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THE DISAPPOINTMENT OF EXPECTATIONS AND THE THEORY OF FLUCTUATIONS[1]

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"O God! That it were possible
To undo things done, to call back yesterday;
That time might turn up his swift sandy glass,
To untell the days, and to redeem these hours"
(Hicks, 1939, Part III, front page)

Introduction

The notion of "Irrtumer in der Zeit" (errors in time) as a fundamental cause of fluctuations was developed by the Italian economist Marco Fanno (1933 [2007], 1931 [1993]; Caldari and Meacci, 2007; Arena, 1998). The same idea reappears, with a renewed emphasis on the equivalent expression of disappointment of expectations in a more cited article published by Hicks in the same year of Fanno's 1933 article. Fanno's and Hicks' ideas were aimed to reach the same result, i.e. the explanation of macroeconomic disequilibrium, and marked a common stepping stone towards a revival of, and a new method for, the theory of fluctuations. This theory, which had been practiced and developed for a long time under the title either of "theory of crises" or of "theory of the business cycle", returned to centre stage in the second half of the 20th century when the main interest of economists and policy-makers rather shifted towards the causes of, and the remedies for, the two macroeconomic evils of inflation and unemployment. The theme of expectations was taken up again in this revival but was confined to an analysis of the mechanisms of their formation rather than of their disappointment. As will be argued below, the end result of this new approach was the spread of the Rational Expectations Hypothesis (REH) and REH-based models by which the link between the disappointment of expectations and the origin of fluctuations was obscured or utterly ignored.

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The paper is divided in two Parts. The first Part is focused on the "years of high theory" (Shackle, 1967) and provides an examination of how the main authors of those years (Keynes, Hayek, Hicks) dealt with the disappointment of expectations in their theory of fluctuations. The second Part is focused on what may be called the "years of rational expectations" and provides an examination of how the main authors of these years have or have not dealt with the disappointment of expectations either in the context of their theory of fluctuations or out of such a context. This Part shows that the issue of the disappointment of expectations has been either neglected or denied by developing arguments based on the extrapolative expectations (EEH), adaptive expectations (AEH) and rational expectations hypothesis (REH); or has been silently raised behind the reconstructions of the Phillips curve, the aggregate supply curve and the theory of economic policy which stand for the leading contributions of this period.

The paper is closed by a bird's-eye-view and comparison of the two blocks of thought on expectations investigated in the two previous Parts. This view and comparison are summed up in the idea that the evolution of the theory of fluctuations from the years of high theory to the years of rational expectations relates to a body of thought that shrinks in quality while growing in size and complexity. This idea brings to mind Robertson's image of the hunted hare which, once departed, "can be relied upon to come around to you in a circle". This image is exploited in the final section to reach two conclusions. One is that the weight and noise of the hare (the size of literature) has increased from the first to the second period under consideration while the diameter of the circle (the scope of literature) was shrinking or changing shape. The other is that the demise of the REH and REH-based models, which seems to be taking place at the end of the second period along with the 2008-2009 great recession, is an implicit proof of the superiority of the theory developed in the first period, at least with regard to some crucial aspects of Keynes', Hicks', Hayek's and Shackle's contributions. These aspects are 1) the contrast between the logic of equilibrium (which is "out" of historical time) and the logic of fluctuations (which are "in" historical time); 2) the notions of "correct" and "incorrect" expectations or of "justified" and "sheer" errors; 3) the "Jevonian interval" and the greater relevance of the intertemporal miscoordination of plans in fixed-capital economies subject both to the irreversibility of investment and to the changeability of expectations; and finally 4) the analytical risk or impossibility of collapsing the future into the present (as done through the "strong" REH) and the present into the past (as done through the AEH and EEH which the REH was intended to replace).

I. The years of high theory

A convenient way to go into the role played by the disappointment of expectations in the theory of fluctuations in the years of high theory is to start from Schumpeter's notions of Statics,

Dynamics and the Stationary State (1954, pp.963-71). In line with Hicks's definition based on dated and non-dated variables (1939, p.115), Schumpeter defines Statics and Dynamics as two different methods of analysis by which all economic variables either "refer to the same point of time" or are influenced by "past and (expected) future values, lags, sequences, rates of change, cumulative magnitudes, expectations". In this sense, the stationary state is just "an economic process that merely reproduces itself" and, more precisely, a methodological fiction such that "when we try to visualize how such a process might look and which of the phenomena of reality might be present in it, we *ipso facto* discover which of them are lacking" (*ibid*., p.964). If one looks into this fiction from the standpoint of expectations, one finds that what is lacking in it are not expectations as such. What is lacking is, rather, their disappointment. This is the key for grasping Schumpeter's idea that Dynamics "is practically coextensive with sequence analysis and includes period analysis as a special case, but it is not coextensive with the theory of economic growth or development, or 'progress'" (1954, p.1160)[2]. On the other hand, if it is true that sequence analysis "includes period analysis as a special case", it follows that, unless dynamics is confined to the methodological fiction of the stationary state, the disappointment of expectations, including any discrepancy between *ex ante* and *ex post* magnitudes, is the central problem of this branch of economics as a "genuinely new departure" in the history of economic thought (*ibidem*). In the following subsections we shall examine how this problem was addressed, sometimes explicitly and sometimes implicitly, by the main authors of those years.

I.1. Keynes

The role of expectations in Keynes' theory was first recognized by Hicks (1936) in his early review of the *General Theory*. This review is focused on expectations as the "missing element" of equilibrium analysis as well as on Keynes' "method of expectations" as a device by which *equilibrium* analysis is pursued as a useful starting point for dealing with what really matters, i.e. *disequilibrium* "in the real world" (p.240). Furthermore, by connecting Keynes' method of

[2] On Schumpeter's view of dynamics as distinct from Harrod's (and others'), see *ibidem,* footnote 1. As for the distinction between "period analysis" and "sequence analysis", it is worth recalling that this twofold approach to economic analysis was first developed by the Swedish economists in the 1930s as a twofold way of taking into consideration the consequences of any discrepancy between *ex ante* (planned) and *ex post* (realized) macroeconomic magnitudes (mostly saving and investment); or, which comes to the same thing, of taking into consideration the consequences, at the end of a given period (according to period analysis) or from period to period (according to sequence analysis), of the (ex post) disappointment of the expectations formed (ex ante) at the beginning of any period. See, in this connection, Myrdal (1939 [1965]), Lindahl (1939 [1970]), Ohlin (1937) and, again, Schumpeter (1954, pp. 494-6). See, in particular, Lundberg (1955 [1964]) and his Swedish-Austrian view of the link between the disequilibrium resulting from the disappointment of the expectations formed at the beginning of a given period and the disequilibria resulting, across a number of different periods, from the disappointment of the expectations running at the inception of a *roundabout method of production* (involving the employment of fixed capital for a large number of periods). This approach is particularly helpful in dealing with the impact of the disappointment of expectations on the "Jevonian interval" to be discussed below.

expectations to the method of the Swedish economists (based as it was on "period analysis" and "sequence analysis" as well as on the related distinction between *ex ante* and *ex post*), Hicks' review introduced the idea that this method would make no sense if expectations were fulfilled all the time, i.e. if no disappointment would ever occur. The link between the method of expectations detected by Hicks and the method of the Swedish economists was never admitted by Keynes[3]. Yet the need for such a link is implicit in the early chapters of the *General Theory*. These chapters are concerned with the concepts of *aggregate* income, saving and investment as *flows* that take place in a given *period*. Keynes' wording of his arguments, however, makes it unclear whether he accepts or rejects the ex-ante/ex-post approach to the study of such flows and, therefore, of expectations themselves, the nature of which is that they are formed at the beginning of a period and turn out to be either fulfilled or disappointed at the end of it.

