The Stability of American Markets

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Much of the evidence of coordination between corporations and their markets comes from cross-sectional studies conducted within portions of the American economy during the past two decades. We know, especially for manufacturing during the late 1960s, that certain structural qualities of markets predict profits and the organization of large firms. But this evidence is open to an uncomfortable empirical question: To what extent did the social-structural qualities determining resource dependence in American markets change during the 1960s and 1970s so as to limit the generalizability of cross-sectional evidence? The analysis here shows that markets were dramatically stable in the social structure of production relations known to predict the structure of large firms. Relying principally on Department of Commerce data, the article traces the American economy through the 1960s and 1970s in terms of 77 broadly defined markets, describing the stability of market boundaries and patterns of transactions with suppliers and consumers, the enduring profit inequalities generated by the social structure of the markets, and the constant sources of market constraint to be managed by firms designed to operate within each market. The implications are that organizational research with cross-sectional

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> data can be generalized (within specified limits) to other periods of time, organizations can be selected for study from a stable sampling frame of corporate markets, and organizational behavior can be studied over time for its success or failure as an adaptation to known market constraints.

Organizational theory typically grounds the structure of corporations in the structure of their markets—the competitive environments of buying and selling in which organizations obtain profits to survive. Population ecology theories attribute organization death to a firm's failure to match the requirements of its market, its niche in the economy. Resource-dependence and transaction-cost theories focus more explicitly on the social structure of production relations defining a market, attributing variation in organizational success to variation in the extent to which organizations are adapted to the structure of their markets. These important complementary approaches in organizational theory are productively reviewed by Pfeffer (1982, chap. 5), Scott (1987, chaps. 6, 7, 8), and Aldrich and Marsden (1988). By either route, one arrives at the vital conjunction of organizations and their markets. An adequate conceptualization of markets is essential to any general theory of formal organization.

This is the reason for the importance of recent developments in network theory and analysis that contribute to organizational theory by defining two foundational qualities of markets—boundaries and parameters. These contributions are elaborated on below—but, in brief, the concept of structural equivalence can be used to define market boundaries, where the market for one commodity ends and the market for another begins. The concept of structural autonomy can be used to define the parameters of a market, classes of transactions with suppliers and consumers in which entrepreneurial opportunities are limited, creating transaction-specific constraints to be managed through corporate relations from firms operating within the market. In theory, profitable markets are those with few constraints on entrepreneurial opportunities, and successful firms are those structured to manage the constraints on their markets. These concepts have been pursued using data on the American economy (Pfeffer and Salancik 1978; Burt, Christman, and Kilburn 1980; Burt 1983*a*) and certain European economies (Ziegler 1982). Profit margins vary significantly with market constraint, and large firms are structured, internally and externally, to manage market constraints.

Unfortunately, available evidence is cross-sectional and so presumes stability in the social structure of the market transactions exogenously defining the market constraints that pattern the structure of large organizations. This is especially bothersome because stability itself is an impor-

tant feature of market constraint. An enduring market constraint must be managed by organizations hoping to prosper in the constrained market. A transitory or erratic constraint can be ignored in the short run or managed with temporary informal agreements between organizations. Cross-sectional analyses of market structure provide no indication of market-constraint stability. For example, the results on American markets reported by Pfeffer, Salancik, and Burt and cited above focus on the economy in the late 1960s. There is no reason to believe that these markets have endured in the same form. During that period, corporations were diversifying at an unprecedented rate, our involvement in Vietnam had created unusual demand in certain markets, and people still preferred automobiles from Detroit. By the early 1970s, peace and collusion among oil producers had driven the American economy into its worst condition since the 1930s. A troubling empirical question is raised: To what extent did the social-structural qualities determining resource dependence in American markets change during the 1960s and 1970s to limit the generalizability of cross-sectional evidence of the market forces shaping organizations?

That is the question I address here. I describe the stability of American market boundaries and constraints during the 1960s and 1970s, tracing 77 markets over the two decades. The markets correspond to commodities distinguished in the aggregate input-output tables of the American economy published by the Bureau of Economic Analysis of the Department of Commerce in 1963, 1967, 1972, and 1977. The input-output table data are merged with census data from other sources to estimate supplier/consumer constraints and structural autonomy within each market over time. I begin with the patterns of buying and selling that defined market boundaries, then turn to the continuing profit inequalities created by differences in the social structure of American markets, and close with a description of the constraints posed for firms in each market by their most important supplier and consumer transactions. Results are summarized at the end of the paper with discussion of the implications for organizational research more generally.

MARKET BOUNDARIES AND TRANSACTION PATTERNS

The boundary of a market is defined by the pattern of buying and selling transactions typical of producing the market's commodity. To the extent that the producers of one commodity and the producers of another have identical suppliers and identical consumers, they are competitors in the same market. The difference between their commodities is a matter of product differentiation rather than of market differentiation. Two commodities are the products of different markets to the extent that the

suppliers and consumers for one commodity are different from the suppliers and consumers associated with producing and selling the other.

Structural Equivalence and Market Boundaries

This commonsense definition of market boundaries in terms of supplier and consumer transactions can be operationalized in network analysis with the concept of structural equivalence (Burt 1983*a*, pp. 60–63). Without going into details available elsewhere (e.g., the review and illustrations in Burt 1982, chaps. 2, 3; Burt and Minor 1983, chaps. 13, 14), I define two elements to be structurally equivalent within a network to the extent that they have identical relations with every other element in the network. As the phrase "extent to which" implies, structural equivalence is typically used as a continuous variable rather than as an absolute. Two structurally equivalent elements in a network could have slightly different relation patterns for substantive or statistical reasons. Euclidean distance is used to measure degrees of structural equivalence, equaling zero between perfectly equivalent network elements and increasing with the extent to which two elements are involved in different patterns of relations and therefore far apart in the social topology of the network.

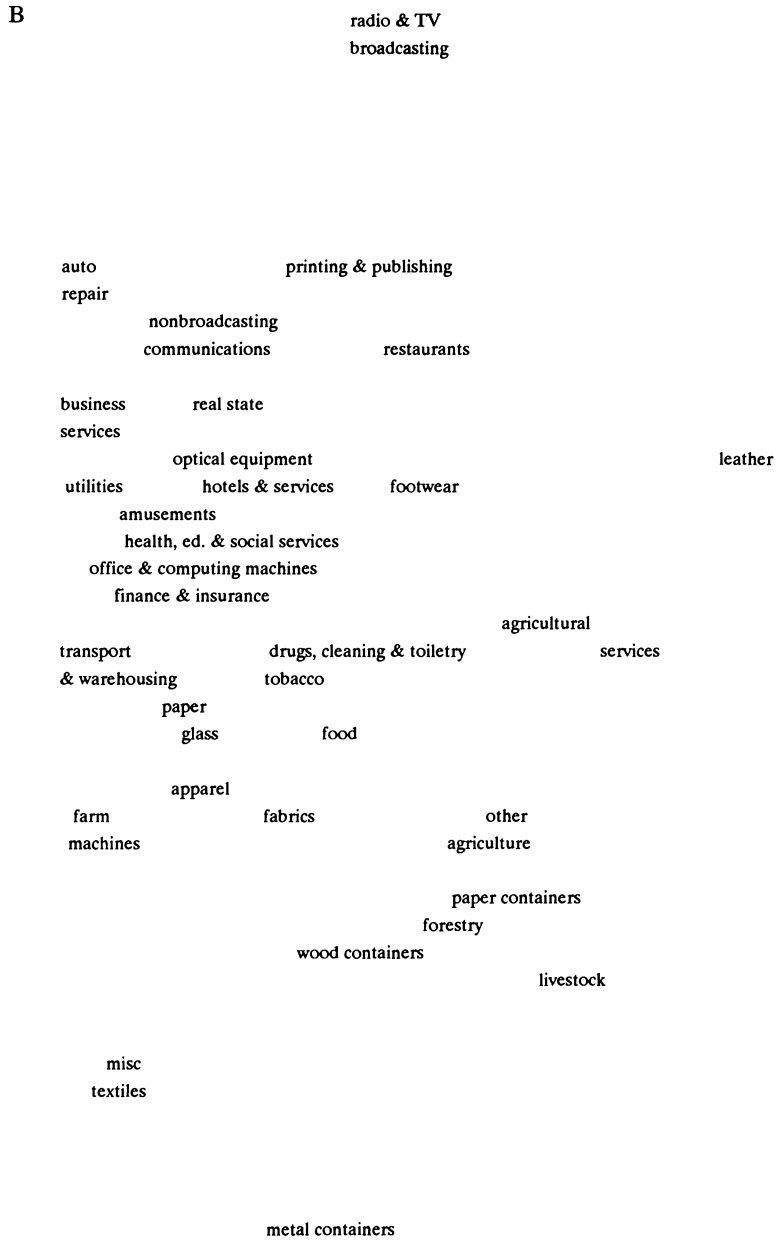
Figure 1 presents a social topology of the American economy during the 1960s and 1970s. The figure is a metric multidimensional scaling of distances, aggregated over time, among 77 commodities.[2] The commodities

[2] Specifically, distances are based on proportional input and output coefficients excluding buying and selling within sectors. The distance between sectors a and b in a particular year is computed as follows:

$$d_{ab} = d_{ba} = [\Sigma_q(o_{aq} - o_{bq})^2 + \Sigma_q(i_{qa} - i_{qb})^2]^{1/2}, \quad a \neq q \neq b,$$

where o_{aq} is the proportion of sector a sales that are made in sector q (i.e., $z_{aq}/\Sigma_k z_{ak}$), and i_{qa} is the proportion of sector a purchases that are made from sector q (i.e., $z_{qa}/\Sigma_k z_{ka}$). Two sectors are structurally equivalent ($d_{ab} = 0$) to the extent that they purchased identical proportions of input from each other sector as a supplier ($i_{qa} = i_{qb}$) and sold identical proportions of output to each other sector as a consumer ($o_{aq} = o_{bq}$). The raw transaction data, z_{aq}, measuring the dollars of goods purchased from sector a by establishments in sector q, are taken from the 1963 transactions table (*Survey of Current Business* 1969, pp. 30–35), the 1967 transactions table (*Survey of Current Business* 1974, pp. 38–43), the 1972 use table (*Survey of Current Business* 1979, pp. 62–67), and the 1977 use table (*Survey of Current Business* 1984, pp. 52–57). Distance was computed across the four years by aggregating time-specific distances. The aggregate distance between two commodities is the square root of the sum of squared distance between them in each year. The distances are treated as interval level data for multidimensional scaling, so fig. 1 is a relatively strict representation. Using the ALSCAL algorithm (Takane, Young, and de Leeuw 1977; Young, Takane, and Lewyckyj 1978), there is a .63 squared correlation between observed distances and distances in one dimension. This increases to .77 for the two-dimension representation in fig. 1 and increases to .82 for a three-dimension representation. The two-dimensional representation is more than adequate for its heuristic purpose in this discussion.

