NOTE ON HOLLEY'S "DYNAMIC MODEL"

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Dr. Holley's paper on "A Dynamic Model"[1] is extremely interesting from a double point of view: on the one hand, it offers a rather detailed description of the actual handling of a dynamic linear model at the national scale, on the other, it contains new results regarding theoretical properties of a special structure as well as useful computational procedures. There is very little doubt in this writer's mind that the readers will receive it with the greatest interest. However, the paper contains some doubtful points that require additional clarification the most important of which will be briefly taken up here. The first is a matter of purely logical presentation and involves no material implication concerning the main results. This cannot be said about the questions raised in (2) and (3). (The remarks in (4), do not concern Holley's paper, but refer to a more general issue.)

1. On p. 620, we read "that for *any state* of the system which is stationary with zero replacements the inputs X'_{ij} and (hence) the expenditure E_j will be proportional to the output X_j." Evidently, the author does not have in mind a *frozen* state, because in such a state every quantity is an absolute constant and one cannot speak in any sense whatsoever of proportionality. But if X_j can vary, then from the proportionality between all X'_{ij}'s and X_j it does not follow that E_j will also vary proportionally with X_j. Indeed, in general, both a_{*j} and e_j are functions of X_j, and the relation $a_{*j} + e_j = 1$, (p. 621) is the equilibrium condition which determines X_j. From the assumption of a_{*j} constant with respect to X_j it does not follow that e_j is constant also. This has to be introduced as an additional restriction. If this is done then the above relation becomes an identity and the scale X_j becomes indeterminate.

2. The statement that multiple leads "add nothing to principle" and that the result obtained for a single lead can be applied to the general case, is evidently true for a stationary state—in which case it is trivial—and false for a dynamic one. It is the latter case that interests us in connection with subsequent applications to the actual structure where "there are a few cases of multiple allocations" (p. 626). Let us illustrate this point for the case of two special leads: 0 and 1. (cf. pp. 624). Because of *linearity* every requirement is proportional to the corresponding output, so that:

$$(1) \qquad r^{(t)}_{ij,t-1} = h_{ij} P_{j,t}\,, \qquad r^{(t)}_{ij,t} = k_{ij} P_{j,t}$$

[1] Econometrica, Vol. 20, October, 1952, pp. 616–642 and Vol. 21, April, 1953, pp. 298–324.