Take, for instance, chapters 3 and 5. After basing his "aggregate supply function" on the proceeds *expected* by entrepreneurs from a given level of employment and after distinguishing between "short-term" and "long-term" expectations, Keynes points out that "the *actually realized* results" of the production and sale of aggregate output will only be relevant to employment in so far as they cause a modification of "subsequent expectations" and also that "a *change* in expectations" will produce its full effect on employment only "over a considerable period" (p.47, Keynes' italics). Furthermore, the repercussions resulting from the process of revision of short-term expectations are examined in chapter 5 in a manner that conforms not only to the method of sequence analysis developed by the Swedish economists but also to a view of time-consuming production that conforms to the Austrian tradition[4].

Now take chapters 6 and 7. Here Keynes' method of analysis changes to the extent that not only the logic of these initial chapters but also the consistency of the whole theory built upon them is potentially undermined. Chapter 7, for instance, is devoted to showing that saving and investment

[3] Of course, Keynes was not unaware of the method of the Swedish economists, especially after their publications were made available in English. In his replies to Ohlin's criticisms, however, Keynes first admitted that he should "certainly give further thoughts to the advantages" of the Swedish method and that he had given it up "owing to my failure to establish any definite unit of time" for carrying it out (*Collected Writings*, Vol. XIV, p.184) while, on the other hand, he promised a future article "dealing with the relation of the 'ex ante' and 'ex post' analysis *in its entirety* to the analysis in my *General Theory*" (1937a, p.663, italics added; see also 1937b, p.241, footnote 2). Other fragmentary views of the *ex ante/ex post* analysis can be found in Keynes' *Collected Writings*, Vol. XIV, pp.179-201.

[4] This is confirmed at the beginning of chapter 5 where Keynes argues that the importance of expectations in determining the volume of output "in the real world" is necessitated by the plain fact of time-consuming production (1936, p.46) as well as in the middle of the same chapter where he points out 1) that it is *current*, not past, expectations that are relevant in determining the volume of output; and 2) that the process of their revision differs depending on whether it comes to short-term expectations (in which case the revision is "gradual and continuous, carried out largely in the light of realized results") or to long-term expectations (in which case the revision is rather sudden and violent) (*ibid*., pp.50-51). Concerning the differences between the *Treatise* and the *General Theory,* Keynes eventually admits that in his former book he did not "distinguish clearly between expected and realized results" and that his method there was to regard current *realized* profit as determining the current *expectation* of profit (*ibid*., p.77).

are necessarily and identically equal. Taking it in its *ex-post* dimensions, this argument is indubitable. But, as Shackle asks, does this argument also imply something about a coherence of intentions? If not, what is the mechanism by which a possible disagreement between *ex ante* (aggregate) saving and *ex ante* (aggregate) investment is corrected into an *ex post* equality? This is, after all, what one would expect from a *general* theory. For what such a theory should also show is "how the interpretation of given conduct, by those who decide upon and perform it, alters as these acts pass from design to actuality in circumstances not successfully foreseen, and how the acts themselves are perhaps revised in the course of performance" (Shackle, 1967, p.148)[5]:

The ambiguities of these initial chapters are overcome, however, in those crucial parts of the *General Theory* which are focused, directly or indirectly, on the precariousness of long-term expectations and on the readjustments resulting from their revision. These parts begin with chapter 12 and continue well into the end of the book. They are based on the idea that this revision accounts for the *shifts* of the curves for the marginal efficiency of capital and liquidity preference; and therefore of aggregate investment, the "flighty bird" of macroeconomics[6]. The importance of these shifts is best conveyed by Shackle's view of the former curve as "a tree-branch in a gale, sweeping up and down with the gusts of politics and of the emerging consequences of past action", and of the latter curve as "a thread floating in a gusty wind, continually liable to change its form not only because of 'the news', but even because of a change in the total quantity of money itself" (1967, p.151 and p.217). The impact of (a disappointment of) long-term expectations on (shifts of) the curves for the marginal efficiency of capital and for liquidity-preference corresponds to Keynes' insight that both durable equipment in the former case and money in the latter can be equally

[5] Keynes' failure to argue in terms of discrepancies between *ex-ante* and *ex-post* magnitudes led Ohlin (1937, p.237) to regard him as an old-fashioned "equilibrium theorist". Ohlin's overall treatment of this issue, however, ends up in a mistake much deeper than Keynes' omission or ambiguities. This mistake consists in regarding *ex-ante* saving and *ex-ante* investment as two *schedules* showing how much people are willing to save and to invest at different hypothetical rates of interest. The mistake consists in smuggling the *static* method underlying the neoclassical (micro) analysis of demand and supply into the (new) *dynamic* method underlying the Swedish (macro) analysis of *ex ante* and *ex post*. Hence Haberler's observation that, by identifying the *ex ante* magnitudes with the alternative plans embodied in those (instantaneous) schedules rather than with the aggregate plans existing at the beginning of a *period*, "it is difficult to see how Ohlin can speak of people being disappointed by events going contrary to their plans" (1946, pp.190-191).

[6] Keynes' view of the links between (changes in) long-term expectations, (shifts of) the marginal efficiency of capital, (changes in) aggregate investment and (changes in) aggregate output provides the framework in which expectations and their disappointment are dealt with in this paper. Such a framework is designed to deal with expectations (and errors) that prevail in the economy as a whole, i.e. with collective or average expectations, rather than with the expectations (and errors) that prevail in the economy of a particular individual or of individuals engaged in a particular market or sector. This approach, it should be noted, need not coincide with the approach sometimes practiced by those very authors (such as Hayek and Hicks to be discussed below) who have dealt with expectations and their disappointment at the aggregate level. Although there are circumstances in which these authors appear to be dealing with the *equilibration* of *prices* in a microeconomic context rather than with the *fluctuations* of aggregate *output*, it should be noted that these two sets of problems are not independent from one another, however different the publications or years in which they have been tackled even by a single author. Some links can indeed be established between them. This is what will be argued below with regard to Hayek's implicit or explicit treatment of expectations, and to Hicks' treatment of changes in the price-expectations of one 'week' and in the output of the following 'weeks'.

considered to be a *link* by which the economic future is connected to the present (1936, p.146 and p.293)[7].