FIG. 1*A*, *B*.—Social topology of the American economy during the 1960s and 1970s. Commodities are close together to the extent that they were produced and sold in the same markets.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correspond to the nongovernment production sectors distinguished in the four aggregate input-output tables published for this time period by the Bureau of Economic Analysis of the Department of Commerce. Two commodities are close together in figure 1 to the extent that—during the 1960s and 1970s—they involved identical proportions of purchases from each input-output sector as a supplier and identical proportions of sales to each input-output sector as a consumer.

Note the lack of clustering within figure 1. There are no obvious groups of commodities that should be combined as structurally equivalent products within a single market. There are some that might be considered. For example, in the lower left of the figure, there is a mining market composed of chemical minerals mining, iron ores mining, and nonferrous ores mining. In the upper left, there is a petroleum market composed of drilling and refining petroleum. However, there is a noticeable empty space between the mining commodities and between the two petroleum commodities. It seems more accurate to say that the commodities in the figure are variably proximate because they define similar markets rather than identical markets. Across a variety of cluster analyses—within specific years and spanning the two decades—illustrated by the distribution of commodities in figure 1, there is no evidence in the aggregate input-output tables of multiple commodities that should be combined as products in a single market.

My conclusion is to treat each of the aggregate input-output sectors in the 1960s and 1970s as a distinct market (ignoring, for the purposes here, submarkets distinguishable with more detailed transaction data). Not surprisingly, the criteria used by the Department of Commerce to define sectors for their input-output tables are similar to the structural equivalence criterion used by sociologists to identify kinds of network elements (cf. Blin and Cohen 1977; Burt 1983*a*, pp. 60–63).

Stability in Transaction Patterns

Of course, these results do not mean that each market's position in the economy was stable over time. Supplier and consumer transactions that were critical for a market in the early 1960s might have been supplanted by transactions with new suppliers and consumers by the end of the 1970s. The position of such a market in figure 1 would have changed over time, shifting from the area of markets defined by its 1960s transactions to the area of the markets defined by its 1970s transactions.

Consider the apparel market, sector 18 in the aggregate input-output tables. Commodities within this market range from woman's hosiery to knit outerwear to all apparel made from purchased materials. The pattern of buying and selling characterizing the apparel market positions it in

figure 1 with respect to every other market in the economy. Apparel is shown in the lower right quadrant of figure 1, near the center of the space. Its pattern of supplier and consumer transactions was most similar to the pattern defining the fabric market. Its pattern was most obviously dissimilar to the patterns characterizing the markets for crude petroleum and natural gas (to the upper left of fig. 1), iron ores mining (lower left), and heating, plumbing, and metal products (left).

The apparel market's position in the economy can be determined precisely by measuring the distance between the apparel transaction pattern and the transaction pattern of every other market. Distances have been computed from the input-output table transaction data to determine apparel's position in 1963, 1967, 1972, and 1977. To the extent that the market's position did not change over the two decades spanned by these data, the four observed distance variables will be strongly correlated. They are. The correlations range from .800 to .973, and variance in the observed distances is similar from one year to the next.

A simple measure summarizing these results to indicate market stability is the extent to which a linear composite of distances to the apparel market over time describes distances observed in each of the four years. A high proportion of the variance in observed distances is described by the first principal component taken from the covariance matrix among the four observed distance variables (92%). Moreover, distances to the apparel market in each year have roughly equal weight in determining the market's position during the two decades. Proportional contributions to the principal component are .26, .26, .24, and .24, respectively, for 1963, 1967, 1972, and 1977.[3] In other words, the position of the apparel market was stable. Its most important suppliers and consumers in the early 1960s were also its most important in the late 1970s.

Similar results are obtained for each market and displayed in figure 2.[4] The figure shows the percentage of variance in distances observed in each

[3] Specifically, I have taken the maximum eigenvalue for the four-by-four covariance matrix among distances and divided it by the sum of diagonal. Each element in the eigenvector corresponding to the maximum eigenvalue has been divided by the sum of elements to define a year's relative contribution to the principal component.

[4] The restaurant market, sector 74 in the input-output table, is not included in these results because it was only after 1972 that restaurants were taken out of retail trade and treated as a separate sector (see p. 42 of the February 1979 *Survey of Current Business*). In the 1963 and 1967 tables, sector 74 is the market for research and development, but is a sector in name only. This sector in earlier input-output tables was discontinued in 1963. For the 1963 table and later, research and development transactions are incorporated into the transactions of sectors performing the research and development. Sector 74 is empty in the 1963 and 1967 tables. It is used to display restaurant transactions in the 1972 and 1977 tables. Further details on changes in sector definitions are given in the original technical report (Burt 1986).

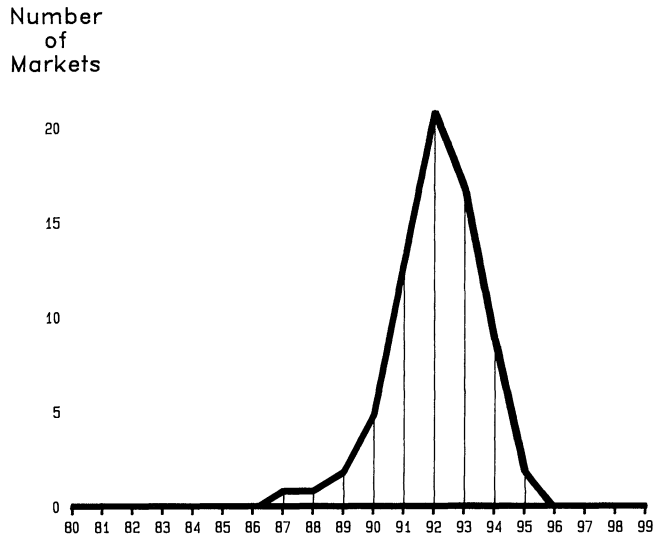

FIG. 2.—Percentage distance variance within years described by a principal component across years.

of the four years that can be described with a single linear composite across the years. On average, 92% of the variance can be described by a single linear composite. The range of results around this average is tight. The least stable market is agricultural, forestry, and fishery services (to the left of the distribution in fig. 2). Even at this extreme, however, 87% of the variance in observed distance to the market can be described by a single linear composite. Moreover, distances observed in each year make similar contributions to the averge market's position over time. If market positions were completely stable over the two decades, then distances in each year would make a .25 proportional contribution to the principal component. The average contribution from distances observed in 1963 is .27, the average from 1967 distances is .26, the average from 1972 is .23, and the average from 1977 distances is a .24 contribution. Clearly, the positions of American markets depicted in figure 1 are stable during the 1960s and 1970s.

In fact, these results understate market stability because they take no account of changes in the assignment of commodities to Department of Commerce market categories. The Bureau of Economic Analysis keys the definition of its input-output sectors to categories of the Standard Industrial Classification (SIC). During the 20 years under study, changes were made in the definitions of input-output sectors and SIC categories. The

names of the aggregate input-output sectors have not changed,[5] but the assignment of commodities to market categories has changed.

Using the Department of Commerce map of SIC categories in input-output sectors published with each input-output table and the definition changes described in the *Standard Industrial Classification Manuals,* one can distinguish two classes of definition changes.[6] Some changes are negligible at the level of aggregation being considered here, affecting distinctions among commodities within a market without affecting the boundary around the class of commodities assigned to the market. Other changes are potentially significant, affecting the boundaries of markets by reclassifying commodities between markets. I say potentially significant because the available data indicate where market categories were redefined without describing how the market's transactions with suppliers and consumers were affected by the redefinition (see Burt 1986, pp. 8 ff., for illustration).

Potentially significant definition changes were not distributed equally over time or markets. Changes between 1963 and 1967 were all negligible, involving redefinitions of commodities within the markets distinguished here. Changes between 1972 and 1977 were not only few but also negligible. All potentially significant changes moving a commodity from one market to another took place between 1967 and 1972.[7] Of the markets in figure 1, 35 were affected by one or more potentially significant definition changes between 1967 and 1972. Within the limits of available data, 41 markets can be treated as unchanged. Either there were no

[5] The exception is the restaurant market, introduced in the 1972 table, as explained in the preceding note.

[6] Once again, the aggregate quality of these data should be emphasized. While the results in fig. 2 understate market stability by ignoring recombinations of commodities without markets, they exaggerate market stability by their level of aggregation. The aggregate input-output sectors distinguish markets at a level of analysis nicely suited to organizational research (e.g., distinguishing markets for armaments, automobiles, shoes, petroleum refining, radio and television broadcasting), but their highly aggregate level obscures production changes at a more detailed level of analysis such as substitutions among commodities within markets. For example, Vaccara (1970, p. 241) mentions the shift from copper to aluminum being obscured in the 1958 input-output table because all nonferrous metals were combined into a single production sector. Sevaldson (1970, pp. 207–12) analyzes aggregation in detail, concluding that input coefficients for aggregate sectors will have lower variance than corresponding coefficients for more narrowly defined sectors.

[7] Included here are changes between 1967 and 1972 in the treatment of secondary products. Selected secondary products were redefined in the 1960s tables to the sector in which they were primary. Beginning with the 1972 table, all secondary products have been redefined (see p. 43 of the February 1979 *Survey of Current Business* and Burt [1986, p. 10] for further details).

changes in the commodities assigned to these 41 markets or the changes made were negligible, affecting distinctions among commodities within the market without affecting the boundary around the class of commodities assigned to the market.

