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Decentralization of Urban Service Activities: an Empirical Study

Wonseon Kyung
Portland State University

DECENTRALIZATION OF URBAN SERVICE ACTIVITIES: AN EMPIRICAL STUDY

by

WONSEON KYUNG

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DISSERTATION APPROVAL

The abstract and dissertation of Wonseon Kyung for the Doctor of Philosophy in Urban Studies were presented March 11, 1994, and accepted by the dissertation committee.

APPROVALS: [redacted]

James G. Strathman, Chair

[redacted]

William A. Rabiega

[redacted]

Kuan-Pin Lin

[redacted]

Kenneth J. Dueker

[redacted]

Abdul Qayum
Representative of the Office of Graduate Studies

[redacted]

Nancy J. Chapman, Coordinator, Ph.D. Program in Urban Studies

[redacted]

Nohad A. Toulan, Dean, School of Urban and Public Affairs

* *

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ABSTRACT

An abstract of the dissertation of Wonseon Kyung for the Doctor of Philosophy in Urban Studies presented March 11, 1994.

Title: Decentralization of Urban Service Activities: An Empirical Study

Post-war metropolitan development in the United States has been mainly due to suburban growth which resulted in dispersal of population, retailing, manufacturing, wholesaling and services. What is known about service suburbanization is primarily derived from survey research on location choices done in localized cases. There has been no comprehensive work done using secondary data on revealed behavior.

This dissertation attempts that comprehensive study. The research analyzes the dynamics of locational structure of services in U.S. metropolitan areas from 1969 to 1989. The descriptive analysis of changes in the location coefficients provides evidence to demonstrate a spatial shifting of consumer oriented services roughly opposite to that of business oriented services. The top ranked business centers tend to exhibit a tendency toward greater centralization. There is a countervailing tendency toward decentralization of business oriented services in small and relatively underdeveloped service areas.

According to the regional analysis, there is no clear tendency of business oriented services for the 1969-79 and 1979-89 periods. The tendency for decentralization of business oriented services, however, appears to be strong for the 1969-89 period, especially for the Manufacturingbelt and South. Models for decentralization of consumer oriented and business oriented services indicate that the spatial dynamics of business services are different from those of

consumer services. Relocation costs appear to be greater for business services than for consumer services. By contrast, service demand and racial composition seem to have a greater influence on decentralization of consumer services than on business services.

The relocation costs are also likely to encourage more centralization of consumer and business services over a longer time span. The locational effects of corporate demand and decentralization of manufacturing activity, on the contrary, appear to weaken over a longer time span.

DEDICATION

To God,

my grandmother, my parents and

my two younger brothers

with love.

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CHAPTER I

INTRODUCTION

Post-war metropolitan development in the United States has been mainly due to suburban growth, which resulted in dispersal of population, retailing, manufacturing, wholesaling and services. Suburban locations are now seen as having advantages for a wide spectrum of economic activities.

What is known about service suburbanization is primarily derived from survey research on location choices done in localized cases. There has been no comprehensive work done using secondary data on revealed behavior.

This dissertation deals with changes in locational patterns of urban services in the U.S. metropolitan counties for the period from 1969 to 1989. The research proceeds on two levels: first, an analysis of the trend in locational patterns of business oriented and consumer oriented services; and second, regression models of locational determinants of these service categories.

Theoretical studies of service location activities provide the conceptual framework. It analyzes how changes in decentralization of service firms are related to some or all of the following factors: structural changes, inertia of the existing spatial pattern, business relocation costs, manufacturing decentralization, corporate influence, racial composition, level of service demand and regional location.

This study is organized into six chapters. Chapter II lays the foundation for the study by reviewing earlier studies of locational patterns among services, core/peripheral studies of urban service activities, and the relevant theoretical framework. Chapter III presents descriptive results of changes in service location patterns, and variations in decentralization of urban service activities

by size of metropolitan area and by region. Chapter IV discusses the collection of secondary data, the methods of analysis, and the hypotheses for this research. Chapter V analyzes the relationships between structural changes, inertia of the existing spatial pattern, business relocation costs, manufacturing decentralization, corporate influence, racial composition, level of service demand, regional location, and decentralization of business oriented services. In addition, the relationships between structural changes, inertia of the existing spatial patterns, racial composition, level of service demand, regional location, and decentralization of consumer oriented services are explored. The final chapter discusses the implications of the study for theories of service location activities.