Whatever the consistency between Keynes' initial chapters on static notions and his final chapters on their dynamic implications and however founded Ohlin's criticisms of Keynes' overall shortcomings may be, a common void seems to affect the analysis of both authors. This void, to be partly shared by Hicks and partly filled by Hayek, consists in the failure to distinguish between the disequilibria originated by the *current* and those originated by the *intertemporal* incompatibility or miscoordination of expectations. As we shall see below, "period analysis" is as necessary to the study of the former incompatibility as "sequence analysis" is to the study of the latter. The latter, we shall also see, is most necessary when it comes to fixed-capital economies, i.e. to economies whose levels of employment and output depend on investments made in a more or less distant *past* and designed to bear fruit into a more or less distant *future*.

I.2. Hayek

The role of expectations in determining the volume of aggregate output and of their disappointment in determining the fluctuations of this volume along with other macroeconomic variables is not as explicit in Hayek's work as it is in Keynes'. On one occasion, however, Hayek rejected Myrdal's allegation that in his theory of the trade cycle "there is no room for the role played by expectations" (1939, p.155). Indeed, one should distinguish Hayek's early article on intertemporal equilibrium (1928 [1984]), where the disappointment of expectations is *implicitly excluded,* from his subsequent works on fluctuations (1931, 1933, 1937, 1939, 1941), where that disappointment is *implicitly included*. Before going into the latter aspect, it should be noted that there is some consistency in this oscillation. For, following Schumpeter's insight on the methodological fiction of the stationary state, Hayek's 1928 article may be regarded as an *a-contrario* introduction to what really matters, i.e. to the "phenomena which are lacking" in the fiction of intertemporal equilibrium[8]. The fluctuations of output are among these phenomena. And

[7] Keynes' recognition of this link is a proof that the analysis of (static) equilibrium under given expectations and the analysis of (dynamic) disequilibrium under changing expectations consistently coexist, in spite of the ambiguities mentioned above, as two branches (the static and the dynamic) of his theory that lend to it "an exceptional power to combine reasoning and realism" (Shackle, 1967, p.222). An echo of these two branches can be found in Kregel's interpretation of the *General Theory* (1976, p.209) as a system based on three models centred respectively on the notions of "static equilibrium" (short-term and long-term expectations are never disappointed), "stationary equilibrium" (short-term expectations are, while long-term expectations are not, disappointed) and "shifting equilibrium" (both short-term and long-term expectations are disappointed and curves shift). However, the idea that Keynes' central emphasis is neither on expectations as such nor on their disappointment seems to contradict Keynes' assertion that the aggregate supply and demand functions (as distinct from the *effective* demand resulting from their intersection) are based on the expectations of entrepreneurs (1936, chapter 3; see also *Collected Writings*, Vol. XIV, p.179).

[8] The compatibility between Hayek's 1928 paper on intertemporal equilibrium and Hayek's subsequent works on fluctuations is supported by the opening assertions of that paper that "all economic activity is carried out through time" and that equilibrium analysis provides "no more than a partial explanation of what goes on in the economy as it actually

since expectations may be explicitly included in an intertemporal equilibrium model only if they are never revised or disappointed over an unlimited sequence of dates, it follows that their revision or disappointment is at the roots of intertemporal *dis*equilibrium, i.e. of fluctuations. This can be realized if one starts from the idea that in the *Prices and Production* model (1931 [1935]) "*monetary* factors *cause* the cycle but *real* phenomena *constitute* it" and that amongst the real phenomena of this model are changes in *relative* prices and in the *expectations* associated with them (Machlup, 1976, p.23)[9]. For what is set in motion by the credit expansion (money creation) contemplated in this model is, first, the (ill-founded) expectation that the expansion of the capital-goods sector will find support in the *real* economy and, secondly, the following (unavoidable) realization that this expectation was founded on errors (disappointment), the result being that the structure of production, which had been "misdirected" in the ascending phase of the cycle, is then brought back to its initial conditions[10]. This self-reversing process is all the more effective the larger the number of entrepreneurs crowding the "Jevonian interval" (Garrison, 1989), i.e. the larger the number of individuals exposed to errors in time and the larger the number of stages into which that "interval" is divided.

The role of the disappointment of expectations as a cause of fluctuations is brought to a clearer light in Hayek's famous Copenhagen lecture (1933). Among the insights of this lecture is the distinction between "justified" and "sheer" errors (1933, p.141) as well as the notion, in the case of justified errors, of *correct* (and, by implication, *incorrect*) expectations, depending on whether everybody's expectations do (or, by implication, do not) incorporate all the available information. This distinction is further developed in *Economics and Knowledge* (1937). By showing the different nature of the errors committed by different individuals at a particular date versus the errors committed by all the members of a community from one date to another, Hayek brings here to light the different nature of the *current* miscoordination of expectations (resulting from the different

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exists". This complies with Hayek's later admission that "the situation seems here to be that, before we can explain why people commit mistakes, we must first explain why they should ever be right" (1937, p.33; see also 1941, p.17).

[9] This conforms to Hicks's assertion that in Hayek's 1931 model "price-expectations are not introduced explicitly, for in 1930 their day had not yet come" but also that there must have been "some implicit assumption" about them (1967, p.206). By arguing that this implicit assumption is that relative prices are constant and by adding that their flexibility is the mechanism by which the disequilibrium triggered by credit expansion is transmitted to the real economy through *lags*, Hicks implies that not only expectations but, indeed, their disappointment is at the roots of the fluctuations depicted in that model. The implicit role played by expectations in this transmission mechanism is eventually revealed by Hayek's treatment of money as a "loose joint" between demand and supply both in the market for *money* and in the market for *saving* (1941, Part IV, chapter XXVIII).