The effect of definition change on market boundaries can be detected and put in perspective by comparing the principal component results for the 35 redefined markets with results on the 41 unchanged markets. To the extent that changes in the bundle of commodities assigned to a market changed the market's pattern of transactions with suppliers and consumers, the market's position in the economy would have changed between 1967 and 1972. The household furniture market is again a simple example. Household furniture is among the less stable markets; 89% of the observed variance in distance to it can be described by a principal component (see fig. 2). Also, the principal component is not equally defined by distances observed in different years. Distances observed in 1963, 1967, 1972, and 1977 make proportional contributions of .33, .31, .17, and .19, respectively, to the market's position over time. In other words, the position of the household furniture market in figure 1 is determined more by its transactions in the 1960s than by its transactions in the 1970s. The difference in contributions between 1963 and 1967 is a modest .02, as is the difference in contributions between 1972 and 1977. Between 1967 and 1972, there is a relatively large difference, one of seven times the magnitudes observed between other years.

If this kind of comparison is extended to other markets, the results show that the greatest changes in market positions occurred during the years of market redefinitions. This is substantiated in figure 3. The graphs are distributions of absolute differences between proportional contributions of distances observed in adjacent years to a market's position over time. Differences between 1963 and 1967 are presented in 3*a*. For example, 25 markets had .01 differences between the 1963 and 1967 contributions to the principal component describing their positions in the economy over time. Seven of the 25 markets were redefined between 1967 and 1972 (striped area in fig. 3*a*), and 18 remained unchanged through the 1960s and 1970s (dark area). Note that the greatest changes occurred between 1967 and 1972—the years of potentially significant changes in market definitions—indicating that much of the slight instability observed in market positions can be attributed to Department of Commerce definition changes. This is apparent from the wider range of data in figure 3*b*. Data distributions in 3*a* and 3*c* are compressed to the left, disclosing little change from 1963 to 1967 and from 1972 to 1977. The mean difference between 1963 and 1967 is .014, and 95% of the differences are less than .05. Between 1972 and 1977, the mean difference is .016, and 96%

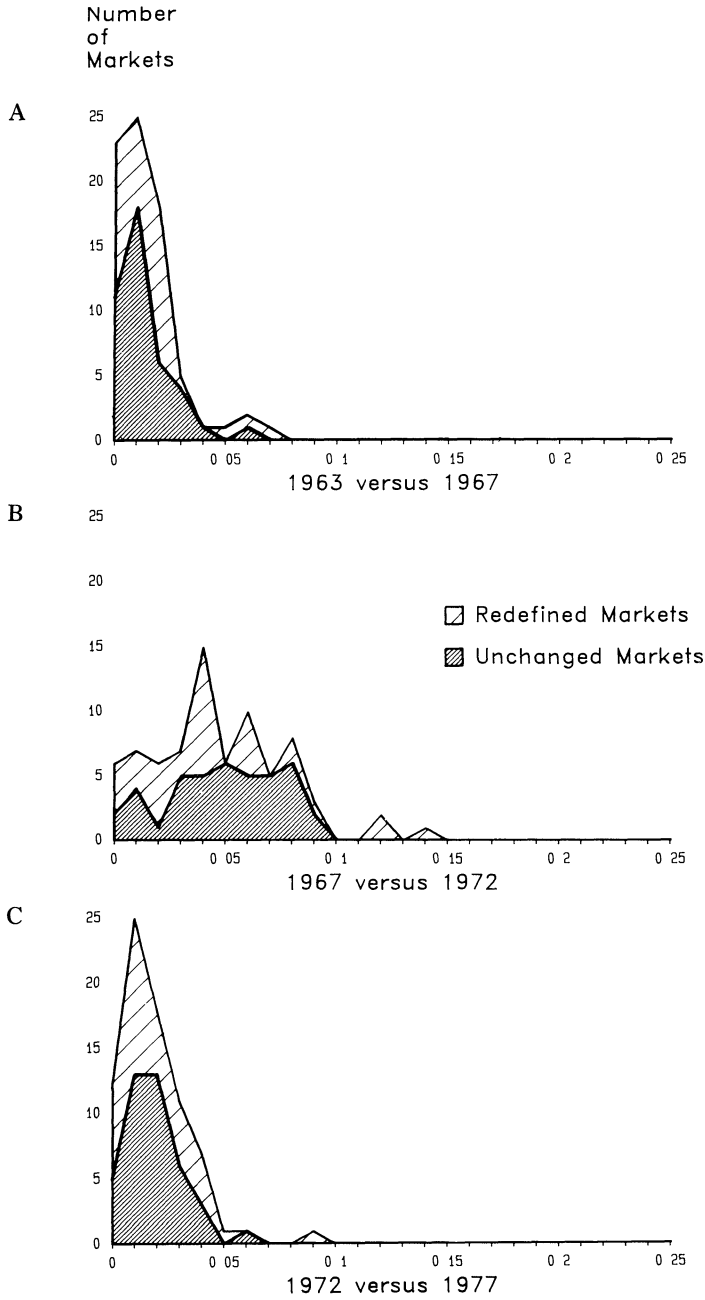

FIG. 3*A*, *B*, *C*.—Differences between proportional contributions of distances within years to market position across years.

of the differences are less than .05. In contrast, the mean difference between 1967 and 1972 is .047, more than double the earlier or the later mean.

At the same time, the graphs in figure 3 illustrate the stability of the market transaction patterns above and beyond definition changes. The horizontal axes in figure 3 equal the average contribution—one fourth—from distances in any one year to a market's position across the four years in which input-output tables were published. Compare the differences in contributions from year to year with the magnitude of the contributions. The data distributions in figure 3 are well to the left on the horizontal axes. The marginal change in contribution from year to year is small. On average, the difference between 1963 and 1967 contributions to a market's position is 5% of the 1963 contribution. The difference between 1967 and 1972 is 18% of the 1967 contribution. The difference between 1972 and 1977 is 8% of the 1972 contribution. There is change in the markets, especially in response to alterations in the Department of Commerce coding of commodities into markets. However, real change and change created artificially by coding alterations are together a small portion of the variability between market transactions observed at any one point in time.

PROFIT AND THE SOCIAL STRUCTURE OF A MARKET

Beyond structural equivalence, network concepts define the parameters of a market as constraints emergent from the structure of the transactions defining the market's boundaries. In particular, brokerage concepts elaborate the advantages of holes in social structure; the lack of connection between two parties in a social structure provides an opportunity for some third party to broker transactions between the first two. The third party is literally an entrepreneur—an individual who takes his profit from being between others. By playing the unconnected individuals off against each other, creating and taking advantage of competition between them, the entrepreneur can negotiate transaction prices to suit his or her interests.

Structural autonomy is a brokerage concept that has already proved informative in understanding corporate markets. Without going into details provided elsewhere (Burt 1982, chaps. 7, 8; Burt 1983*a*, chap. 2), structural autonomy varies with the entrpreneurial opportunities provided by an individual's position in the social structure. The more entrepreneurial opportunities—the greater in number and less interconnected the parties with whom an individual has relations—the greater the individual's structural autonomy to negotiate transactions to his own advan-

tage.[8] At the market level, there is structural autonomy within a market to the extent that there are few entrepreneurial opportunities within the market for suppliers and consumers to exploit and many such opportunities for producers to exploit. Firms operating in markets rich in entrepreneurial opportunities will be able to negotiate advantageous prices in transactions with suppliers and consumers. These advantageous prices will allow corporate budgets to expand in various ways, including the bottom line; profit margins should increase with market structural autonomy. The review and analysis presented in Burt (1983*a*) documents the association in 1967 between profits and structural autonomy within American manufacturing industries defined at the level of two-digit and four-digit SIC categories.

Measuring the Structural Autonomy within a Market

Although this study is at a more aggregate level, it extends those results over time and into nonmanufacturing sectors of the economy. The structural autonomy in each of the markets in figure 1 has been estimated for 1963, 1967, 1972, and 1977 from variations on the following basic model:

$$A = b + b_o O + b_c C + b_x X,$$

where A is a market's structural autonomy expressed as a profit margin expected from the structure of the market, b is an adjustment for means on the variables in the equation, O is a measure of market oligopoly, C is a measure of constraint on the market's entrepreneurial opportunities in its transactions with suppliers and consumers, and X is an interaction term measuring the extent to which O is high and C is low.[9] The b_o effect should be positive, reflecting the profit advantages of oligopoly in a market subject to average constraint in its transactions with suppliers and consumers. The b_c effect should be negative, reflecting the profit disad-

[8] Brokerage can be associated with several recent advances in network theory related to structural autonomy, advances concerning the extent to which certain individuals are the center of a network (Freeman 1977, 1979), position power in exchange networks (Cook and Emerson 1978; Cook et al. 1983), and network restrictions on the distribution of power in collective exchange systems (Marsden 1983).

[9] Specifically, X is the product: $(O - \overline{O})(\overline{C} - C)$, where $\overline{O}$ and $\overline{C}$ are the mean values of O and C in manufacturing. This means that the direct effects of oligopoly and constraint (b_o and b_c, respectively), describe effects at the mean of O and C in manufacturing. Throughout the analysis, interaction terms are the products of deviations from market-structure means in manufacturing because (*a*) those means lie at the center of the market-structure data for the whole economy and thus lie at a point where statements about effects can be made with the greatest confidence and (*b*) effects evaluated at those means are comparable with results in the rich literature on market-structure effects typically estimating additive effects in manufacturing sectors of the economy.

vantages in a moderately competitive market of severe constraint in transactions with suppliers and consumers. The b_x effect should be positive, reflecting the profit advantages in an oligopolistic market of having unconstrained transactions with its suppliers and consumers.

Market oligopoly, O, varies with the extent to which the number of competitors within the market is low, so that suppliers and consumers have little opportunity to exploit entrepreneurial opportunities within the market. I have measured O in 1963, 1967, 1972, and 1977 with concentration data—O varying between zero and one as the ratio of sales by the four largest firms within segments of the market over the total volume of sales. The concentration data are taken from multiple sources. The best data are available on manufacturing. For manufacturing markets, O is the weighted mean four-firm concentration ratio (CR_k) in each four-digit SIC category k within the market; $O = w_1CR4_1 + w_2CR4_2 + \ldots$, where the w_k weight is the ratio of sales from the four-digit SIC category k divided by totals sales summed across all four-digit SIC categories within the market. Sales and concentration ratios for the SIC manufacturing categories are taken from the 1963, 1967, 1972, and 1977 *Census of Manufactures* published by the Department of Commerce. The weighted concentration ratios are summed across all four-digit SIC categories assigned to the market in the listing published with each input-output table in the *Survey of Current Business*. The Department of Commerce publishes census data on selected nonmanufacturing sectors, but comparable concentration data are not available for all nonmanufacturing markets considered here. Concentration ratios in nonmanufacturing have been approximated with sales data published in *News Front* compilations of the largest firms operating in four-digit SIC categories (see Burt 1986, p. 15, for details).

