi, N. (2001a) Hayek and Keynes: From a Common Critique of Economics Method to Different Theories of Expectations, *Review of Political Economy*, 13, pp. 269-285.

Carabelli, A. & De Vecchi, N. (2001b) Individuals, Public Institutions and Knowledge: Hayek and Keynes, in: P. L. Porta, R. Scazzieri & A. Skinner (Eds) *Knowledge, Social Institutions and the Division of Labour* (Cheltenham, Edward Elgar).

Carabelli, A. & De Vecchi, N. (2004) On Hayek and Keynes Once Again: A Reply to Butos & Koopl, *Review of Political Economy*, 16, pp. 249-256.

Davidson, P. (1989) The Economics of Ignorance or Ignorance of Economics?, *Critical Review*, 3, pp. 467-487.

Davidson, P. (1991) Is Probability Theory Relevant for Uncertainty? A Post Keynesian Perspective, *Journal of Economic Perspectives*, 5, pp. 129-143.

Davis, J. B. (1994) *Keynes's Philosophical Development* (Cambridge, Cambridge University Press).

Dequech, D. (1999) On Some Arguments for the Rationality of Conventional Behaviour under Uncertainty: Concepts, Applicability and Criticisms, Working Paper, IE/UNICAMP.

Desai, M. (1994) Equilibrium, Expectations and Knowledge, in: J. Birner & R. van Zijp (Eds) *Hayek, Co-ordination and Evolution. His Legacy in Philosophy, Politics, Economics and the History of Ideas* (London, Routledge).

Dow, A. & Dow, S. C. (1985) Animal Spirits and Rationality, in: T. Lawson & H. Pesaran (Eds) *Keynes' Economics. Methodological Issues* (London, Routledge & Kegan Paul).

Dow, S. C. (2003) Probability, Uncertainty and Convention. Economists' Knowledge and the Knowledge of Economic Actors, in: J. Runde & S. Mizuhara (Eds) *The Philosophy of Keynes's Economics. Probability, Uncertainty and Convention* (London, Routledge & Kegan Paul).

Fleetwood, S. (1996) Order without Equilibrium: A Critical Realist Interpretation of Hayek's Notion of Spontaneous Order, *Cambridge Journal of Economics*, 20, pp. 729-747.

Garrison, R. W. (1987) Full Employment and Intertemporal Co-ordination: A Rejoinder, *History of Political Economy*, 19, pp. 335-341.

Hayek, F. A. (1960) *The Constitution of Liberty* (Chicago, The University of Chicago Press).

Hayek, F. A. (1976) *Law, Legislation and Liberty. A New Statement of the Liberal Principles of Justice and Political Economy*, vol. II: *The Mirage of Social Justice* (Chicago, The University of Chicago Press).

Hayek, F. A. (1978) *New Studies in Philosophy, Politics, Economics and the History of Ideas* (London, Routledge & Kegan Paul).

Hayek, F. A. (1979) [1952] *The Counter-Revolution of Science. Studies in the Abuse of Reason* (Indianapolis, The Free Press).

Hayek, F. A. (1980) [1948] *Individualism and Economic Order* (Chicago, The University of Chicago Press).

Hayek, F. A. (1983) [1973] *Law, Legislation and Liberty. A New Statement of the Liberal Principles of Justice and Political Economy*, vol. I: *Rules and Order* (Chicago, The University of Chicago Press).

Keynes, J. M. (1973a) [1936] *The Collected Writings of John Maynard Keynes*, vol. VII: *The General Theory of Employment, Interest and Money* (London, The MacMillan Press).

Keynes, J. M. (1973b) [1937] The General Theory of Employment, in: *The Collected Writings of John Maynard Keynes*, vol. XIV: *The General Theory and After. Part II. Defence and Development* (London, The MacMillan Press).

Koppl, R. G. (1991) Retrospectives. Animal Spirits, *Journal of Economic Perspectives*, 5, pp. 203-210.

Koppl, R. G. & Butos, W. N. (2001) Confidence in Keynes and Hayek: Reply to Burczak, *Review of Political Economy*, 13, pp. 81-86.

Koppl, R. G. & Rosser Jr., J. B. (2002) All What I Have to Say Has Already Crossed Your Mind, *Metroeconomica*, 53, pp. 339-360.

Lachmann, L. M. (1976) From Mises to Shackle: An Essay on Austrian Economics and the Kaleidic Society, *Journal of Economic Literature*, 14, pp. 54-62.

Lavoie, D. (1991) [1986] The Market as a Procedure for Discovery and Conveyance of Inarticulate Knowledge, in: J. C. Wood & R. N. Woods (Eds) *Friedrich A. Hayek: Critical Assessments*, vol. IV (London, Routledge & Kegan Paul).

Mises, L. von (1949) *Human Action. A Treatise in Economics* (New Haven, Yale University Press).

Shackle, G. L. S. (1989) What did the *General Theory* do?, in: J. Pheby (Ed) *New Directions in Post-Keynesian Economics* (Aldershot, Edward Elgar).



Snippe, J. (1985) Finance, Saving and Investment in Keynes's Economics, *Cambridge Journal of Economics*, 9, pp. 257-269.

Snippe, J. (1986) Finance, Saving and Investment in Keynes's Economics: A Reply, *Cambridge Journal of Economics*, 10, pp. 373-377.

Snippe, J. (1991) [1987] Momentary Equilibrium versus the Wicksell Connection, in: J. C. Wood & R. N. Woods (Eds) *Friedrich A. Hayek: Critical Assessments*, vol. IV (London, Routledge & Kegan Paul).

Vaughn, K. I. (1992) The Problem of Order in Austrian Economics: Kirzner vs. Lachmann, *Review of Political Economy*, 4, pp. 251-274.

Vaughn, K. I. (1999) Hayek's Implicit Economics: Rules and the Problem of Order, *Review of Austrian Economics*, 11, pp. 129-144.