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A note on Hicks's 'contemporaneous causality'

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In *Causality in Economics* Hicks (1979) proposes a distinction between three categories of temporal causality: 'static', 'contemporaneous' and 'sequential' causality. In this note I wish to comment on the concept of 'contemporaneous causality'; in particular I shall try to show that the examples of 'contemporaneous causality' chosen by Hicks from the literature properly belong instead to his category of 'static causality'. I shall argue that the only temporal distinction which may be drawn following Hicks' own definitions separates causal atemporal schemes from causal temporal ones, i.e. contemporaneous causality disappears from the picture.

Furthermore, I shall try to show that Hicks's distinction between 'contemporaneous' and 'sequential' causality (i.e. the existence of lags between the cause and the effects) may hide a pitfall which is not made explicit by Hicks to his readers.

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Hicks's propositions concentrate on temporal structures as the basis of causal relations in theoretical models. This is because the central task, as he sees it, is to define causal relations according to whether they express *static causality* (in which the analytical scheme is out of time); *contemporaneous causality* (in which 'cause and effect relate to the same time period'); or *sequential causality* (in which 'cause precedes effect') (Hicks, 1979, p. 26).

The reasons for rejecting 'Hume's principle that cause necessarily precedes effects' (Hicks, 1979, p. 26) are not questioned here. The separation of the concept of causality from that of temporal sequentiality may also be found in the writings of other economists. Simon, for instance, insisted that, if A causes B and it also precedes it in time, the *asymmetery* of the relation linking A and B is the relevant feature which defines the causal relation, not the temporal sequence by itself (Simon, 1953, p. 51). Feigl, from a different perspective, describing the 'domains' of causal laws, distinguished the sequential domains from the simultaneous domain of these laws (Feigl, 1953).

Our concern here is with Hicks's distinction between the three categories of causality and the problems that arise when Hicks's concept of contemporaneous causality is applied to theoretical models.

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The basic feature which distinguishes static causality from contemporaneous casality is that the latter has a temporal reference absent from the former. 'Static causality', Hicks explains, 'may indeed be regarded as a limiting case of contemporaneous causality in which the period, during which the cause operates and takes effect, has been stretched out to become indefinite'; in static causality 'both the cause and the effect are permanencies'. 'However', he adds, 'when we proceed to this limit there is a change of character'. There is *no uncertainty* to distinguish past from future values of the variables because, as Hicks further explains, 'in the static models time is not taken seriously. *Past and future are the same*; they remain the same as far forward and as far back as we care to look' (Hicks, 1979, p. 62).[1]

Uncertainty, it thus emerges, is the distinctive feature of temporal causality. In contemporaneous and sequential causality, uncertainty about future events is the only feature, according to Hicks, which forces us to recognise that the future is qualitatively different from the past (and therefore that both contemporaneous and sequential causality are framed in time).

These two categories, of course, are themselves further distinguished by the fact that in sequential causality the cause precedes the effect. In the present paper this distinction is of only secondary importance.

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One of Hicks's examples of static causality is taken from Adam Smith: 'the relative cheapness of water transport is a *cause* of the relative wealth of some places that have good water communications'. Hicks maintains, 'Thus, in terms of our analysis, Adam Smith is comparing what was in his time with *what would have been if*, other things being equal, the relative cost of land and water carriage had been different' (p. 45). 'The model itself', Hicks stresses 'must be unchanging' and 'the method belongs in comparative *statics*' (p. 57). As an example of contemporaneous causality Hicks points to the theoretical scheme of the *General Theory*. In the multiplier there is a cause (investment) and its effect (income), and their relation is contemporaneous, according to Hicks, because 'income is a flow over a period' and 'investment is a flow over the same period'.