Supplier and consumer constraint, C, varies inversely with the extent to which a market's suppliers and consumers are spread across many unconnected markets that contain many competitors. The weaker the connections among a market's suppliers and consumers, the more entrepreneurial opportunities are available to firms operating in the market. I have measured C in 1963, 1967, 1972, and 1977 as the sum of transaction-specific constraints on the market using the following index defined for market j (see Burt 1983*a*, pp. 37–43): $C_j = c_{j1} + c_{j2} + \ldots + c_{j77}$, where c_{jk} varies from zero to one measuring the extent to which there are no entrepreneurial opportunities for market j in transactions with market k; $c_{jk} = (p_{jk})^2O_k$, where O_k is the concentration ratio measuring the lack of competitors within market k and $(p_{jk})^2$ measures the extent to which market j firms cannot avoid market k in their transactions with suppliers and consumers, p_{jk} equaling the proportion of market j buying and sell-

ing with suppliers and consumers that directly or indirectly involves market k.[10]

The transaction-specific constraint, c_{jk}, increases with the extent to which producers in market j have few opportunities to take advantage of competition among their suppliers and consumers, and with the lack of competition within supplier/consumer market k, indicated by concentration within the market. It also increases with the extent to which market k is directly or indirectly involved in all producer market j transactions with suppliers and consumers. This high resource dependence makes it difficult for producers to avoid the disadvantageous prices that the large dominant firms in market k can negotiate and facilitates coordination among their suppliers and consumers. Further, the producers suffer from a lack of other supplier/consumer markets in which they can cover the cost of disadvantageous prices in their transactions with market k firms.

As defined, C measures only market constraint posed by suppliers and consumers among the 77 nongovernment production markets distinguished in the aggregate input-output table. Adjustments for constraint in transactions with the government will be considered in the analysis by measuring the proportion of each market's output purchased by three classes of government organizations: government business establishments (e.g., Post Office, federal electric utilities), federal government agencies (e.g., defense and welfare), and state and local government agencies (e.g., police, fire, education).

Estimating Structural Autonomy Effects across the Markets

I have estimated effects in a restricted multivariate regression model predicting multiple indicators of market profit. The structural autonomy effects can be obtained from a canonical correlation model in which canonical variates, usually standardized, are expressed in the metric of profit margins. The schematic representation of the covariance model in

[10] Specifically, the proportion $p_{jk} = p^*_{jk} + \Sigma_q p^*_{jq} p^*_{qk}$, $j \neq q \neq k$, where the summation term identifies transactions that occur with supplier and consumer markets that are in turn dependent on transactions with market k, and p^*_{jk} is the proportion of market j buying and selling with suppliers and consumers that takes place directly with market k: $p^*_{jk} = (z_{jk} + z_{kj})/\Sigma_q(z_{jq} + z_{qj})$, $j \neq q$, where z_{jk} is the dollars of commodity sold to market k from market j reported in an input-output table and summation is across all 77 nongovernment production sectors in the table. The network-constraint index, C, and transaction-specific constraint data, c_{jk}, have been obtained with the general purpose network-analysis program STRUCTURE. See n. 1 for information on how interested readers can obtain the input data used to generate the constraint data for alternative analyses.

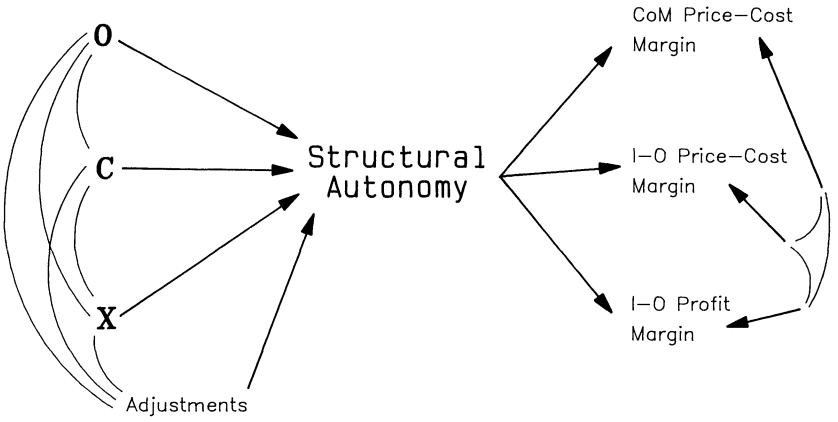

FIG. 4.—Aggregating market-structure effects across profit indicators. Structural autonomy variance equals the predicted variance in profit margins.

figure 4 should help communicate the results. In the diagram, the three structural autonomy components—*O*, *C*, and *X*, with adjustments—jointly define a canonical variate measuring the structural autonomy in a market. Effects are estimated to maximize the correlation between structural autonomy and the multiple profit indicators. The maximized correlation is a canonical correlation, and its squared value is analogous to the R^2 in a multiple regression model (e.g., Jöreskog and Goldberger 1975). Juxtaposing the familiar price-cost margin in manufacturing with the less familiar input-output table profit indicators available for all markets makes it possible to check the similarity between market-structure effects for the two kinds of indicators, clearly linking the results of this analysis with previous market-structure research.

Three profit indicators are specified in figure 4. The first is Collins and Preston's (1969) price-cost margin computed from *Census of Manufactures* data (CoM Price-Cost Margin in fig. 4). This is a popular dependent variable used by economists in market-structure research. The price-cost margin, a ratio of net income to total income, is computed as value added minus labor costs, quantity divided by total sales. Margins have been computed for four-digit SIC categories from data in the 1963, 1967, 1972, and 1977 *Census of Manufactures*. The four-digit SIC category margins have been aggregated to the level of input-output sectors as weighted averages in the same way that the *Census of Manufactures* concentration ratios were aggregated earlier in this article. Note that this indicator is only available for manufacturing markets. The second profit indicator in figure 4 is also a price-cost margin, but it is computed directly from data

in the input-output table (I-O Price-Cost Margin in fig. 4).[11] It is available at the market level of aggregation and so requires no averaging across SIC categories within the market. It is similarly defined for manufacturing and nonmanufacturing markets, providing a profit indicator with which to estimate market-structure effects throughout the economy. It is more accurately adjusted for production and distribution costs, some of which, such as advertising and entertainment, are included as net income in *Census of Manufactures* price-cost margins. The third profit indicator is the most conservative, adding indirect business taxes to the costs subtracted from gross receipts, to define net income. It is the ratio of "property-type income" over total sales.

As might be expected from the successive deductions from net income, the three profit indicators indicate successively smaller profit margins. *Census of Manufactures* price-cost margins average .268 over time, a profit of 27 cents on each dollar of sales. Corresponding input-output price-cost margins average .123, and input-output profit margins in manufacturing average a slightly lower .106 over time.

Although suggesting different levels of profit, all three indicators are strongly correlated with market structure. In table 1, I present results on the profit side of the covariance model in figure 4. Results from 10 models are presented; five models applied to manufacturing markets and five applied to all markets. The manufacturing results are presented for comparison with previous research. Within each set of five models, four describe effects within a specific year and one describes effects pooled across years. The pooled results are based on variables averaged across the four cross sections.[12]

The magnitude of association between profit and market structure is indicated by the canonical correlations in table 1. The correlations vary between .59 and .73 across the models. In other words, the market-structure variables under consideration describe one-third to one-half the

[11] The aggregate input-output tables published for 1967, 1972, and 1977 contain data on the components of value added needed to compute profit margins. The total sales figure used to compute profit margins is published at the bottom of columns in the tables (which need not equal the row totals in the 1972 and 1977 tables). The needed data are not presented with the 1963 input-output table, but are available on p. 36 in a table published in the April 1973 *Survey of Current Business*.

[12] The cross sections are averaged over time because autocorrelation is so high that there is little efficiency gained by treating the four observations on each market as partially independent observations in a generalized least-squares estimation of effects. Alternative strategies for pooling cross sections in a panel study are nicely laid out by Hannan and Young (1977) and Berk et al. (1979) with references to textbook treatments of the topic in the econometrics literature. Still, as will be discussed shortly, I have preserved distinctions among the four observations on each market in order to test for change in effects over time.

TABLE 1

PROFIT INDICATORS

	1963	1967	1972	1977	Pooled
Profit in manufacturing:					
Number of markets	51	51	51	51	51
Mean I-O profit margin	9.6	10.6	10.2	11.9	10.6
SD	5.1	3.9	5.3	4.3	4.1
Canonical correlation	.650	.659	.691	.594	.683
Correlations with structural autonomy:					
CoM price-cost margin	.418	.533	.312	.428	.350
I-O price-cost margin	.643	.620	.626	.586	.631
I-O profit margin	.475	.565	.582	.494	.568
Profit in all markets:					
Number of markets	76	76	77	77	77
Mean I-O profit margin	13.8	14.7	14.1	15.8	14.5
SD	10.2	10.0	10.5	10.1	9.9
Canonical correlation	.722	.728	.698	.687	.713
Correlations with structural autonomy:					
CoM price-cost margin	N.A.	N.A.	N.A.	N.A.	N.A.
I-O price-cost margin	.722	.727	.696	.669	.712
I-O profit margin	.681	.698	.640	.613	.667

NOTE.—These results describe the profit side of the covariance model specified in fig. 4, relating profit-margin indicators to market-structure variables. As described in the text, CoM price-cost margins are computed from *Census of Manufactures* data, and I-O profit indicators are computed from the *Survey of Current Business* input-output tables. The *Census of Manufactures* price-cost margins are not available (N.A.) in all markets. Pooled results are based on variables averaged across the four cross sections (except the data on eating and drinking places, which are averaged across the two 1970s cross sections in which such establishments are distinguished as a separate market).

variation in market profit margins. Routine procedures for statistical inference clearly reject the null hypothesis of no market-structure effect. For example, the comparatively weak canonical correlations of .59 and .69 observed in 1977 generate χ^2 statistics of 45.5 (with 18 *df*) for manufacturing and 52.2 (with 20 *df*) for all markets, both of which give much less than a .001 probability to the null hypothesis.[13]

Second, note the correlations between structural autonomy and each profit indicator. An indicator's correlation is high to the extent that it is strongly associated with the market-structure variables. Three indicators are available in manufacturing. The correlations in the top half of table 1 show that the input-output indicators are at this level of aggregation as

[13] Within manufacturing there is additional covariation between profits and market structure in the 1970s not represented by structural autonomy, but it seems tangential to this analysis (Burt 1986, p. 20n). If one expands beyond manufacturing to all markets, only the *Survey of Current Business* indicators are available, and all second canonical correlations are negligible.

good as or superior to the popular *Census of Manufactures* price-cost margin at each time period. The two input-output table profit indicators are available for all markets. The strong, nearly equivalent, correlations at the bottom of table 1 show that both variables are good profit indicators for estimating market-structure effects. Similar patterns of results are obtained with multiple regression models predicting each profit indicator individually.