CHAPTER II

REVIEW OF THE LITERATURE

This study analyzes the trend in locational patterns of service activities, and locational determinants of these activities. The concepts pertinent to service locational patterns provide theoretical explanations about location of service activities. Thus, this chapter reviews the theoretical studies on service location activities. In addition, the empirical studies of locational patterns among services and core/peripheral studies on service activities are reviewed. Before examining these studies, the definition of services is discussed since it is not universally known.

"What are Services?"

Differing from goods, services can be defined in simplest terms as "the exchange of a commodity which does not have a tangible form" (Price and Blair, 1989: p. 2). In practice, service categories are defined in Standard Industrial Classifications (SICs). For example, the service sector comprises 15 categories (2-digit SICs) (US Department of Commerce, 1989). Among these categories are: Personal (SIC 72), Business (SIC 73), Repair (SIC 75-76), Recreation (SIC 79), Health (SIC 80), Legal (SIC 81), Educational (SIC 82), Social (SIC 83), and Management Services (SIC 87). More generally, services constitute Transportation, Communications and Utilities, F.I.R.E (Finance, Insurance and Real Estate), Wholesale and Retail Trade, and private and public services (Price and Blair, 1989; Beyers, 1989; Coffey and Polese, 1987; Daniels, 1985; Stanback, 1979). The sectors defined as services for this study are business services, and retail trade and other consumer related services.

THE RELEVANT THEORETICAL FRAMEWORK

This section reviews the theories pertinent to service locational patterns, and evaluates the relevance of the theories to a study of locational determinants of urban services. Theoretical studies of office location patterns are also reviewed because business service activities are largely office-based.

Contact Theory

Contact theory postulates that different decision levels, namely, 'orientation' (non-programmed), 'planning' and 'programmed' decisions give rise to corresponding contacts. 'Non-programmed' decisions are broad and diverse in scope, and involve complicated and unstructured decisions. These decisions cause 'orientation' contacts involving predominantly face-to-face meetings with feedbacks (Goddard, 1971). On the contrary, 'programmed' decisions are relatively narrow and limited in scope, and involve standardized and routine decisions. Hence, these decisions result in 'programmed' contacts carried out by telephone, implying more suitability of telecommunication uses. Finally, 'planning' decisions lie between the two extremes (i.e., 'non-programmed' and 'programmed' decisions) (Goddard, 1971).

Pye (1979) similarly maintains that 'orientation' contacts are likely to occur when a manager's role requires a significant change, whereas 'programmed' contacts involve routine changes, and, therefore, will be short, and telephone contacts rather than meetings. The contact types, a key concept of contact theory, provide theoretical explanations about locational patterns of urban services. Business services involving intensive 'orientation' contacts (arranged, long and face-to-face contacts) would be locationally constrained (Pye, 1979; Goddard, 1973). In contrast, services relying largely on unarranged,

short and regular telephone contacts (programmed contacts) (Pye, 1979; Goddard and Morris, 1976; Goddard, 1971) are more suitable for telecommunication uses. For example, computer services involving 'programmed' decisions (Howells and Green, 1986) are likely to be susceptible to telecommunication impacts, and thus are more likely to be decentralized.

The contrasting nature of contacts also provides insight into office location patterns. For example, a firm's administrative unit which relies on active personal contacts for information exhibits high rates of frequency of contacts with the administrative units of other firms, and thus exhibits locational centralization. On the contrary, its operating units involving few personal contacts with administrative units are locationally dispersed (Tornqvist, 1968).