[10] The changes in the structure of production and in the composition of output resulting from errors in time coincide with Haberler's "vertical" and "horizontal" maladjustments (1946, chapters 3 and 4). By associating horizontal maladjustments with what he calls "error theories" (these errors being those relating to forecasts of final demand), however, Haberler fails to see that errors lie at the roots of both kinds of maladjustment, the major difference being that, whereas in the case of vertical maladjustments these errors have an impact on the whole economy, in the other case they are mostly responsible for the fluctuations only of the particular firms or industries in which these errors occur.

knowledge available to each individual within a particular period) versus the *intertemporal* miscoordination of aggregate expectations (including those resulting from the *ex-ante/ex-post* discrepancies discussed above). Hence Hayek's emphasis on the difference (to be neglected, as we shall see, in the years of rational expectations) between the 'data' (sets of knowledge) that are "supposed to be given to the observing economist" and those that are supposed to be given "to the persons whose actions he wants to explain". This emphasis goes hand in hand with Hayek's further distinction, within the latter set of data, between changes in 'objective' data and changes in 'subjective' data (i.e. in expectations). From that emphasis and this distinction comes Hayek's treatment of change as "a change of data in our sense, that is a change relative to expectations" (irrespective, that is, of any alteration in 'objective data') (*ibid*., p.40). This twofold approach to change eventually supports Hayek's view that the theory of fluctuations cannot do without the theory of capital and that both theories cannot do without a theory of individual behaviour. For an economy is all the more subject to an intertemporal miscoordination of expectations (or to an intertemporal change in 'subjective data') and to the resulting fluctuations the greater the "Jevonian interval", i.e. the degree of roundaboutedness or the amount of fixed capital employed in the production of aggregate output. In particular, the greater the amount of fixed capital (the greater the degree of roundaboutedness), the more subject is a capital-using economy to the consequences of "sheer errors". For, unlike "justified errors" which reflect some miscoordination between the intentions of different individuals within the *current* period (whatever the amount of fixed capital inherited from past periods), "sheer errors" reflect the intertemporal mismatch between the proportions in which the entrepreneurs of the *current* period plan their investments for the current *and* future periods (i.e. their demand for capital in different periods) and the proportions in which the consumers of *future* periods will divide their income between consumption and provision for further consumption (i.e. their supply of savings) in each of those future periods[11].

The role of equilibrium *in time*, the difficulty of achieving it in an economy where knowledge is dispersed amongst different individuals and where a shock promotes the disappointment of the expectations shared by all individuals receives in *The Pure Theory of Capital* (1941, especially Parts II and III)[12] a greater attention than in Hayek's previous works. The

[11] It must be noted that the verbs and tenses used in the text above do not coincide exactly with those actually adopted in Hayek's. For Hayek makes it unclear whether the coordination is *current*, i.e. related to a given period, or *intertemporal*, i.e. related to a set of successive periods. It should also be noted, however, that Hayek's ambiguities never go so far as to include the mix-up (noticed in the years of high theory) between *expectations* (which include a project or plan) and *forecasts* (which do not). See, in this connection, Hayek's observation above on the difference between the "observing economist" and the "persons whose actions he wants to explain".

[12] While Part II is focused on the expectations and plans of a single mind (the central planner) at a point in time and, therefore, on the necessary compatibility of these expectations and plans, Part III is focused on the expectations and plans of a multitude of individuals (free-market economy) and, therefore, on the possible incompatibility of the independent plans of all these individuals.

complexity of this theme is here enhanced by Hayek's treatment of the case of an unforeseen event that hits a fixed-capital economy. This case is based about the assumption that "some persons suddenly decide to consume less" (1941, p.272); i.e. about the assumption of an unforeseen change in *saving*[13]. In this case, as Hayek argues, "it makes little difference whether we assume that the unforeseen event occurs quite unexpectedly or whether we assume that its imminence becomes known some time *after* the investment has been made" (1941, p.306, italics added). By splitting his argument in two parts depending on whether the unforeseen saving of the current period exceeds or falls short of what was expected when a multi-period investment was decided in a previous period, and by concluding that, in the case of an unexpected excess, the result is "a temporary accumulation of stocks of consumer goods", Hayek implies an intertemporal (rather than current) incompatibility of plans (expectations). This incompatibility stems from a lack of "correspondence between individual intentions" not within a single period (sometimes identified by Hayek as one month, 1941, p.23 and p.254) but over a certain set of successive periods. Hayek's argument, however, is not without ambiguities. The notion of equilibrium, for instance, is initially referred (in an implicit context of period analysis) to "a state of complete compatibility of *ex ante* plans" (1941, p.23) but is eventually re-utilized (in an implicit context of sequence analysis) to discuss the disruption that occurs once the (saving) plans of one period turn out to contradict the (investment) plans of previous periods[14].

I.3. Hicks

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[13] This case, which Hayek (1941, p.272) draws from Bresciani Turroni and Strigl, is nothing but the case first examined by Fanno (1931, 1933). Both Hayek and Fanno look at the unforeseen change as hitting a time-consuming economy divided in at least two sectors (consumption goods and capital goods) and in such a manner that the sudden fall in consumption "cannot affect the relative quantities of the two kinds of goods available" *at the time* of the fall. It is worth noting that the issue of the specificity versus mobility of capital goods is raised by Hayek in this connection (1941, Chapters XXIII and XXIV). For what this issue implies is that the more irreversible is current investment and the longer its actual life the more will the economy suffer from the intertemporal miscoordination or disappointment of expectations.

[14] Thus Hayek fails to develop some arguments that would have thrown further light or coherence on other parts of his theory. He fails, for instance, to clarify 1) that what the case of unforeseen saving is concerned with is nothing but the intertemporal disappointment of expectations; 2) that this special kind of miscoordination is all the more likely and relevant the more "fixed" is the capital employed in production or, which comes to the same, the longer is the "Jevonian interval"; and finally 3) that "it makes little difference" (to use Hayek's expression above with regard to Parts II and III of his 1941 book) whether the economy affected by this special kind of miscoordination is a free-market or a centrally-planned economy in that both kinds of economy are subject to "sheer" errors. This failure seems to reflect a more general neglect for the difference between the two notions of time that intersect the Austrian theory, old and new; i.e. the notion of "time as a container" (which properly underlies Hayek's theory of fluctuations) and the notion of "time as an ingredient" (which underlies Böhm-Bawerk's theory of capital) (Meacci, 1994). The overlapping of the different contexts resulting from these notions conceals what Hicks (1956, p.221) ambiguously calls the "central dynamic issue" of modern theory, i.e. "how to superimpose the pattern of change, which is one time-pattern, upon the underlying pattern of capital-using production, which is another".

Hicks's analysis of expectations, of their disappointment and of their impact on fluctuations is most evident in his initial (1933) and final (1939) contribution to the years of high theory. These contributions hinge on the initial assertions that "the condition for equilibrium is perfect foresight", that "disequilibrium is the disappointment of expectations" and that "a real economy is always in disequilibrium" (Hicks, 1933, p.32)[15]. These assertions reveal some links not only with the ex-ante/ex-post approach and its implications in terms of expectations disappointed or fulfilled, but also with some aspects of Keynes' and Hayek's approach to the problem of fluctuations. These links have been admitted by Hicks himself when, concerning his 1936 review of the *General Theory* and his disentanglement of Keynes' "method of expectations" from Keynes' "special theory" of employment, he acknowledges that it was the method of the Swedish economists which led him to detect that method in Keynes' book (Hicks, 1973, p.8, note 4); and when, concerning his late remake of the "Hayek story" (Hicks, 1967), he eventually brings to light the implicit role of expectations, and of their disappointment, in the origin and evolution of that "story". Finally, and most importantly, Keynes' and Hayek's joint influence on Hicks is also discernible behind his later insights on the epistemological difference between economics *of time*, economics *in time* and economics *out of time* (Hicks, 1976). It is this difference that supports Hicks' view of Keynes's theory as a theory that "has one leg which is *in* time, but another which is not" (*ibid*., p.269). While maintaining, as Shackle would, that the leg which is *in* time revolves around the concepts of marginal efficiency of capital and liquidity preference, Hicks implies in two different periods of his life (1936, 1976) that Keynes is along with Hayek one of the pioneers of economics *in time*. Since, however, Hicks believes that it is the "method of expectations" (in the sense discussed above) that supports the leg of Keynes's theory which is *in* time, one can eventually realize what is only implicit in that belief, namely that the disappointment of expectations is the unrecognized "knee" of this leg.