Table 2 presents results on the market-structure side of the covariance model in figure 4. The eight models correspond to the models in table 1. As indicated in figure 4, the canonical variate measuring structural autonomy has been scaled with the mean and standard deviation of the most conservative profit indicator, the input-output table profit margin. Without restricting the correlations between structural autonomy and the profit indicators, the 1.0 path from structural autonomy to the input-output profit margin in figure 4 defines the variance in structural autonomy to be the predicted variance in profit margins. The effects in table 2 have the metric of coefficients in a regression equation predicting profit margins.

Statistical tests are presented for effects over time on profit as a linear composite of the multiple profit indicators. The linear composite dependent variable is the canonical variate for the profit indicators corresponding to the canonical variate for structural autonomy in figure 4; however, the tested effects have been estimated from the pooled cross sections without averaging the four observations on each market. Instead, each equation includes dummy variables controlling for conspicuous autocorrelation within markets.[14] Although the dummy variables are

[14] After market-structure effects are removed, 88% of the residual variance in *Census of Manufactures* price-cost margins can be attributed to autocorrelation. Similarly high proportions of the residual variance in the *Survey of Current Business* input-output table price-cost margins (88%) and profit margins (84%) can be attributed to autocorrelation. These proportions were obtained, and conspicuous autocorrelation identified, by regressing each profit indicator over the relevant market-structure variables in the pooled cross sections: 204 observations on manufacturing markets and 306 observations on all markets. The six market-structure variables for manufacturing in table 2 were used to predict *Census of Manufactures* price-cost margins, and all market variables in table 2 were used to predict the input-output table profit indicators. The residuals from each prediction were then regressed over dummy variables distinguishing each market. The squared multiple correlations in these predictions measure autocorrelation in profits above and beyond that expected from the market-structure variables: .884 for *Census of Manufactures* price-cost margins, .879 for input-output table price-cost margins, and .838 for input-output table profit margins. The effect of the dummy variable for a market measures the extent to which profit in the market was consistently above or below the level expected from the market's structure. The test statistics in table 2 are adjusted with dummy variables for each of the 59 markets for which the autocorrelation effect in one or more of the equations was two or more times its standard error.

TABLE 2

STRUCTURAL AUTONOMY EFFECTS

	MANUFACTURING					ALL MARKETS				
	1963	1967	1972	1977	Pooled	1963	1967	1972	1977	Pooled
Number of markets	51	51	51	51	51	76	76	77	77	77
R^2	.432	.434	.479	.351	.467	.521	.530	.488	.472	.509
Main components:										
Concentration (O)	.133	.076	.139	.086	.087	.134	.078	.147	.103	.114
	.468	.337	.444	.333	.359	.325	.192	.358	.245	.287
					(3.5)					(2.1)
Supplier/consumer constraint (C)	.610	.567	.587	.398	.508	.776	.718	.549	.416	.600
	−.341	−.406	−.339	−.370	−.371	−.371	−.325	−.268	−.219	−.219
					(−5.7)					(−3.4)
Interaction (X)	3.362	2.617	1.812	2.528	2.412	3.620	3.464	2.731	4.707	3.678
	.357	.296	.147	.247	.251	.526	.452	.517	.916	.583
					(1.8)					(1.3)
Level and slope adjustments for nonmanufacturing:										
Nonmanufacturing dummy variable						.165	.160	.148	.150	.154
						.767	.758	.670	.672	.746
										(6.2)

Concentration						−.029	.023	−.043	.001	.002
						−.057	.046	−.089	.002	.005
										(−.3)
Constraint						.317	.175	.221	−.201	.110
						.135	.068	.095	−.086	.047
										(.5)
Interaction						−3.338	−3.224	−2.631	−5.147	−3.577
						−.458	−.404	−.491	−.987	−.552
										(−2.0)
Public sector adjustments:										
Trade with government enterprises	4.360	3.638	.157	−.091	−.101	−.278	−.278	−.519	−.465	−.452
	.176	.218	.014	−.011	−.008	−.063	−.068	−.057	−.054	−.073
					(1.8)					(−.3)
Sales to federal government	−.123	−.126	−.348	−.236	−.261	−.208	−.274	−.299	−.307	−.270
	−.227	−.247	−.531	−.337	−.493	−.249	−.298	−.335	−.270	−.297
					(.1)					(−4.2)
Sales to state and local government	.125	.377	−.063	.344	.052	−.496	−.529	−.370	−.696	−.497
	.041	.167	−.029	.196	.025	−.173	−.210	−.139	−.228	−.182
					(1.4)					(−7.6)

NOTE.—Corresponding to the profit results in table 1, these results describe the market-structure side of the covariance model specified in fig. 4. Effects are scaled in the metric of input-output profit margins (see table 1 for means and SDs), and the R^2s are squared values of the canonical correlations in table 1. Metric effects are above with standardized effects below. Routine t-tests for ordinary least-squares effects over time with dummy variables controlling for autocorrelation are given in parentheses with the pooled results (see n. 14). The tests have 157 df in manufacturing, 236 across all markets.

a severe control, in the sense of attributing some portion of cross-sectional market-structure effect to autocorrelation, I present these tests because they are a popular practical method of ruling out autocorrelation effects. There are 51 manufacturing markets observed four times to provide 204 observations for the test statistics. There are 77 markets throughout the economy, all but one of which (restaurants; see n. 4) is observed four times providing 306 observations for the test statistics. Routine statistical inference is awkward here because the data are population data instead of sample data. However, routine test statistics provide a useful guide for judging the relative magnitude of effects and are presented to provide no more than that. Alternative F-tests distinguishing each year and aggregate t-tests yield the same conclusions (Burt 1986, pp. 21 ff.).

Note the lack of significant changes in market-structure effects during the two decades. This is apparent to some extent in the comparison of the magnitudes of effects over time in table 2. More explicitly, tests for change over time are negligible. If we begin with trends, average profit margins increase over time in table 1. The significance of this increase—above and beyond changes in market structure—can be tested by adding the year in which a market is observed to the market-structure variables predicting profit in the pooled cross sections. The F-test for trends in manufacturing is 1.35 with 3 and 194 df ($P = .26$), and the test for trends across all markets is 0.64 with 2 and 293 df ($P = .53$). Similarly negligible results are obtained for nonlinear differences in the level of profit margins over time, yielding F-tests of 1.30 in manufacturing ($P = .23$) and 0.51 across all markets ($P = .80$). Tests for changes in the slopes of the market-structure effects are also negligible, with the strongest giving a .46 probability to the null hypothesis of no change over time. Furthermore, it should be noted that these negligible test statistics overstate the significance of the effects they test. They are based on the assumption that each of the four observations on a market is independent. However, the strength of autocorrelation effects in these data shows that multiple observations on a single market are not independent, so change over time is even more trivial than these negligible test statistics imply.

Stability in Market Inequalities

The documented stability in transaction patterns and structural autonomy effects come together to define stable inequalities among American markets. This is displayed in figure 5 for relative levels of structural autonomy within the markets. In the figure, markets are arranged from left to right in order of increasing structural autonomy. Within the data, the solid line snaking from the lower left to the upper right describes the average level of structural autonomy provided within each market over

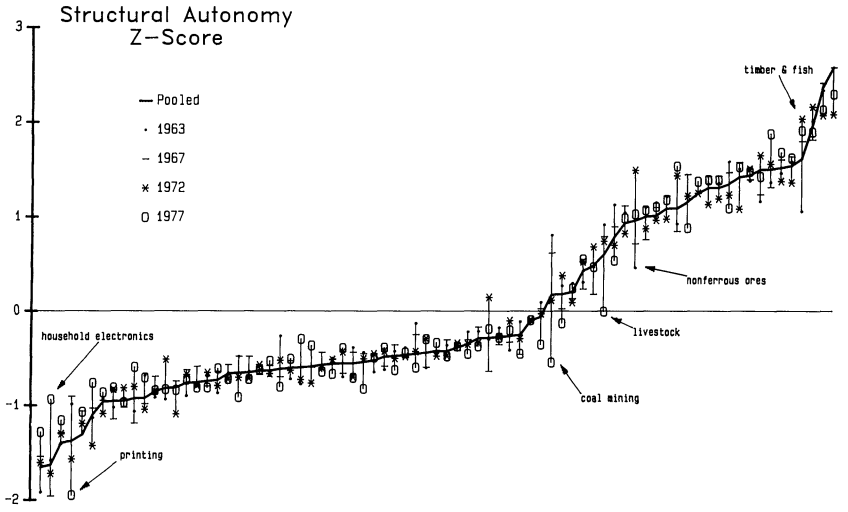

FIG. 5.—Stability in market inequalities. Markets are ranked in order of their average structural autonomy over time.

time. This is the market profit margin predicted by the equation in table 2 for all 77 markets pooled over time. Scores are expressed as z-scores to provide a clear sense of relative autonomy at each time period.

In terms of the popular contrast between center and periphery (e.g., Averitt 1968; Tolbert, Horan, and Beck 1980), the markets to the left in figure 5 are peripheral sectors of the American economy. Structural autonomy was at a minimum in these markets, meaning that there were many small competitors within each market and a high proportion of buying and selling was transacted with a small number of supplier or consumer markets that were dominated by a few large firms. The opportunities for entrepreneurial action in these markets were few, making profit margins tight. An example is the market for manufacturing stereos, telephones, televisions, and radios (not to be confused with the retail market or with Japanese producers). This market, which is identified as household electronics, appears at the far left of figure 5, with a -1.6 z-score describing the relative structural autonomy within the market during the 1960s and 1970s. Firms in this market survived during the two decades on an average profit margin of 5.8 cents, emerging with an average profit in 1977 of 4.8 cents on each dollar of sales.