The observed location patterns of urban service and office activities support the theoretical concept of contact types (Hutton and Ley, 1987; Daniels, 1986, 1985; Marshall, 1985; Dunning and Norman, 1983; Clapp, 1980; Manners, 1974). Further operationalization of this concept will provide more applications in reality for location patterns of urban service activities.

Intrametropolitan Office Location Theory

Intrametropolitan office location theory emphasizes the notion that contact (or communication) costs involving face-to-face meetings or contact maintenance among offices are a significant location factor because information is a major input and output for office activities (Coffey and Polese, 1987; Tauchen and Witte, 1983; Pye, 1977; Goddard, 1971). Other location factors important for office activities are: recruitment and retension of employees, floor-space needs, and prestige (Daniels, 1979; Pye, 1977).

Under the assumption of firm's choice of profit maximizing location, the theoretical importance of contact (communication) costs as a key location factor

is extensively shown by the intrametropolitan office location models. In their model, Tauchen and Witte (1983) postulate that firm location and contact patterns are jointly determined by firms making profit-maximizing decisions. Assuming that the contacts require face-to-face meetings, locational equilibrium is obtained by profit maximizing number of contacts with other firms. Consequently, a firm does not have an incentive to leave a CBD in which it can minimize its contact costs. Thus, the contact-expense curve rises with a firm's increasing distance from the center. The model suggests interdependency between contact patterns and firm locations, but does not adequately incorporate the firm's interactions involving 'orientation' contacts characterized as long and arranged contacts (Goddard and Morris, 1976) which also involve predominantly face-to-face meetings with feedbacks (Goddard, 1971).

Similarly, Coffey and Polese's (1987) location model for office-based activities explains office clusters generated by the firms pursuing minimization of communication cost associated with service output. It is thus suggested that 'organization-oriented' services relying on links with their head offices by intrafirm trade will produce locational concentration in pursuit of minimization of the associated communication costs. Assuming low communication costs for output, engineering services and other high tech services would exhibit a spatially dispersed pattern, although they are strongly S-type input (skilled management or professional resources) oriented. Also, local market-oriented services (e.g., repair, construction and rental services) and computer services which are weakly associated with intrafirm trade channels are likely to be spatially dispersed.

Pye's (1977) model emphasizes contact cost savings in central locations and explains the resistance of relocations among London area firms, especially due to contact maintenance (e.g., travel for meetings). Hence, it addresses cost-

effective relocation by comparison between office relocation costs and relocation benefits, such as economic savings in rents and salaries.

Intrametropolitan office location theory based on a cost minimization objective is especially useful to interpret the locational concentration of office-based business services, which seek central locations in pursuit of information cost savings. But the theory fails to incorporate the effects of technology and policy changes on contact benefits (Daniels, 1985). Further developments in communications technology may weaken communication linkages, a significant office location factor. The optimal location in theory also leads to limitations: in unpredictable times, events outside a firm's control is likely to change its optimal location.

Bid-Rent Theory

Alonso (1964) postulated decreasing land rents with distance from the CBD based on very rigid assumptions of uniform urban geography. Bid-rent models with an emphasis on access to information in the CBD provide an insight into intraurban individual service locations (Daniels, 1985). Niedercorn's (1971) model assumes that the profits of an information service firm depend on its location in relation to the city center in which it minimizes its communication costs. Hence, the communication cost per unit of service rises with the increasing distance from the city center. This accounts for the location of information intensive service firms in the city center.

Taking a similar approach, the Tauchen-Witte (1983) model assumes that contact costs are lower at locations which offer greater accessibility, and thus contact cost saving is balanced by higher rent. Although firms at distant locations from the CBD make fewer contacts, they can not overcome the

increasing costs of contact maintenance with the CBD. Therefore, the office rent for firms declines rapidly with distance from the CBD.

O'Hara (1977) assumes a uniform distribution of firms that rely on exogenous contacts, who also benefit equally from access to information in the CBD. Under these assumptions, office rent declines with the square of a firm's radial distance from the CBD, thereby obtaining a concave rent function.