Hicks' twofold interaction with Hayek and Keynes is most evident, however, in the initial chapters of Part III of *Value and Capital* (1939). Here it is argued 1) that the stationary state is an evasion from the "main crux" of Dynamics, namely from the divergence between prices *expected* (in the past) and prices *realized* (in the present) as well as between *current* prices and *expected*

[15] These assertions have been related by Hicks (1991, pp.371-2) to Hayek's 1928 notion of equilibrium and to the "criterion for non-distortion" implicit in this notion. This criterion might be regarded as a benchmark for identifying *a contrario* what might be called the "criterion for distortion" which is needed when it comes to the analysis of real-world economies. This criterion calls for the acknowledgment of the role played in fluctuations by disappointment of expectations. Concerning the link between this disappointment and *money* as a store of value as well as the parallel link between Hicks and Keynes on these matters, see Hicks (1933 and 1973). On Hicks' lifelong interest for the role of historical time, see Leijonhufvud (1984). Finally, Hicks' familiarity with Fanno's 1931 and 1933 articles is proved by his quotation from the former, and citation of the latter, article in the final footnote of his own 1933 article. This footnote was abolished in the 1980 translation and reprint of this article (see Hicks' introduction to a further reprint in 1933 [1981-1983], Vol. II, Chapter 3).

prices; 2) that one thing is "equilibrium over time" (in which no mistakes are ever committed and plans continue to be executed without revisions) while another thing is "temporary equilibrium" (which holds on the Monday of each 'week' and is disrupted by the conditions that may occur on the Monday of the following 'week'); 3) that disequilibrium is accordingly the prevailing condition of an economy *in* time, the degree of this disequilibrium depending on the extent to which "expectations are cheated, and plans go astray"; and finally 4) that a "Futures Economy" (in which "people would be under contract to buy or sell certain goods on the second Monday") can indeed remove "inconsistency disequilibrium", i.e. the disequilibrium resulting from the inconsistency of current plans, though it cannot remove the disequilibrium resulting from *unexpected* change (for in this case all the people "might be unwilling or unable to buy or sell the amounts of goods contracted for") (*ibid*., Chapter X).

These two kinds of disequilibrium, i.e. the one that can and the one that cannot be removed in a "Futures Economy", are the result, it should be noted, of respectively the "current" and the "intertemporal" miscoordination of expectations (plans) or, in Hayek's terms, of "justified" and "sheer" errors discussed above. This second kind of miscoordination and errors cannot be properly tackled, however, within the confines of period analysis and of its central notion of "temporary equilibrium". Indeed, in spite of Hicks' final admission that "the consequences of accumulation or decumulation of capital" must be studied in the context of a number of successive periods and belong to a part of dynamics "which falls outside temporary equilibrium theory" (1939, chapter XXIII), and in spite of the numerous revisions and self-criticisms produced throughout his life, Hicks never went far enough to develop the dynamic parts of his 1939 book in the direction of tackling the "ultimate dynamic problem" (as he calls it in chapter XX of that book). This problem is posed by the disequilibria resulting in *future* 'weeks' from the disappointment of the expectations held on the Monday of any *initial* 'week' and can be tackled, therefore, only by resorting to the method of sequence analysis. Yet, when he eventually came back to the dynamic parts of *Value and Capital* and to the Swedish method, Hicks confined his remarks to the simple argument that the "single-period theory" developed by the Swedish economists (in particular by Lindahl) was framed in terms of *fixed* prices with *ex ante* demands and supplies not necessarily equal (in terms, that is, of what Hicks calls the "fixprice method") whereas his *Value and Capital* "single-period theory" was framed in terms of *flexible* prices with *ex ante* demands and supplies necessarily equal (in terms, that is, of what Hicks calls the "flexprice method") (Hicks, 1956, p.224)[16].

[16] Hicks' last-ditch defence of his *Value and Capital* dynamic method is not enough, however, to deflect from it the criticism that he himself eventually raised against Keynes' theory as an "inherently short-sighted" theory (Hicks, 1985, p.60). Short-sighted, it should be noted, in the sense that this theory, being confined to a concept of equilibrium "restricted to the determination of employment within the period that is under consideration, taking that period *by itself*" (1985, p.59-60), is a "single-period theory" rather than a "continuation theory" (1956, p.223); it is, in other words, a theory based on what happens in a *given* period rather than on what happens in *successive* periods once the expectations

II. The years of rational expectations

While the economists of the years of high theory came to the theme of expectations in view of the impact of their disappointment upon macroeconomic equilibrium over time or upon disequilibrium and fluctuations, the economists of the second half of the 20th century re-focused their attention on the same theme with the initial aim of putting forward a specific hypothesis or formula for the *mechanism* by which (aggregate) expectations are *formed*[17]. This hypothesis or formula was then used to develop new theories or models in contrast with, or in support of, the main arguments sometimes of the "economics of Keynes" and sometimes of "Keynesian economics" (Leijohnhufvud, 1968). One important difference between these two sets of arguments is that expectations play the role we have seen in the former and scarcely any role at all in the latter set[18]. The main hypotheses formulated along the new trend have been the extrapolative expectations hypothesis (EEH), the adaptive expectations hypothesis (AEH) and the rational expectations hypothesis (REH)[19]. If only because the aim of these hypotheses was to focus on the mechanisms of expectations formation rather than on their disappointment in time, the resulting models were to reach a unifying climax either in an explicit neglect of the macroeconomic consequences of that disappointment or in an implicit acknowledgement of this phenomenon in the main theoretical

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of this period are revised or disappointed. It is not by chance, therefore, that chapter 6 of *Methods of Dynamic Economics* (1985, pp.52-61) is titled by Hicks "The Methods of Keynes" (methods, that is, in the plural and in contrast with the method, in the singular, attributed to Keynes in Hicks's early review of the *General Theory*). For a similar view of Keynes's "hybrid" theory, see above Shackle's criticism of Keynes's neglect of the *ex ante-ex post* distinction.