The markets at the far right of figure 5 existed at the center of the economy, providing the greatest structural autonomy of all American markets. Here a small number of large competitors transacted business with many small, disorganized consumers and suppliers. The opportuni-

ties for entrepreneurial action in these markets were many, so prices could be negotiated to provide comfortable profit margins. For example, the communications market (excluding radio and television broadcasting) appears on the far right of figure 5, with a 2.6 z-score describing the market's relative structural autonomy during the 1960s and 1970s. Firms in the communications market emerged from the two decades with an average profit in 1977 of 34.8 cents on each dollar of sales. This is the conservative input-output table estimate of the market's profit margin. The market's price-cost margin in the 1977 input-output table is a lush 45.3 cents on each dollar of sales.

Vertical lines in figure 5 indicate variation over time. The lines connect the relative levels of structural autonomy provided within each market in 1963, 1967, 1972, and 1977. Long lines indicate markets in which structural autonomy rose and fell most noticeably over the two decades. Short lines indicate markets in which the relative structural autonomy provided at one point in time was the same provided throughout the two decades. For example, the market for mining nonferrous metal ores was one of the least stable markets and is identified by name in figure 5. Over time, the structural autonomy provided within this market was above average (1.0 z-score). However, autonomy within the market increased sharply during the 1960s and early 1970s and dropped again in 1977. The autonomy z-scores vary from 0.5 in 1963, to 0.7 in 1967, to 1.5 in 1972, and back down to 1.0 in 1977. The vertical line connecting these levels is one of the longest in figure 5.

I wish to note three points concerning figure 5. First, and most important, the figure shows how little variation occurred within markets relative to the variation that occurred between markets. The vertical lines are short in comparison with the differences between maximum and minimum structural autonomy. Of the total variance within and between years shown in figure 5, 95.5% is described by variance between markets over time. In other words, the solid line of data in figure 5 is a good summary of all the data in the figure. On average, the relative level of structural autonomy within a market at the beginning of the 1960s is a good indicator of the relative level available at the end of the 1970s.

Second, changes that did occur are randomly distributed across levels of structural autonomy. Before seeing these data, one could have made a reasonable argument for a positive or a negative association between autonomy and market stability. On one hand, in markets providing high autonomy, dominant firms could be expected to control prices, ensuring stable profits and making it difficult for new producers to enter the market. On the other, the high profit margins available in markets providing high autonomy would have encouraged special efforts by new entrants, and these would have made the market unstable. Neither argument is

true. Stability has no association with structural autonomy. There is a .107 correlation (0.9 *t*-test) between the level of structural autonomy within a market over time (the pooled scores in fig. 5) and the maximum difference between relative levels of autonomy within the market over time (the length of a vertical line in fig. 5). Inspection of the graph between these two variables shows no systematic pattern.

Third, there are a few exceptions to the general tendency toward stability. A histogram of the vertical line lengths in figure 5 shows that most of the markets are clustered around an average of .38 (Burt 1986, fig. 6). However, the distribution is skewed, with six markets' outliers in the direction of instability (0.9 or larger *z*-score changes). These are identified in figure 5 from left to right as the markets for: (*a*) household electronics, (*b*) printing, (*c*) coal mining, (*d*) livestock, (*e*) nonferrous ores, and (*f*) timber and commercial fishing. Instability in these outlier markets cannot be attributed to the Department of Commerce's redefinitions of commodity categories between 1967 and 1972. Three of the markets were affected by potentially significant redefinitions, but the other three were not, and structural autonomy within redefined markets was no less stable than it was within unchanged markets (0.7 *t*-test).

The data in figure 5 provide some indication—by the length of vertical lines between adjacent years—of *when* the outlier markets were unstable. The results in table 3 provide some indication of *how* they were unstable. The table contains proportions of variance in market measures that occurred within markets over time. Variance is reported separately for the 71 stable markets and the six outlier markets. Note how little variation occurred over time within the stable markets. Trade with government establishments and the product of market concentration and constraint,

TABLE 3

PROPORTION OF VARIATION OCCURRING OVER TIME WITHIN MARKETS

	Stable Markets	Outlier Markets
Number of markets	71	6
Observations	282	24
Structural autonomy	.044	.104
I-O price-cost margin	.052	.206
I-O profit margin	.079	.187
Concentration	.027	.051
Supplier/consumer constraint	.093	.080
Interaction	.167	.147
Trade with government establishments	.279	.065
Sales to federal government	.020	.222
Sales to state and local government	.059	.281

variable X, are the most unsteady, but the results in table 2 show that these are minor components in structural autonomy. Over 90% of the variation in every other variable occurred between markets rather than over time within markets. In fact, the 9.3% variation over time in supplier/consumer constraint is disproportionately increased by a single observation. Concentration within crude petroleum and natural gas production increased in 1977, and thus greatly increased supplier constraint on the petroleum-refining market. Apart from this one market in one year, 93.2% of the variation in supplier/consumer constraint occurred between markets, leaving only 6.8% occurring over time.

The stability of relative structural autonomy is the key issue at hand. Of all the variance observed in structural autonomy over time and across the 71 stable markets, 95.6% occurred between markets and 4.4% occurred over time. In contrast, 10.4% of the variance in structural autonomy within the six outlier markets occurred over time. The market variables responsible for the instability of structural autonomy within the outlier markets will have this same pattern of low variation over time within stable markets and high variation over time within the outlier markets. Thus, profit and sales to government agencies seem to have been most responsible for the instability of the outlier markets. In comparison, market concentration and constraint do not differ greatly between the stable and outlier markets. Of the variance in market concentration, 5.1% occurred over time in outlier markets and 2.7% in stable markets. Of the variance in supplier/consumer constraint, 8.0% occurred over time in the outlier markets and 9.3% in stable markets. In other words, these two fundamental components of structural autonomy were stable even within the outlier markets.

CONSTRAINED TRANSACTIONS AND THE PARAMETERS OF A MARKET

Results presented thus far describe the level of structural autonomy provided by the whole pattern of transactions that defined a market. This is merely a sum of contributions from transactions with each consumer and supplier market (see my definition of constraint in the section on measuring structural autonomy), so it is a simple matter to disaggregate autonomy into its transaction-specific components. My principal motivation for using models such as figure 4 to describe the association between structural autonomy and profit differences between markets is to move to the next level of analysis—transactions between specific pairs of markets. It is at this level that the network concept of structural autonomy defines the parameters of a market that in turn define the form of organizations optimally structured to thrive in the market.

Transaction-specific constraint has already been introduced, with the variable c_{jk} measuring the extent to which transactions between markets j and k posed a constraint for the structural autonomy of the firms producing the commodity sold in market j. As introduced, c_{jk} varies from zero to one with the extent to which there were few entrepreneurial opportunities for producers to negotiate favorable prices in their transactions with supplier/consumer market k. External constraint on the market and concentration within the market jointly determine a_{jk}, the contribution that transactions with market k made to structural autonomy within market j, which is to say, a portion of the market j profit margin that can be attributed to transactions with suppliers and consumers in market k. As c_{jk} increases, indicating constrained transactions with market k, a_{jk} becomes more negative, indicating the meager profit that can be squeezed out of the transactions.[15] These are the parameters of market j in the sense that they are the transactions with critical supplier and consumer markets that must be managed by any firm hoping to thrive from producing commodity j. From a population ecology perspective, management of these vital transactions is a fundamental class of competence elements (comps) for an organizational form's survival in the market (McKelvey 1982; McKelvey and Aldrich 1983; Aldrich 1986, chap. 3). From a resource-dependence or transaction-cost perspective, these parameters identify classes of transactions to be conducted within a corporate hierarchy rather than in the open market (Williamson 1975, 1981; Pfeffer and

[15] More specifically, a_{jk} decreases with increasing c_{jk} at a rate that varies (because of the interaction term X) with the level of concentration in market j. The greater the concentration is, the faster a_{jk} decreases with increasing c_{jk}. There is more profit to lose when a concentrated market's transactions with suppliers and consumers are constrained. At the other extreme, having an oligopolistic supplier or consumer can increase the meager profit margin typical of an extremely competitive market, lending some stability to supplier or consumer transactions. Formally, a_{jk} is the contribution that transactions between markets j and k make to structural autonomy within market j (and can be studied as the partial derivative of market profit with respect to transactions with supplier/consumer k [Burt 1983*a*, pp. 48–54]). This contribution can be written as a transformation of the transaction-specific component in the equations defining A in the text: $a_{jk} = [b_c + b_x(\overline{O} - O)]c_{jk}$, where $\overline{O}$ is the mean concentration ratio in manufacturing. The structural autonomy effects b_o and b_x are respectively negative and positive, determining with market j concentration the sign of a_{jk}. For markets more concentrated than the average manufacturing market, $b_x(\overline{O} - O)$ is negative, making the direct negative effect of constraint, b_c, even more negative, reflecting lost oligopoly profit. For less concentrated markets, the term $b_x(\overline{O} - O)$ can be sufficiently positive to eliminate the direct negative effect of constraint. Weights have been computed from the effects in table 2 estimated across all markets for each year. Almost all are negative, ranging from -2.8538 to 0.8676 across the 77 markets and four time periods.

Salancik 1978; Burt 1983*a*). I will return to the link between market parameters and corporate structure in my concluding comments.

Correlations among market parameters in 1963, 1967, 1972, and 1977 are presented in table 4. The correlations have been computed across the 5,852 transactions between each pair of markets as supplier and consumer (minus 152 in 1963 and 1967 for the then-undefined restaurant market; see n. 4). The correlations in table 4 show that the level of constraint in a class of transactions in any one time period is highly correlated with the constraint in those transactions throughout the 1960s and 1970s. A single principal component can describe 94.2% of the covariation among raw market constraints (the c_{jk} at the top of table 4), 83.1% of the covariation among market constraints keyed to profit margins (the a_{jk} in the middle of table 4), and 86.0% of the covariation among absolute values of market constraints keyed to profit margins (the $|a_{jk}|$ at the bottom of table 4).