There are, however, two critical points:

(i) For Hicks the multiplier is an example of contemporaneous causality, because it explains 'what income would have been in that period if investment had been different over the same period, *ceteris paribus*' (Hicks, 1979, pp. 74–75)[2]. But this example is not formally different from Hicks's description of Adam Smith's static analysis, i.e. 'comparing what was in his time with what would have been if, other things being equal, the relative cost of land and water carriage had been different' (Hicks, 1979, p. 45). However, Hicks explained in that example that Smith's 'model must be unchanging', so that 'the method belongs in comparative *statics*' (p. 57): 'both the cause and the effect are *permanencies*'.

(ii) The unit of time is irrelevant for the analytical purpose of any theory which focuses on the causal structure of a process and which tries to identify the forces determining the

[1]Hicks compares this change of character to the change between the short period and the long period of Marshall. Insofar as 'the short period effects are in time, they relate to what happens in a period'. 'Long period effects, on the contrary, are not in that way in time, for the long period has no clear beginning and no clear end'. Hicks has stressed these features of static models on several occasions (see, for example, Hicks, 1965, Ch. 1).

[2]Considering the consumption function in more detail, Hicks notices that the model assumes that planned savings and realised savings are the same (pp. 77–78). This means that 'expectations, within the period, are correct' (p. 82).

process according to the causal relations which the theory specifies. This is because such a causal structure is independent of time; it only implies a set of general relations of a qualitative character. The process can therefore be analytically squeezed at will and the causes can be assumed to work out their effects *instantaneously*, in exactly the same way they may be stretched *ad infinitum*, provided that the *logical priorities* are respected. In the former case we have Keynes's 'instantaneous' multiplier and the simultaneous occurrence of investment and saving; in the latter we have Smith's 'permanencies'. It is this very feature of Keynes's method and analytical aim in the *General Theory* (i.e. that of 'studying *the forces* which determine the scale of output') which entitles us to classify it instead within Hicks's category of static causality. This point is more fully argued in a previous article (Termini, 1981, para 5) and only the main line of reasoning is recounted here.

The analytical feature of the *General Theory* enables Keynes to leave out of his analysis of the multiplier any temporal process, and to neglect the time lags and the disequilibrium positions which are required by the adjustment mechanisms of the variables. Keynes writes: 'the logical theory of the multiplier holds good continuously, without time lag, at all moment of time' (Keynes, 1936, p. 122). Because this causality is framed within a logical scheme, logical precedence does not entail any chronological precedence; any temporal reference is absent from these laws.

Keynes further stresses that 'the *General Theory* has evolved into primarily a study of the forces which determine the scale of output' (Keynes, 1936, pp. VI–VII). It should be clear, but has to be emphasised, that to single out the determinants of a process of change does not imply the study of the dynamics of the changing process itself. Of course, if we leave the field of analysis where causal laws may be generally inferred to explain the relations which govern the economic structure and instead set out to study the *actual* development of these relations in time, one can no longer relate I_0 at time t_0 with Y_1 at time t_1 (according to an *a priori* given parametric relation). Keynes himself supplies us with several examples of uncertain outcomes in the *General Theory*, when he considers the alternative paths which may prevail if he follows, *in time*, the *actual* development of his logical relations.

The multiplier thus emerges as the logical expedient which enabled Keynes to maintain his causal chain (in particular the causality from Investment to Saving flows) irrespective of the temporal relations that may have existed in the analysis.

These atemporal features of the multiplier have been underlined by Hicks previously (1976, p. 140. See also Davidson, 1978, pp. 372–378). These features, contrary to later claims, now seem essentially to be without question features of static analysis, according to Hicks's own classification.