[17] The focus on the mechanism by which (collective) expectations are formed -rather than on the impact that these expectations, once and however formed, have on fluctuations- creates a wedge between the ex-ante/ex-post formulation and the Adaptive Expectations Hypothesis (AEH). For the Swedish approach was not concerned with how expectations are formed once errors are recognized "in time", i.e. as a period of any length comes to an end (a lapse of time is always necessary for errors to be recognized by those who have committed them). What this approach is concerned with is rather how expectations, once and however formed, lead -if fulfilled- to macroeconomic equilibrium and -if disappointed- to disequilibrium and fluctuations.

[18] For an overview of the snowballing literature on the economics of Keynes, Keynesian economics, Old and New Classical economics, Old and New monetarism, New and Post-Keynesian economics and many other divisions, conflicts and transformations of modern macroeconomics, see Snowdon and Vane (2004). See also Phelps (1990).

[19] While the EEH is based on the idea that the expected value of a variable for a given period is determined by changes in the actual level of this variable in two or more previous periods (see, to begin with, Metzler, 1941), the AEH takes into account not only the actual values and changes observed in past periods but also any difference between the actual values observed in past periods and the values previously *expected* for these periods (see, to begin with, Cagan, 1956). As for the REH, this hypothesis assumes, contrary to the backward-looking bias of the other two, that expectations are formed on the basis of the information available *now* and of the prediction of relevant economic *theory* (see, to begin with, Muth, 1961). Amongst the implications of the REH, which has proved to be the most sophisticated and practiced of these three hypotheses, is the idea that, if the theory is right, expectations are necessarily fulfilled as well as the idea that, if theoreticians believe in the validity of their theory, they must also believe in the validity of the REH. For a complete account of the REH and REH-based models in the years of rational expectations, see Pesaran (1989), Hoover (1992) and others. For a view of the REH as incompatible with Hicks's view of "temporary equilibrium" (based as the latter is on the possibility of the disappointment of expectations from one 'week' to another), see Farmer (1999, p.89).

constructions of the new period. Among these constructions is the expectations-augmented Phillips curve, the misperceptions-augmented aggregate supply curve and the policy-ineffectiveness propositions. These constructions will be examined in what follows in the light of the advances promoted by the main authors of the years of high theory.

II.1. The expectations-augmented Phillips curve

A major difference between the three hypotheses on expectations formation mentioned above is that, while the EEH and the REH do not take into account the possibility of errors in time, the AEH does allow for this possibility to the extent that it is also known as a "learning-from-errors" or an "errors-correcting" hypothesis. It is ironic to note, however, that the AEH inclusion of these errors, though aimed to cripple those branches of "Keynesian economics" which, due to their lack of attention for the role of expectations, were far away from the spirit and letter of the "economics of Keynes", was eventually re-utilized in promoting the abandonment of the former to the advantage of the latter approach to economics.

The old Phillips curve is a case in point. When Phelps (1967) and Friedman (1968) launched their critique and, in hindsight, the reconstruction of this curve, they resorted, in spite of their different terminology, to the role played in its transformation by "errors in time" and the disappointment of expectations. The main difference between the new approach and the approach that carried the way in the 1930s relates to the *object* of these errors as well as to the set of *agents* who are most prone to them. While this object was in most contributions of the 1930s the *ex ante/ex post* discrepancies between *saving* and *investment* (entrepreneurs being the agents most exposed to these errors), in the modern revival of the theory of fluctuations the object has become the expected/actual rate of *inflation* (workers rather than entrepreneurs being now the agents most prone to committing the errors). Moreover, while the force lying behind the errors committed by entrepreneurs may be thought to be, for instance, their "animal spirits" (via shifts of the propensity to invest facing a constant propensity to save) (Keynes, 1936, Ch.12), the force lying behind the errors committed by workers is more likely to be their "money illusion" (via the belief that a change in money wages involves an equivalent change in real wages). Hence the idea of the "augmented" Phillips curve. This "augmentation" implies that there are as many possible curves as expected rates of inflation and that any actual curve relating to a given expected rate is to shift upwards once workers realize that they have been "fooled". This signifies the disappointment of their expectations once the rate of inflation *expected* when contracting nominal wages turns out to fall short of the rate of inflation *experienced* at the end of the contracting period. The AEH is at the core of this argument in the sense that workers are assumed to adjust (i.e. to revise upwards or downwards) their inflation expectations at the beginning of a period by at least a fraction of the forecast errors

committed in previous periods. The final result is known: the inflation-unemployment trade-off along the short-run Phillips curve is dissolved into a combination of rising inflation rates with a constant rate of unemployment at its "natural" level along a long-run vertical line. This implies that only when unemployment is at its natural level expectations are fulfilled; and, accordingly, that when unemployment falls short of, or exceeds, its natural level, the expectations running at the beginning of a period are disappointed and revised at the end of it. In such a framework, the disappointment of expectations reappears as the root cause of the impossibility of *keeping* not only the "market" rate of unemployment below (or above) its "natural" rate (in the case of workers' expectations of inflation) but also the "money" rate of interest below (or above) its "natural" rate (in the case of people's expectations of inflation). It is understood that this impossibility becomes manifest only after the period has run its course and only in the absence of *accelerating* inflation, i.e. of a situation in which people keep being "fooled" over an unlimited number of periods[20].

Not that the old Phillips curve be devoid of any meaning. Given the difference between a static (stationary) and a dynamic context, one can still argue that the old Phillips curve might well fit a static context (a context, it should be noted, in which expectations are given and fulfilled) though it cannot fit at all the dynamic context. The trouble is that this context –and the dynamic method introduced in the 1930s for dealing with it- is the context that *must* be adopted in economic analysis when it comes to the problems of the *real* world (unemployment being one of these problems) and, even more so, when it comes to the policy measures needed to solve these problems (a most important task initially assigned to the Phillips curve). Unfortunately, the disappointment of expectations is one of the problems that cannot be avoided in the real world. Even more unfortunately, this problem cannot be solved by relying on the static method.

II.2. The misperceptions-augmented aggregate supply curve

We have hinted above at the ambiguities incorporated in the initial chapters of the *General Theory.* Among these ambiguities is Keynes' "Aggregate Supply Function" by which the proceeds (net of user cost) expected by entrepreneurs from a given volume of output are related to the employment associated with this output (1936, chapter 3). These ambiguities may be responsible for the conflicting interpretations of that function in the 1950s and 1960s as well as for the

[20] Hence Friedman's distinction between a *rising* rate of inflation (which implies the disappointment of the expectations based on past inflation) and a *high* rate (which is assumed to be constant and can be easily anticipated) and his final conclusion that "a rising rate of inflation may reduce unemployment, a high rate will not" (1968, p.11). For a comprehensive discussion of the relation between *natural* and *actual* magnitudes in the light of optimal policy rules, see Woodford's neo-Wicksellian model in Woodford (2003). It can however be noted that the "explosive spiral" in which Woodford summarizes Friedman's Wicksellian view of the "cumulative process" triggered by a low interest-rate peg is the result of expectations that are continuously disappointed upwards rather than self-fulfilled from one round of inflation to another.

replacement of this function by the similar, but by no means identical, "aggregate supply curve" that followed suit. While Keynes' function was drawn in the Z,N plane (Z being the proceeds and N the employment level) with expectations explicitly, though not unambiguously, included in the proceeds, the new curve is universally drawn in the P,Q plane (P being the hypothetical price level and Q the actual aggregate output) as an "augmentation" of the horizontal aggregate supply curve (which was previously adopted to represent the possibility of increasing aggregate output at constant prices). A crucial difference between this "augmented" curve and Keynes' function or the horizontal aggregate supply curve is that the disappointment of expectations is unambiguously, though only implicitly, included in it.