According to Sullivan (1986), the inverse curve of office rents is attributed to increasing travel costs (per central market trip) with increasing distance from the central market area, which provides the advantages of face-to-face contacts. Clapp's (1980) model also incorporates face-to-face contacts in the CBD; hence, office rent increases with a move closer to the CBD. Also, a higher office rent is caused by amenities of office buildings and neighborhoods, as found at suburban centers. In Clapp's analysis of 105 office buildings in Los Angeles, access to face-to-face contacts appears to have a stronger influence on office rent than other factors such as suburban office centers and access to suburban employee residences.

Conventional bid-rent models which postulate the CBD as the most accessible location for communication activities are useful to interpret the centralization of business services. These models, however, do not necessarily apply to services emphasizing national and intermetropolitan linkages, such as investment banking (Wheeler, 1986). The strong emphasis on access to information in the CBD and a lack of consideration of suburban centers in the bid-rent models also limit their usefulness for application to the modern metropolis (Erickson, 1982). Models which incorporate more realistic considerations, such as the suburb's enhanced accessibility to the metropolitan market and the central city's congestion would better account for service location patterns in the modern metropolises.

External Economies of Scale

External economies of scale (agglomeration economies) are generated by interactions among linked firms, hence inducing the spatial clustering of these firms (Greene, 1980). This will increase the market for the user firms, thereby lowering the service input costs. The office sector is also subject to external economies of scale in that its average production costs decrease with the growth of a central market (Sullivan, 1986).

The theoretical importance of these agglomeration benefits is shown by the Tauchen and Witte (1983) model, which suggests that external economies play a key role in a firm's location. It is assumed that the agglomeration benefits are the contact benefits from interactions among the firms in the CBD. The enhanced agglomeration benefits generated by the greater density of CBD firms will allow firms to increase their number of contacts until average revenue per contact declines.

Notions about external economies offer valuable insights into service locational behaviour; services with different market functions which consequently use different degree of economies of scale exhibit different spatial patterns. The centralization of sophisticated business services in urban centers is largely attributable to large urban economies of scale. The advantages of urban economies of scale are: (a) savings in communication and labor costs; (b) specialized information services; and (c) specialized expertise (Price and Blair, 1989; Noyelle and Stanback, 1984; Goddard and Morris, 1979; Daniels, 1979; Pred, 1977, 1974).

Urban economies of scale increase contact benefits in both quantity (number of contacts) and quality (frequence, diversity and ease of contacts), hence attracting advanced business services to the large urban centers. Stanback and his associates (1981) argue that economies of scale appear after

producer services have been specialized: In the later development process of the producer service market, economies of scale increase the market for the user firms, hence lowering service input costs.

There is a close correspondence between the specialization of services and size of market (measured by total population) associated with urban economies of scale (Noyelle and Stanback, 1984; Meyer, 1980; Stanback, 1979). In fact, the size of market and external economies of scale have been major location factors of export services, such as business services and head offices. Dunning and Norman (1983) similarly assert that business services are relatively more significant in larger metropolises than in small metropolises.

On a smaller scale, agglomeration economies significantly influence locational patterns of local market-oriented consumer services (Price and Blair, 1989). Erickson's (1983) model suggests that modern consumer shopping behavior (e.g., multipurpose trip-making and comparison shopping) has contributed to the increased importance of consumer economies of scale.

The importance of the benefits of external economies of scale has been supported by the observed spatial patterns of service activities. On the contrary, disadvantages of diseconomies of scale, such as congestion, reinforce the trend of service decentralization.

Information Diffusion Theory

Information diffusion theory accounts for the concentration of business services and corporate headquarters in the U.S. large metropolitan areas (Pred, 1977). The large share of non-local specialized information channels in these metropolitan areas is attributed to such advantages as a high concentration of contact-intensive employees, specialized services and headquarters, and the convenience of face-to-face contacts (Pred, 1974). In this view, service location

patterns reflect the location decisions of individual firms or corporate firms, which rely on specialized information as well as accessibility to this information (Daniels, 1985).