The second example of contemporaneous causality given by Hicks is the marginal efficiency of capital. Here, Hicks again underlines the temporal dimension of this relation and thereby separates it from the static concept of the marginal productivity of capital. Hicks states, 'the marginal efficiency of capital is forward looking', and he stresses 'ignorance of the future is essential to it'. Hicks also points out, however, that the marginal efficiency of capital has to remain unchanged through time and the only possible way to assume this, he specifies, is to assume that '*expectations remain unchanged*, over a period, provided that *within the period* expectations are correct. What was expected in January to happen in June does happen in June, what was expected to happen in September does happen in September' (p. 82). This assumption is required, according to Hicks, if one is not prepared to follow Keynes's own solution to the problem, namely 'to confine attention to Fixed Capital Investment, the incentive for which depended on expectations on the

further future'.[1] Hicks specifies: 'if we refuse to accept Keynes' line of escape, what can we do? 'And he answers: 'As for the expectations of the further future, nothing is to have happened within the year which changes them. So nothing is to have happened within the year which has been unexpected' (p. 83). Again, as before, *uncertainty has thus to be explicitly ruled out* or, as I could re-phrase it, the variables have to be considered in their *ex post* registered values. What then is left of the analytical feature by which Hicks has distinguished the atemporal static framework of the first category (i.e. static causality) from the temporal non-static one (i.e. contemporaneous causality)? Do the causal relations of Keynes's multiplier and marginal efficiency of capital lack a temporal reference and, if so, does it follow that they properly belong within the 'static' models?

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Hicks himself supplies a peculiar answer to these questions. In order to maintain his earlier distinction between *static* and *contemporaneous* causal concepts he stretched the definition of equilibrium which he had stated in static terms so that it could be equally applied to 'non-static' models. Thus, if, as in the static case, the model is in equilibrium when 'it is unchanging over time' (e.g. in the example from Adam Smith), in the second model this is said to be in equilibrium 'when expectations are realized' (see pp. 45–46 for the static definition of equilibrium, pp. 82–83 for the temporal definition). By introducing this elaboration, it appears that temporal co-ordinates can be maintained in the scheme of the *General Theory*, and attention focused on the requirement that all flows of real variables, in particular investment and income, refer to the same time-periods.

It is interesting to note that a similar definition of equilibrium is used by Lindahl in defining Keynes's theory, in his reformulation of 'Keynes's model' in 1954. 'Keynes' constructions refer to equilibrium positions', Lindahl writes, 'provided that *the concept of equilibrium can be applied to correctly anticipated processes*'.[2] It will be appreciated, however, that Lindahl does *not* interpret the scheme of the *General Theory* in causal terms in his 1954 model. Lindahl described it as 'an equilibrium with *simultaneous interdependence* of the various magnitudes' (1954, p. 25, 20–23). Coherently enough, he then drew a complete picture of both the method and the results of Keynes's scheme in terms of an atemporal simultaneous interdependent system. But this is not the case, of course, according to Hicks's interpretation, for he repeatedly warned against the picturing of simultaneity in Keynes's approach (see Hicks, 1976).

By assuming that expectations are realised, we immediately recognise that Hicks is assuming, in an alternative way, that *uncertainty has no effect* on these relations.[3] There-

[1] This solution is recalled by Kregel (1976, pp. 213 ff.), and by Chick (1982), among others.

[2] Lindahl writes: 'If consumers plan to spend a certain fraction of their income during the period, but the income is determined only after the consumers' purchases are finished, the only possibility of avoiding the distinction between the expected income which is the result of the carrying through of the plans . . . is to make them equal, i.e. implicitly to assume that individuals correctly anticipate their income' (1954, p. 29). See also Hicks (1976) and also Pasinetti (1974); this is further discussed in Termini (1981, para 5). The fact that the equilibrium concept is used differently in different places has been stressed recently by Davidson (1982, pp. 61–62).

[3] By ignoring 'uncertainty' in Keynes's scheme, Hicks is led to classify the *General Theory* among those models which according to Thomas's accurate classification may be called 'quasi-static'. They 'cover the situation where future changes are accurately foreseen and people dispose of their resources in the light of the perfect foresight'. This, it should be noticed, corresponds to the stream of intertemporal equilibrium theories (where complete future markets or perfect foresights actually prevent the analysis from considering past, present and future in different terms) and which, started by Hayek (1928), was followed by Lindahl (1929) and more recently by Arrow-Debreu and Benassy, among others.

fore, until meaningful alternative examples are found to fit contemporaneous causality, the category is, it seems, empty. It follows, provided a basic distinction is drawn between analyses which are causally framed and analyses which are framed according to interdependent and simultaneous equilibria (on the relevance of which I totally agree with Hicks), that the only temporal distinction which may be further drawn separates causal atemporal models from causal temporal ones, i.e. contemporaneous causality disappears from the picture.