The implicit non-ambiguity of this inclusion may be clarified by cross-examining the contributions by Phelps (1967, 1968, 1970), Friedman (1968) and Lucas (1972, 1973). Starting from the context of imperfect information (Stigler, 1961) and of incomplete knowledge (Hayek, 1937) captured in their "island parable" (Phelps *et al*., 1970)[21], these authors proceed by explaining the impact of shocks, say an unanticipated monetary expansion, on output and employment. Given this context and given the crucial distinction between the *initial* and *final* effects of the disturbance, these authors trace the former effects to the *misperceptions* by which individuals (whether households or firms), constrained as they are by the information available on their own island, react to the disturbance. If it comes to a monetary expansion, these misperceptions consist in misinterpreting the (unavoidable) rise of *absolute* prices induced by the expansion for the (impossible) rise of the *relative* price of each of the goods to be produced. The joint outcome of the wrong solution given by imperfectly informed individuals to this "signal extraction problem" is a decrease in the level of unemployment and an increase in the volume of aggregate output[22]. This increase can be depicted by a curve sloping upward in the P,Q plane and known as the *surprise* aggregate supply curve. But it should more properly be called the *misperceptions-augmented* aggregate supply curve. For it is true that both expressions are made equally ambiguous by the fact that, when surprises occur or misperceptions are revealed, the curve stops sloping upwards. But the clear distinction between the initial and the final effects of the disturbance on which this curve is

[21] According to the "island parable", goods are supposed to be produced on different islands by firms and workers whose knowledge is limited by the "interisland" obstruction to the flow of information. In such a context it may well happen that money wages and money prices do increase while real wages and relative prices actually decrease in each island with the result that employment and output mistakenly increase across all the islands.

[22] It is interesting to note that in his Nobel Lecture Lucas (1996) regards the solution of this problem as the key for coming to grips with Hume's "double standard" or conflicting ideas (on what was to be called the neutrality of money) in his two essays *Of Money* and *Of Interest*. For there are passages in these essays in which Hume argues for the neutrality of money as well as passages in which he argues for the opposite. The solution suggested by Lucas for this outward contradiction is that what Hume has in mind in the neutrality passages are the final or long-period effects of a monetary expansion whereas what he has in mind in the non-neutrality passages are the initial or short-period effects of the same expansion, captured as they are in what is called above the misperceptions-augmented aggregate supply curve.

built makes it possible to separate the *expectations* that form in individual minds at the *beginning* of the process (when no one knows whether they are doomed to fail) and the *disappointments* that are enforced upon these very minds by the time the process comes to an *end*. What makes it worthwhile to dub this curve the misperceptions-augmented aggregate supply curve in a way similar to the expectations-augmented Phillips curve is that along both curves people are subject to errors in time, i.e. to errors committed at the beginning and realized at the end of a period rather than to the *surprises* they experience at a point of time (a lottery ticket may provide a surprise without its purchase being ever considered a mistake). The essential difference between the two curves, once it is acknowledged that the disturbance is to force unemployment in one case and aggregate output in the other below or above their "natural" levels, is that the expectations ruling at the beginning of the process stem from the *neglect*, in the former case, and from the *misinterpretation*, in the latter, of what is happening (or going to happen) in the actual economy.

This simply means that the process set in motion in the two cases, beginning with a given set of expectations and ending after a certain time lag into a related set of disappointments, is nothing but a process of *errors in time*: when errors are realized and disappointments take place, both curves, however different the planes in which they are drawn, shift upwards and tend equally towards a long-run (full-information) vertical shape consistent with the equilibrium (natural) levels of employment and output[23].

II.3. The policy ineffectiveness proposition

If one assumes that the expectations ruling at the beginning of a period are formed on the basis of the whole information available at that moment by agents who neither ignore nor misperceive what is happening, it follows that the shocks discussed in the previous sections can have no impact on real magnitudes either along the expectations-augmented Phillips curve or along the misperceptions-augmented aggregate supply curve. Since, under this assumption, the very possibility of errors in time disappears along with the difference between the initial and final effects of the disturbance, the two curves acquire immediately, i.e. as soon as the shock takes place, their full-information vertical shape and are accordingly consistent with the REH. It should be noted, however, that the REH is made up of two components: one consists in assuming that expectations are formed on the basis of the whole information available at a particular moment; the other consists in adding to, and drawing from, this perception the resulting predictions of the theory. The former

[23] It may be of interest to note that, when Phelps came to present the neutrality of money as a feature to be observed "if and when firms and workers formed *correct* expectations" (of money wages and money prices) except that they "have no way of perceiving such neutrality *at the start*" (2007, p.546; first italics Phelps', second italics added), he made use of the same expression ("correct expectations") that we saw above to be used by Hayek while conveying the idea of expectations resulting from the *whole* set of existing information.

component may be said to convey the REH in its "weak" dimension, the latter in its "strong" dimension.

The usefulness of splitting the REH into these dimensions becomes clear when it comes to the so-called "policy ineffectiveness proposition" (Sargent and Wallace, 1975, 1976). According to this proposition, the mere announcement of a policy measure, say an expansionary monetary policy, is "digested" into the economy in the sense that agents are able to anticipate all the consequences of the new measure at the very moment, or even before, the measure is enacted[24]. The resulting "super-neutrality of money" (a feature by which money is regarded as neutral not only in the long run –i.e. in a run long enough for errors in time to be perceived and expectations to be revised- but also in the short run –i.e. in a run never too short to keep agents from perceiving what is going to happen) signifies that central banks can affect employment and output levels only at the cost of creating illusions and disappointments. It is here that the "weak" and "strong" REH come into the picture. For not only is the REH, being forward-looking in both of its dimensions, more suitable than the EEH and the AEH for evaluating the future impact of current policies (particularly of *new* policies). It also provides, when considered in its strong dimension, the further advantage resulting from the agents' ability to draw the predictions of the theory underlying those policies. The fact is that this ability boils down to nothing once the *expected* outcome of particular policies is separated from the *future* conditions of the economy to be affected by these very policies. The snag is that between the expected outcome of a policy measure (whatever the model on the strength of which this outcome has been expected) and the future condition of the economy lies the flow of historical time. This is, as argued above, the "main crux" not only of dynamic theory but also of Keynes', Hayek's and Hicks' contributions to this theory. The complications raised by historical time can be easily removed when it comes to modelling an *abstract* economy. But they cannot when it comes to evaluating the future impact of particular shocks or policies on the economies of the *real* world. For not only does that flow add ever new *complexities* to the complexities that normally afflict these economies or the theories designed to understand them. It also brings forth *novelties* that these theories, let alone the resulting economic policies, are unable to predict or to overcome[25].