Information diffusion occurs between large cities, and also from smaller to larger places when inventions are first used in smaller places. These diffusion patterns do not, therefore, necessarily follow the rigid hierarchical principles of central place theory; in the strict hierarchical view, the information diffusion occurs from the largest places to successively lower down the hierarchy (Pred, 1977). In the U.S., the stability of geographical diffusion of specialized information is, however, attributable to the stability of a firm's communication channels over time and the geographical inertia of firms (Pred, 1974).

Specialized information diffusion provides an understanding of a concentration of information-oriented services in certain cities. Information diffusion theory is also supported by Stanback's analysis of business service employment (Stanback, 1979). He found that the metropolitan centers with a significant share of business service employment in 1960 also experienced a high growth of the business service jobs in the subsequent decade. This indicates that the stable routes of specialized information, a key input for business services, have remained the same in these metropolitan centers.

While geographical theory implies that the diffusion of business services is necessary to narrow the gap between service developed areas and service underdeveloped areas (Daniels, 1985), behavioral theory attributes this widening gap to organizational structure, as will be discussed in detail in the following section.

Behavioral Theory

Behavioral theory reflects the location choices of decision-makers (Lloyd and Dicken, 1977). Hence, it potentially offers a more realistic perspective on a firm's location choice than neoclassical least cost location theory. The behavioral theory recognizes the importance of changes in a firm's internal and external environment. The internal environmental factors include a firm's policies and organization, and the nature of control in a firm. In contrast, external environmental factors include changes in market and in population character (Daniels, 1985, 1979; Edwards, 1983).

The theoretical importance of organizational factors is supported by Edwards model of office location decision-making (Edwards, 1983). Her model emphasizes the role of organizational character (e.g., investment and locational policy, and internal systems). It is suggested that organization factors have a greater influence on office suburbanization (Marshall, 1985; Edgington, 1982), than traditional location factors such as transportation costs, accessibility and rents (Edgington, 1982).

The nature of control factors in the behavioral theory provides an insight into the distinctions between core and peripheral regions. Thus, it is useful in understanding of the widening gap between service developed areas and service underdeveloped areas. Behavioral models which incorporate a firm's internal and external environmental factors adequately illustrate the locational decision-making of individual service firms. These models are, therefore, more useful to interpret the locational patterns of individual service types than central place theory (Daniels, 1985).

Central Place Theory

The hierarchical concept associated with market size in central place theory provides insight into inter-metropolitan service locations (Manners, 1974). The hierarchical concept was initially outlined by Christaller (1933). In his view, higher level services are found in the larger central places, which also offer all the services of smaller places under the assumption of an evenly distributed population. Hierarchical levels of service specialization are consistent with the size hierarchy of metropolitan areas (Stanback et al., 1981). That is, the largest metropolitan areas are characterized by provision of the highest specialized services and the most diversified service types.

Central place theory, with its very simplistic assumptions of a uniform distribution of consumers, minimum travel distance and omnidirectional travel provides insight into the spatial organization of retail trade and other consumer services which serve suburbanized populations (Stanback, 1979). Central place theory's market threshold requirement, along with its hierarchical structure explains the range of choices offered to consumers between small and large places (Kellerman, 1985). This is thus much more useful in understanding and persuasive in interpreting the inter-metropolitan service locations, especially the distribution of shopping centers and other consumer services (Price and Blair, 1989; Kellerman, 1985; Daniels, 1985) than in clarifying intra-metropolitan service locations (Manners, 1974).

The theory is, however, inadequate to apply its hierarchical principles to areas with varied functional bases such as different population densities and income levels. The strong emphasis on market size in the theory leads to limitations. Although market size is important, agglomeration benefits also attract business services to the larger urban areas (Stanback, 1979).

Contrary to the tenets of central place theory, level of service specialization is not directly related to metropolitan size, since organizational structure and agglomeration economies can distort the urban service hierarchy (Daniels, 1985). Burns and Healy's analysis of 185 metropolitan areas, for example, shows that the level of service specialization is not directly related to metropolitan size (Daniels, 1985). Furthermore, central place theory cannot provide insights into the longer term evolution of service location patterns (Kellerman, 1985).