The stability across markets evident in table 4 is not equally evident within markets. For example, the least stable transition occurred between 1972 and 1977 in market constraints keyed to profit margins. The a_{jk} in 1963 and 1967 are correlated .948 in table 4. The correlation between 1967 and 1972 is slightly lower, .918, and drops to .732 between 1972 and 1977. This drop is not created by slightly lower stability in all markets but by a dramatic change in the constraints on certain markets.

TABLE 4

CORRELATIONS AMONG TRANSACTION-SPECIFIC MARKET CONSTRAINTS

	SD	1963	1967	1972	1977
Number of transactions		5,700	5,700	5,852	5,852
c_{jk}:					
1963	.00715	1.00			
1967	.00660	.973	1.00		
1972	.00721	.891	.937	1.00	
1977	.00749	.868	.915	.954	1.00
a_{jk}:					
1963	.00453	1.00			
1967	.00432	.948	1.00		
1972	.00329	.847	.918	1.00	
1977	.00273	.582	.585	.732	1.00
$\|a_{jk}\|$:					
1963	.00453	1.00			
1967	.00432	.952	1.00		
1972	.00329	.861	.919	1.00	
1977	.00272	.664	.668	.795	1.00

Evidence for this conclusion is presented in figure 6. Correlations between market constraints in 1972 and 1977 have been computed for each market separately. The 77 correlations distributed in figure 6*a* are components in the .954 correlation in table 4 between the c_{jk} across all markets in 1972 and 1977. Note the sharply skewed distribution. In 21 markets, raw market constraints have a perfect 1.00 correlation between 1972 and 1977. There is a .99 correlation between raw constraints in another 11 markets. It is clear from the distribution in figure 6*a* that the high (.954) correlation in table 4 between all c_{jk} in 1972 and 1977, by and large, occurs within each market. Further, the similarity between the dark and light striped areas in the graph shows that there is high stability both in the constraints on markets affected by one or more of the potentially significant Department of Commerce redefinitions of commodity categories and in the constraints on unchanged markets.

The graph in figure 6*b* presents a different picture. The constraints on certain markets are completely reversed between 1972 and 1977, whereas the constraints on most markets are completely stable. This is true of both redefined and unchanged markets. In other words, the .732 correlation in table 4 between a_{jk} in 1972 and 1977 across markets obscures a bimodal distribution of correlations within markets, correlations either extremely positive or extremely negative. The transition between 1972 and 1977 contains the largest number of negative correlations within markets, but negative correlations between the a_{jk} are also produced in the transitions from 1963 to 1967 and 1967 to 1972.

The negative correlations in figure 6 occur when raw constraints are expressed in terms of market-structure effects on profit margins. This adds variability over time in market-structure effects to any existing variability over time in market constraint. More specifically, the a_{jk} are adjusted for the indirect effect of market concentration in interaction with supplier/consumer constraint (the variable X in fig. 4 and table 2). Where concentration was sufficiently below average and the direct effect of market constraint was low, the weight transforming c_{jk} into a_{jk} could be positive (n. 15). The small, negative contributions to profit margins traced to raw market constraint in one year become positive in the next year if the weight changes from negative to positive. This is why I have presented results for the absolute value of the a_{jk}. In table 4, the $|a_{jk}|$ are slightly more strongly correlated than the a_{jk} across all markets, and all negative correlations between a_{jk} in figure 6*b* are positive correlations between $|a_{jk}|$ in the bottom graph. The distribution of correlations between the $|a_{jk}|$ in figure 6*c* looks like the distribution of correlations between raw constraints in 6*a*. In other words, instability in market constraints expressed as contributions to profit margins lies in the direction, not the magnitude, of the contributions.

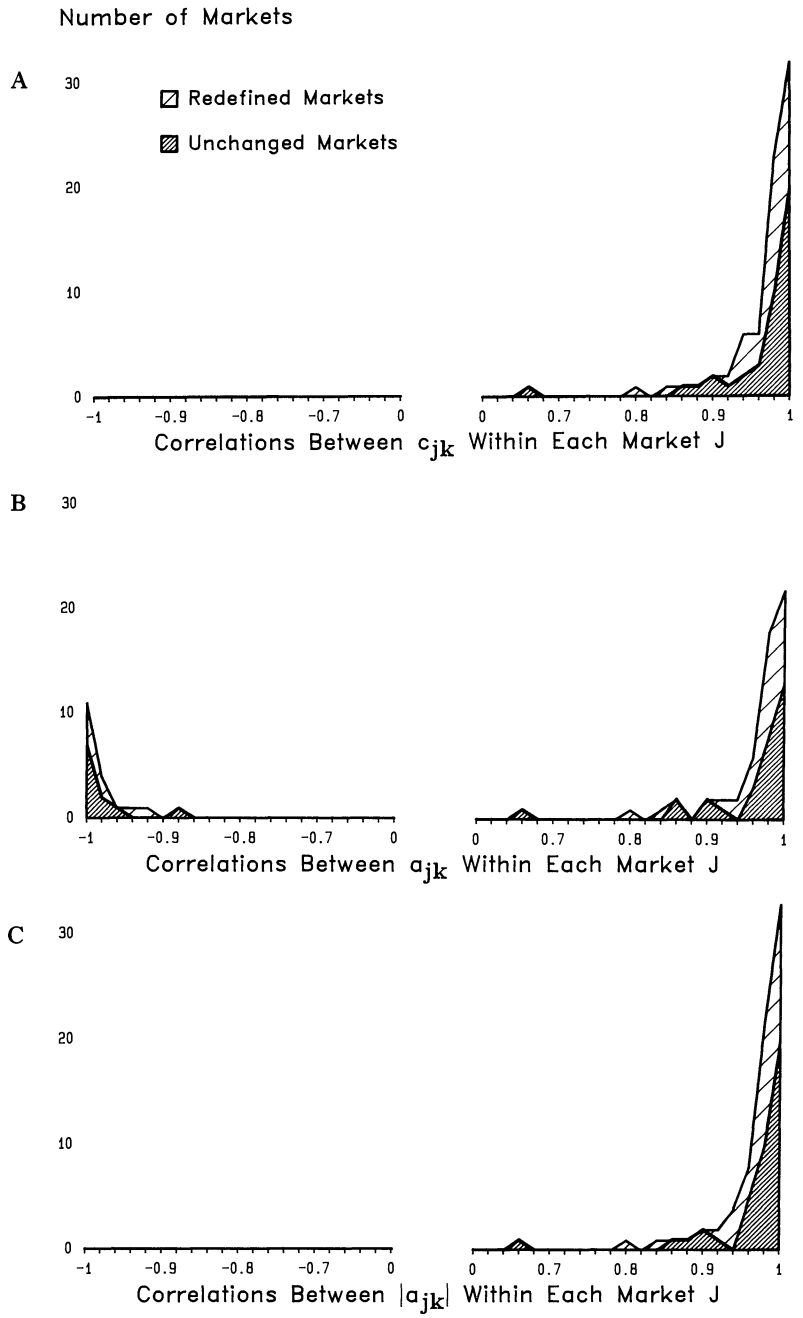

FIG. 6*A*, *B*, *C*.—Correlations between market constraints in 1972 and 1977

The distributions in figure 6 provide a more accurate sense of constraint stability than the results in table 4, but both obscure an important quality of these data: market constraint is concentrated in a small proportion of all transactions. The typical pair of markets either conducted no trade with each other or posed negligible constraint for each other's profits. The few transactions in which constraint is detectable tend to be outliers in the general distribution of market constraints.

However, frequency tables of turnover between categories of market constraint corroborate the reported evidence of stability (see Burt 1986, pp. 34–36, for details). A turnover table was defined by dichotomizing transactions into those posing negligible constraint and those posing detectable constraint. Of the 5,700 transactions for which information was available across all four time periods, 5,094 were never constrained and 332 were always constrained. In other words, 95.2% of the dichotomous market constraints did not change during the two decades. These stable market relations dominate the table, clearly rejecting any hypothesis of independence over time. Constraint in each time period can only be described as contingent on constraint in all preceding time periods. It is inaccurate to say that constraint in one time period is contingent only on the immediately preceding time period or even that it is contingent only on the two preceding time periods. This stability is less striking without the consistently negligible constraints. Constraint is still contingent between adjacent time periods; however, minor changes from time period to time period during the two decades cumulated to the point at which dichotomous market constraint in 1977 can be treated as if it were independent of constraint in 1963. However, changes occurred only at the lowest levels of market constraint. No market constraint of .015 or more at any time was negligible at any other time, and almost no constraints greater than .002 were negligible in the next time period.

CONCLUSIONS, CAUTIONS, AND SOME IMPLICATIONS FOR ORGANIZATION RESEARCH

Focusing on the market side of the mutually defining relationship between markets and corporations, I have begun to answer a critical question more often than not ignored in organization research: To what extent did the social structure of production relations determining resource dependence in American markets change during the 1960s and 1970s to limit the generalizability of cross-sectional evidence of the market forces shaping organizations?

I began with the 77 commodities distinguished in the aggregate input-output tables for the American economy published by the Department of Commerce's Bureau of Economic Analysis for 1963, 1967, 1972, and

1977. I showed how transactions with suppliers and consumers defined a distinguishable market for each commodity, and I described the stability of the boundaries between markets; the suppliers and consumers important to each market in the early 1960s were usually the same in the late 1970s. Change is observed, but it is slight and much of it can be attributed to Department of Commerce changes between 1967 and 1972 in the conventions for assigning commodities to market categories.

I next described the continuing profit inequalities created by differences in the social structure of the markets. The association, previously established with 1967 data, between market structure and profit margins within manufacturing generalizes to all sectors of the economy throughout the 1960s and 1970s. No significant adjustments to effects have to be made for the specific year in which effects are estimated. Across all markets over time, profits increased significantly with market concentration and decreased significantly with constraint on a market's transactions with suppliers and consumers. Although market-structure effects are slightly weaker in nonmanufacturing, no significant slope adjustments are required to describe the positive effect throughout the economy of market concentration or the negative effect of constrained transactions with suppliers and consumers. I then showed how the stability in transaction patterns and the stable structural autonomy effects were jointly responsible for stable profit inequalities among American markets. Ranging from the center of the economy to its periphery, the relative level of structural autonomy within a market at the beginning of the 1960s is a good indicator of the relative level at the end of the 1970s.