[24] Closely linked to the policy ineffectiveness proposition is 1) the so-called 'Lucas critique' (whereby the parameters of the macroeconometric models used for framing policies cannot incorporate also the changes in expectations originated by these policies); 2) the call for monetary rules (whereby central banks should refrain from "fooling" the people about what they are going to do or where the economy is going to go); 3) the issues of central bank credibility (whereby central banks cannot "fool" the people more than once) and of time inconsistency (whereby the "fooling" by central banks or governments consists first in announcing a certain rule and than in reaping the impact on real magnitudes of "cheating" with it).

[25] This applies to any kind of policy measure or policy rule as well as to the repercussions of any shock (whether exogenous or endogenous, monetary or real) in a multiple-period economy. Some neglect of the role of surprises in altering or reverting the fluctuations resulting from "real" shocks (which are by themselves a source of surprises) can be detected in the wave of "real business cycle" models from its inception (Kydland and Prescott, 1982; Long and Plosser, 1983) to some later overviews (Prescott, 2006; Rebelo, 2007). On real business cycle models as "one of the ways

Concluding remarks

A bird's eye view of how the disappointment of expectations has entered the theory of fluctuations from the years of high theory to the more recent years of rational expectations brings to mind Robertson's vision of the hunted hare, i.e. that "if you stand in the same place, or nearly the same place, it can be relied upon to come around to you in a circle". For, if one compares the theory developed in the latter with that developed in the former years, one may realize that the weight and noise of the hare (the terminology, size and diversification of literature) have hugely increased while the diameter of the circle covered (the scope of literature) has under some respects shrunk in front of a motionless hunter (the authors of the years of high theory). The mismatch between the swelling of the hare and the shrinking of the circle seems to be at the roots of the demise of the REH and REH-based models after their peak in the 1980s and 1990s. Apart from the crises that have struck the world economy ever since[26], a number of analytical reasons can be provided to account for such a demise.

The most general reason seems to be the tendency (somehow shared by Shackle himself) to confuse the scope and limits of General Equilibrium Theory with the scope and limits of the Economics of Uncertainty and Expectations (Meacci, 2009); or, in Hicks' terms (Hicks, 1976), the inability to separate the economics *of time* (or of no time at all) from the economics *in time*; or, in Hayek's terms (Hayek, 1933, 1937, 1941), the logic of equilibrium (which is *out* of time) and the logic of fluctuations (which are *in* time); or, in still different terms, the inability to grasp that decisions taken in historical time are "self-destructive" and that the learning process is at all times "eating its own heart" (Shackle, 1969). All these insights underlie the argument, drawn above from the achievements of the years of high theory, against the confusion between the *expected* or *deducted* outcome of a particular policy and the *future* condition of the economy as such.

Another reason can be drawn from the tendency of the years of rational expectations to neglect Keynes's distinction between short-term and long-term expectations as well as Hayek's remarks on the difference between the actual behaviour of agents and the forecasts by model builders. As for Keynes, we have seen above that aggregate investment is more affected by the sudden revision of long-term expectations than by the slow and gradual changes of their short-term counterparts (which might indeed be modelled according to a "weak" REH or even to the AEH, for

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general equilibrium theory can contribute to applied economics" and on their implicit similarity with REH-based models (as another way to reach the same result), see Lucas (2007). On the more general relation between "General Equilibrium Theory" and the "Economics of Uncertainty and Expectations", see the following section.

[26] For an early example of the rising scepticism about the power of modern macroeconomic theory to comprehend the most recent crises and recessions, see Leijonhufvud (2009) and Lawson (2009).

it is sensible for producers to base their expectations on the "most recent realized results": 1936, p.51). As for Hayek, his warning against confusing the information given to the "observing economist" with the information given to the "persons whose behavior we try to explain" (1937, p.6) reflects the more general distinction, discussed above, between "correct" and "incorrect" expectations (depending on whether they are or are not compatible in the current period) and, in case of "incorrect" expectations, the associated distinction between "endogenous" and "exogenous" disturbances or, as we saw above, between "justified" and "sheer" errors. The distinction between "correct" and "incorrect" expectations and the possibility of "justified" errors may be used in support of Phelp's critique of the REH in that people have not only to form expectations of other peoples' expectations but also to choose the "true" model among the plurality of models available for processing existing information (Frydman and Phelps, 1983, Phelps, 2003, 2007; Frydman and Goldberg, 2007).

A third reason for the changing shape of the hare-and-circle image may be the recent neglect for an aspect of modern economies which occupied centre stage in the years of high theory. This relates to the "Jevonian interval" which makes economies to enjoy today the fruits of investments made in a distant or very distant past as well as to carry out today investments the fruits of which will be enjoyed in a distant or very distant future. These economies are, in other terms, fixed-capital economies. The heavy use of fixed-capital implies that the disappointment of expectations (especially the expectations of entrepreneurs) should play a greater role in the theory and events of modern fluctuations than it used to do in the past. Yet, while the authors of the years of high theory highlighted, however differently, the devastating impact that the miscoordination of plans on saving and investment exert on the "Jevonian interval", the authors of the years of rational expectations have rather overlooked this impact and have focused instead on the oscillations of output and employment around their "natural" levels as if these levels were not subject in their turn to fluctuations and to both kinds of miscoordination.

A further reason for the changing emphasis of the literature may lie in the fact that, by collapsing the *future* into the *present*, the "strong" REH has pushed the theory in an essentially similar, though apparently opposite, direction relative to the one undertaken by the two hypotheses (the EEH and the AEH) which it was meant to replace and which rather consist in collapsing the *present* into the *past*. In any case, the weak dimension of the REH reminds us not only that the whole information set given to agents today may be turned by the flow of historical time into a completely different set tomorrow; but also that this tomorrow may come much earlier than the "investment period" has been completed or capital has returned to its point of departure in the sphere of its circulation. The result of these "exogenous" disturbances is that rational expectations,

including the expectations that rule in Hicks' "Futures Economy", are subject to "sheer" errors, to say the least, and therefore to disappointment as much as any other kind of expectation.

This brings us back to the beginning of the years of rational expectations as a step that lies below the step reached in the years of high theory. The inferiority of this step is due to the habit of focusing on the mechanism of expectations formation as a topic more relevant than the consequences exerted by the disappointment of expectations, whatever the mechanism of their formation, on the capital structure of the economy and on the levels of employment and output associated with this structure.

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