* * *

Furthermore, the second distinction introduced by Hicks between contemporaneous and sequential causality within temporal structures, i.e. the existence of lags between the cause and the effect, may hide a pitfall which is not made explicit by Hicks to his readers. There is no doubt that 'sequential causality' implies lags. But the reverse condition does not hold. We can find many examples in the literature were a 'temporally' lagged structure is based upon a set of *ceteris paribus* conditions which effectively exclude uncertainty from models. Lags may be devices to describe mechanisms that are implied by static causal models.[1] Indeed, what *conceptual* considerations could enable us to distinguish a model where $C_t = f(Y_t)$ from a model where $C_t = f(Y_{t-n})$ (i.e. a model where the cause brings about its effects after a time lag) *if* all the parameters and functions are the same as in the previous model?

The pitfall lies in the fact that the first scheme may account for a set of causal relations which are *logically* framed, out of time. In this case, to extend these relations merely mechanically by means of a lagged structure necessarily implies a change of character. The same kind of problems are involved as in the direct use in quantitative terms of the logical relations of a static model. It may be added that this represents a translation which Keynes was very worried about and strongly opposed to (see Keynes, 1939).[2]

Let us explore the argument by means of an example. Within the field of causal relations considered by Hicks, we find several models which turn the *logical* relations identified by Keynes in the *General Theory* into lagged structural relations. The variables are dated in order to follow the sequence of their values. We may recognise, however, that these models set out a step by step development of the process precisely because they assume a mechanical notion of time. They show us that the different phases of the multiple increase of income determined by a given increase of investment are merely an expository expedient of static analysis which has nothing to do with time.

Indeed, if we follow the different phases of the income generation through time, we necessarily encounter disequilibrium points of the variables. We are then faced with the choice of ignoring them or dealing with them. In the first case, the analysis corresponds to a logical scheme which is atemporally framed, and *the same* final values of variables in equilibrium are reached for all variables. In the second case, it is important to acknowledge that one can no longer relate I_0 at time t_0 with $Y = Y_n$ at time t_n according to parameters

[1] I am referring here to Keynesian aggregate cyclical models and neo-Keynesian models of growth among those which fit Hicks's general definition of causality. In intertemporal equilibrium models and models of temporary equilibrium which do not fit Hicks's definition of causality, we can find the examples of lagged structures which do not deal with time and uncertainty.

[2] This point has been argued in paras 3 and 4 of my 1981 article.

that are *quantitatively given a priori*: during the process, expectations may be unfulfilled, the functions changed, decisions altered.[1]

It is possible to show, therefore, that these kinds of lagged models have nothing necessarily to do with a framework where uncertainty dominates economic relations, which Hicks has described as a temporal model. It follows, if we wish to consider these lagged models in a separate category—as I think we should—that we may need to introduce an *ad hoc* subcategory of '*mechanical time*' sequentiality which belongs within Hicks's static causality. Such a subcategory should help to distinguish these apparently temporal relations from the 'truly' temporal ones, i.e. from those relations where the future is different from the past, as Joan Robinson would say, or where there is uncertainty, as Hicks's classification suggests.

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[1]For instance, it is often implied that a given ratio of consumption to income is a fixed constant at any point of time. Of course, this excludes by definition the possibility of interpreting in the same theory situations where the changing behaviour of economic units has to be explained. In such cases, changes of the parameters and functions during the process of the generation of income should themselves be the object of explanation, and the parameters cannot be assumed to be unchanging. The typical example of a situation which cannot be studied in terms of fixed parameters and functions is the cyclical path of the economy.

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