Shifting to the transaction-specific parameters of each market, I closed with a description of the constraints posed for firms in each market by their most important supplier and consumer transactions. Even at this level of detail, stability is the rule. Supplier and consumer markets that posed a negligible constraint on profit in any period in the 1960s and 1970s tended to pose negligible constraint throughout the two decades. Classes of supplier/consumer transactions that were severely constrained in any period were constrained throughout the two decades. The constraint on some classes of market transactions did shift between negligible and detectable levels, but such changes typically occurred at the lowest levels of constraint. More dramatic changes were apparent in market-constraint coefficients measuring contributions to profit margins; however, the magnitude of transaction-specific constraint remained stable.

The net conclusion is that the market boundaries and parameters shaping large American corporations were dramatically stable during the 1960s and 1970s. It would be easy to overgeneralize this conclusion. I emphasize three cautions.

First, the markets I have studied are very broadly defined; to be sure,

they are more narrowly defined than the two-digit Standard Industrial Classification industries often analyzed in studies of organizational resource dependence, but much more broadly defined than the four-digit categories typically analyzed in studies of market concentration and profits. There are good reasons for studying markets at the level chosen here. For one, because it is more feasible to assign large corporations to these broadly defined markets, results obtained at this level of aggregation are well suited to informing organizational research into the market forces shaping firms. Also, Department of Commerce changes in the definitions of commodity categories make it difficult to compare more detailed markets over time. Further, because the detailed input-output tables are not distributed with profit data, the input-output table indicators of profit margins, so useful in this analysis for calibrating the effect of market constraint, are not available across more narrowly defined markets. These justifications notwithstanding, it should be noted that much more extreme conditions of market structure are observed in more narrowly defined markets (Burt 1983*a*), so the high stability of market boundaries and parameters reported here for aggregate markets is likely to be lower in more narrowly defined markets.

Second, the stability observed here need not extend to earlier and later points in time. If a model of market change had been tested and found to be adequate, then the model could have provided a guide for judging market stability beyond the limits of the time period studied here. However, mine has been a purely descriptive effort intended to show that the market boundaries and parameters shaping large American firms in the late 1960s were not unique to that time period. That purpose is well realized. More general explanation of why the markets were as stable as they seem to have been remains a topic beyond my scope here. I have my own speculations, and readers have imagined their own, but this is a problem that calls for systematic research dedicated specifically to its resolution. The market transaction and constraint data are readily available (Burt 1986). On a purely empirical level, however, these results place the burden of proof on the skeptic who insists that market structure need not be stable over time. The skeptic who argues that market data from the 1970s cannot be used to predict the structure of firms in the 1980s, for instance, must show that market changes in the 1980s have been more severe than changes in the 1960s and 1970s, two decades of social and economic turbulence in journalistic accounts but of striking stability in the sociologically defined boundaries and parameters of American markets. As of this writing, it would be very difficult to argue that the 1980s have been more turbulent than the two decades preceding.

Third, and perhaps most important, I have described stability across markets, not within markets. The boundaries and parameters of each

market have been measured over time, and I have shown that the distinctions and inequalities between markets are stable. This does not mean that a case study of individual markets would find the same stability. Most of the markets were quite stable, but the degree to which they were stable varied across markets. Six markets were distinguished as exceptions to the general tendency toward stability. Moreover, my description of the stability in market boundaries and parameters could be based on unstable relations between firms within markets. To illustrate the point, imagine an extreme case. Imagine a highly concentrated market completely dependent on a single other market for its supplies and consumers in which concentration and constraint are constant (i.e., concentration and all c_{jk} constant from 1963 to 1967, to 1972, to 1977). Suppose, further, that the four largest firms in the market at each time were entirely different from the four largest at any other time, so that the bulk of the transactions defining the market were conducted by entirely different firms during the two decades. A case study of the market could conclude, rightly, that the market was highly unstable. In terms of the comparative analysis just presented, however, the market boundaries and parameters shaping large firms in the market were quite stable. This illustration is unrealistic in both the extreme levels of market constraint and the instability of the leading firms in the market. No observed market was remotely similar to this illustration, but the point should be clear. Here is the familiar sociological tension between enduring social structures and changing populations. The social structure of the production relations defining markets and the shape of successful firms in the market can be stable despite massive turnover in the population of firms transacting those relations. Much change in the population of firms could have occurred within American markets without being detected in my analysis of market boundaries and parameters.

This final caution returns the discussion to my initial concern with the social structure of markets as a key ingredient in understanding the structure and processes of large organizations. In closing, I will be more explicit about the link between markets and firms, suggesting some ways in which the linkage's study can be informed by the evidence of market stability. The network theory of the firm that has evolved from resource-dependence and transaction-cost theory puts us in the position of producers designing the optimum corporate bureaucracy for a market. Transactions with each of the producer's supplier/consumer markets can be rank-ordered from the most constrained transactions at the top down to irrelevant transactions at the bottom. Broadly speaking, two mechanisms are used to regulate these transactions. Competitive pricing is the default, and the rank order of suppliers and consumers in descending order of market constraint indicates the extent to which the producer would be at

a disadvantage under this mechanism. Corporate authority is the alternative, exercised through any of various interorganizational relations that range from ownership to interlocking directorates to one or more establishments in a supplier or consumer market. Corporate authority has certain advantages and disadvantages relative to price. The principal advantages of the nonmarket corporate authority relation are information, influence, and privacy. The principal costs are exposure to risk in constrained markets and, with expansion into additional markets, the potential inefficiences of a large bureaucracy. Useful reviews are readily available (e.g., see Williamson 1975, 1981; Lindblom 1977, chaps. 2, 3, 5, and 6; Ouchi 1980; Hall 1982, chap. 12; Lincoln 1982; Burt 1983*a*, chap. 3; Galaskiewicz 1985; Scott 1987, chaps. 7 and 8). The corporate structure optimum for a market can now be defined: Begin with the market's most severely constrained transactions. Evaluate the advantage of using price versus corporate authority as the mechanism regulating the transactions. If the difference between price and cost in the transactions under corporate authority would be substantially smaller with suppliers, or substantially greater with consumers, than the difference that can be anticipated on the open market, move the transaction into the corporate bureaucracy by creating a suitable organizational tie to the supplier/consumer market, such as purchasing a subsidiary supplier or distributor in the market, adding to the board of directors an officer from a leading firm in the market, forming a joint venture with a firm in the market, and so forth. Proceed to the next most severely constrained transactions. Make the same evaluation. Continue down the rank order of transactions. At the point where the profit of moving the next class of transactions into the firm equals the profit of conducting them on the open market, stop. The set of transactions now conducted within the firm is optimum for the market (cf. the equilibrium in Coase's [1937, p. 341] classic paper on the theory of the firm).[16]

[16] This is one of two ways in which human action is built into network models of markets. The alternatives preserve interdependent action and social structure but differ in how the interdependency is played out. The traditional approach adopted here takes the social structure of production relations defining a market as an exogenous factor, a technologically obligatory pattern of buying and selling. People build corporations to manage constraints created by their positions in the social structure of production relations. Management decisions are less ex post (Leifer 1985, p. 466) than they are lagged, today's management decision serving to restructure tomorrow's market; they do not restructure production relations directly, but restructure the way in which production relations are transacted. This approach is nicely suited to studying the coordination of markets and corporations across multiple markets. It preserves a distinction between technological production requirements, which are relatively fixed, and the human responses to those requirements, which vary enormously from person to person, organization to organization, and culture to culture. In complement, a second approach focuses on intramarket behavior with people changing the volume

In other words, the reported evidence of stability in market boundaries and parameters is evidence of stable exogenous variables driving organization behavior. Research can take advantage of this in several ways. For one thing, the scope of cross-sectional research is expanded. Within the limits of broadly defined markets and with the few exceptions noted, comparisons of corporations adapted to markets at a single point in time during the two decades can be generalized to the entire time period.

Further, precise sampling frames can be constructed for studying organizations in the contexts of their markets. To ensure that a sample of organizations represents the population of market conditions determining organization forms in the American economy, sample firms so that they represent the spatial distribution of markets in figure 1. To ensure further that the variability in market constraint on American firms is represented in the study, stratify sampling regions in figure 1 by levels of structural autonomy, then sample markets by region and level of structural autonomy. There is ample precedent for using Department of Commerce commodity categories, in input-output tables or the SIC, to define sampling frames for organization research. The new factor introduced with a map of market structural equivalencies such as figure 1 is knowledge of the extent to which separate Department of Commerce categories refer to similarly structured markets that in turn would be expected to spawn similarly structured organizations. The stability of a market-sampling frame over time invites comparisons between cross-sectional studies of organizations at different points in time and provides a basis for comparing case studies of firms within separate markets. Even greater precision is available to sample strategic research sites for organization research (Merton 1987, pp. 10 ff.). Classes of transactions can be sampled to represent the population distribution of market constraint. Firms conducting their buying and selling in severely constrained transactions can be studied—and compared with firms transacting unconstrained buying and selling—for better understanding of the diversity and effectiveness of alternative corporate strategies for managing markets (Burt 1983*b*).

Furthermore, the evidence of market stability can be used to greatly

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and substance of economic production according to their positions in the market's social structure. Leifer (1985) provides an engaging argument in this approach, building on White's (1981) earlier effort (cf. DiMaggio and Powell's [1983] concept of an organizational field). Where it is meaningful to assume that the production relations defining a market can be changed by its constituent players, this approach is informative, especially in analytical ethnographies of markets. For example, Faulkner (1983) describes the importance of network range for successful composers in the market for background music in Hollywood films, and Baker (1984) deftly weaves microeconomic and sociological concepts together to reveal insights into network processes determining trade and price within a national securities market.

simplify dynamic studies. Corporate behavior can be studied over time with respect to fixed exogenous market variables. This is especially exciting in light of the increasing attention being given to organizations over time, attention that is typically limited to comparisons between firms within a single market because of the extensive information required on each firm selected for study. This analysis shows that the classes of transactions most subject to market constraint in the 1960s were most constrained in the 1970s. Firms conducting these transactions can be studied over time and across American markets to describe, and to judge the success of, organizational strategies used to manage severe market constraints. Further, the "fit" of an organization to its market can be measured as described above so the growth and decline of representative firms can be studied over time and across American markets as a dependent variable predicted by the extent to which a firm was properly structured to manage the known constraints on its primary markets.

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