General Interaction Theory

Like central place theory, general interaction theory concerns the pulling power of competing retail centers influencing shopping movements, and it thus provides insights into shopping center locations (Daniels, 1985). The break-point model identifies a point between two competing retail centers representing consumer choice of one retail center rather than the other. It is assumed that the identified point applies to all the services in a shopping center without considering the different types of services with different market requirements (Daniels, 1985). This rigid assumption imposes limitations with regard to a consumer's choice of retail centers. The area inside the identified break-point will not have uniform consumer demand because of the presence of different types of services. The shortcoming in the model is partially overcome by Huff's probability model which specifies the probabilities of consumers choosing one of the competing retail centers (Price and Blair, 1989).

Both central place theory and general interaction theory are especially useful to account for locational patterns of retail activities, but fail to take account of services with different market requirements, therefore are not adequate to apply to individual service locations.

Consumer Service Location Models

Consumer service location models include more realistic assumptions of consumer shopping behavior, such as multi-purpose and comparison shoppings, and different time needs (Dudey, 1990; Stahl, 1987; Ingene, 1984; Erickson, 1983; Greene, 1980; Eaton and Lipsey, 1979). In their model of comparison shopping, Eaton and Lipsey (1979) postulate that customers bear the transport cost for information, and thus seek for minimizing this cost. Assuming fixed price, customers must compare nonprice factors, for instance quality, delivery dates, and servicing arrangements. The model provides theoretical explanations about the clustering of firms, which can reduce transportation costs. According to Horton (1968), retailers are likely to cluster when the expected benefits from comparison shopping are greater than the consumer's search costs.

Stahl's (1987) model of firm location choice similarly suggests the importance of benefits of comparison shopping, which lead to firm clusterings. Assuming that consumers don't expect lower prices in places where large numbers of firms are located, firm clusterings are likely to occur when consumers are attracted to places which offer a large variety of products. These clusterings benefit both consumers and businesses. For instance, the Greene model of multi-purpose trip economies suggests that the clustered firms will benefit by an increase in demand (Greene, 1980). According to Dudey's model, firm clusterings are also likely to facilitate price comparison and search by consumers under the assumption of not too intense local competition (Dudey, 1990).

Since many services require a location in proximity to final consumer markets, the theoretical importance of consumer demand as a key location factor is extensively shown by the consumer service location models (e.g., Dudey, 1990; Stahl, 1987; Greene, 1980; Eaton and Lipsey, 1979; White, 1975). These models

are largely based on demand considerations, such as access to market, population size and density, traffic flows, and level of demand. For example, White's theoretical model suggests that retail firms will become more decentralized relative to population due to the declines in both population density and transportation costs, and income increases (White, 1975). The spatial variability in population density and incomes also influences consumer attractiveness to retail firms, as noted by Horton (1968).

Consumer service location models incorporate more realistic assumptions of consumer shopping behavior (e.g., multi-purpose and comparison shoppings), and are thus more able to account for the location choices of consumer service activities than central place theory. However, the strong emphasis on demand factors in consumer service location models lead to shortcomings. For example, the usefulness of retail location models would be enhanced by incorporating supply considerations such as the role of developers in planned retail centers.

DIFFERENT LOCATIONAL PATTERNS AMONG SERVICES

This section reviews recent empirical literature on locational patterns among services and research on relocation of service activities.

Centralization of Service Activities

The advantages of face-to-face contacts, specialized business contacts, expertise, and communication and labor costs account for the centralization of business services in the United States (Hutton and Ley, 1987; Daniels, 1985; Dunning and Norman, 1983) and in the Western Europe (Daniels, 1986; Marshall, 1985; De Smidt, 1984). Research by Gad (1979) on central Toronto suggests that technical services and business services involving research (e.g.,

market research and engineering consultants), which involve the relatively low levels of communication activity, exhibit spatial dispersal.

