

NEEDLESS COMPLEXITY IN THE IDENTIFICATION OF INDUSTRIAL COMPLEXES: A REPLY

William R. Latham III*

Replying to Professor Czamanski's comment [3] offers the opportunity to clarify several points which were apparently not clear in my article (Latham [7]). The comment may have been engendered because of three specific misunderstandings.

The first misunderstanding resulted in my erroneously associating Czamanski's work with aspatial industrial complexes. He is correct in noting that my interpretation of the terms complex and cluster differed from his. The forthcoming article by Czamanski and Czamanski [5] clarifying definitively the distinction between aspatial clusters and spatial complexes will be a welcome addition to the literature. My spatial interpretation of the term cluster was derived from its usage by others such as Bergsman, Greenston, and Healy who state (in the article cited by Czamanski in his Comment), "Our basic conception of an industrial cluster is a group of activities that tend to locate in the same places" [1, p. 265]. An association of Czamanski's work with aspatial complexes was encouraged by Roepke *et al.* who found that "aspatial approaches to the recognition of industrial complexes include Czamanski" [8, p. 16]. Comments on Czamanski's work based solely on this terminological misunderstanding are, of course, no longer valid.

The second misunderstanding is of the basis for my appeal for simplicity in identifying industrial clusters. Intuitive appeal is not the basis for, but only buttresses, a methodological choice made after finding that the more complex methods did not seem to be superior to a simpler method in identifying existing clusters. The cluster (which is also a complex) in my article (Latham [7, p. 53]) seems to be as tightly interrelated, interesting and useful for policy purposes as those identified by other techniques. I regard the direct analysis of interindustry links, used to identify this cluster, to be simpler than factor or graph theoretic analyses of correlation coefficients computed from the links which was the procedure used in both Czamanski [4] and Roepke *et al.* [8]. Czamanski is in substantial agreement that the direct examination of interindustry links is a useful technique, basing three of four methods he uses in his study of clustering of industries (Czamanski [2]) directly on analysis of interindustry links.

A third misunderstanding regards the procedures used in my article to identify

* Assistant Professor of Economics, University of Delaware.

Date received: April, 1977.

both an industrial cluster and an industrial complex.¹ The measure used to identify members of an aspatial industrial cluster is the sum of the four possible links between two industries based on the U.S. input-output table (Latham [7, p. 50]). As noted in the preceding paragraph, this method seems to be unambiguously simpler than factor or graph theoretic analysis. The correlation coefficients referred to in my article are computed between regional industry employment distributions and are used to measure the degree of geographic association between two industries. The coefficients are not uniformly high, as Professor Czamanski suspected, because they are calculated from the employment distributions for 4-digit S.I.C. industries in 205 urban and 172 nonurban regions spanning the U.S.² A high value of the coefficient of correlation is required for inclusion of an industry in a complex so that the complexes definitely have a significant spatial content. An arguable assertion in the paper is that the combination of the two procedures, (i) identifying clusters with linkage data and (ii) identifying geographic associations with correlation coefficients, is still simpler than the methods used in Czamanski [4] and Roepke *et al.* [8] to identify clusters alone. Note that I recommend searching for potential links in the least restricted source of data on such links, the U.S. input-output table, and then searching for indications of a spatial response pattern to these links by examining locational data for relatively small geographic regions.

After taking the above clarifications into consideration, Professor Czamanski and I seem to have a larger basis for agreement than either my article or his comment indicated. Regarding both the importance of industrial complex analysis for policy purposes and the appropriate procedures for identifying an industrial cluster we are in substantial agreement. The remaining issues between us pertain to my questioning of three propositions: (1) the possibility of identifying a meaningful spatial industrial complex from data for whole large states or provinces; (2) the proposition that the optimum industry to expand in a regional economy can be found among the industrial complexes already present; and (3) the proposition that, by subjecting bilateral input-output relationships to any kind of analysis, results not obtainable from analysis of the links themselves can be derived. Regarding this last point, Czamanski [2, p. 10] has shown that industrial clusters identified with factor analysis of coefficients of correlation based on links are quite similar to those identified using the links themselves. Both methods will assign two industries to a cluster if they do not trade with each other but are strongly linked to a third industry.

REFERENCES

- [1] Bergsman, J., P. Greenston, and R. Healy. "The Agglomeration Process in Urban Growth," *Urban Studies*, 9 (1972), 263-288.

¹ The inaccessibility of a detailed description of my procedures in published form has been remedied by publication of Latham [6]. I regret being forced to cite unpublished work; I note that it is frequently done (Czamanski's reference to a paper [5] not to be published for at least nine months from this writing may be a case in point) and that usually copies may be obtained on request from the author.

² Only five percent of 19,701 such coefficients were greater than 0.5.

-
- [2] Czamanski, S. *Study of Clustering of Industries*. Halifax, Canada: Institute of Public Affairs, Dalhousie University, 1974.
- [3] ———. "Needless Complexity in the Identification of Industrial Complexes: A Comment," *Journal of Regional Science*, 17 (1977), 455-457.
- [4] ———. "Some Evidence of the Strengths of Linkages Between Groups of Related Industries in Urban-Regional Complexes," *Papers, Regional Science Association*, 27 (1971), 137-150.
- [5] Czamanski, D. Z. and S. Czamanski. "Industrial Complexes: Their Typology, Structure and Relation to Regional Development," *Papers, Regional Science Association*, forthcoming in 38 (1977).
- [6] Latham, W. R. III. *Locational Behavior in Manufacturing Industries*. Leiden: Martinus Nijhoff, 1976.
- [7] ———. "Needless Complexity in the Identification of Industrial Complexes," *Journal of Regional Science*, 16 (1976), 45-55.
- [8] Roepke, H. *et al.* "A New Approach to the Identification of Industrial Complexes Using Input-Output Data," *Journal of Regional Science*, 14 (1974), 15-29.