In both the United States and the United Kingdom, business service locations are strongly tied to headquarter locations (Gillespie and Green, 1987; Wheeler, 1986; Noyelle and Stanback, 1984; Stanback et al., 1981). Researchers have suggested the linkages between business services and corporate headquarters are important factors in the continuing centralization of business services and headquarters in urban centers (Wheeler, 1986; Noyelle and Stanback, 1984; Stanback et al., 1981).

The role of headquarters with high-level decision-making functions on service purchases leads to a reinforcement of the centralization of business services in the urban centers. For example, headquarters exert influence on their branches to purchase business services from the firms in the urban centers (Howells and Green, 1986; Daniels, 1985). In contrast, the local services (e.g., repair, construction and rental services), engineering services, technical services, computer services and other high tech services are spatially dispersed because they are not tied to the location of headquarters.

Other researchers identified the following factors as important for centralization: availability of specialized services, prestige of a CBD address, and access to business clients and international air-transportation facilities (Noyelle and Stanback, 1984; Daniels, 1982; Pred, 1977; Manners, 1974). For example, Noyelle and Stanback (1984) and Pred (1977) argue that international air-transportation facilities are an important location factor for business services because of the importance of air travel for business meetings.

Decentralization of Service Activities

Researchers suggest that suburban freeways have contributed to the decentralization of service activities (Daniels, 1985; Kellerman, 1985; Mills and Price, 1984; Erickson, 1983; Muller, 1981; Wright, 1978). Suburban freeways provide access to the metropolitan market and savings in transportation costs (Erickson, 1983), and also connect suburban residences and office centers (Erickson, 1983; Muller, 1981; Wright, 1978; Alexander, 1978). The CBDs are no longer the most accessible locations to consumers in modern metropolitan areas (Price and Blair, 1989). Furthermore, suburban locations provide the following advantages: (a) avoidance of the congestion of central cities; (b) space for expansion; (c) parking; (d) environmental and neighborhood amenities; and (e) accessibility to part-time female labor, to employee residences, and to clients (Mills, 1988; Daniels, 1985; Stanback, 1979; Tarpley et al., 1970). These advantages especially attract retail and other consumer related service firms, hence accounting for their decentralization. The same interpretation pertains to F.I.R.E (finance, insurance and real estate), whose activities rely on links with consumer clients (Noyelle and Stanback, 1984). Other residential services, such as education and health, also exhibit a decentralization pattern.

Relocation of Service Activities

Empirical studies of firm relocations have identified the following variables as key factors of central cities' service firms resistance to relocation: contact (communication) costs, labor costs (search of specialized expertise), and linkages with other CBD firms and multi-site clients (Daniels, 1985; Marshall, 1985; Goddard and Pye, 1977; Fernie, 1977; Goddard and Morris, 1976). Goddard and Morris's (1976) survey reveals that the London firms which do not relocate tend to engage in more face-to-face contacts than the movers. The firms

which greatly rely on face-to-face contacts decide against relocation to take advantage of savings in contact costs such as advantages of face-to-face meetings.

Pye (1977), Goddard and Pye (1977), and Manners (1974) suggest that business service firms would remain in central cities since relocation would be costly due to the possible disadvantages of information and expertise. In another study, Marshall (1985) asserts that peripheral locations have disadvantages for nonfinancial business services relying on linkages with multi-site clients.

Due to the great locational need for access to central cities, Daniels (1985) indicates that relocations of service firms have often been short distance moves within the same city rather than a longer distance move between areas. A firm whose relocation costs are greater because of costs of contact-maintenance with the CBDs than the relocation benefits prefers to remain in central cities (Stanback, 1979; Goddard and Pye, 1977; Goddard and Morris, 1976).

Effects of Telecommunication Technology

It is widely expected that the effects of telecommunication technology on service locations will continue to increase. Some speculate that telecommunications developments have contributed to the weakening of central city advantages (Mills, 1988; Kutay, 1986; Edgington, 1982), and of functional (or communication) and physical linkages between firms (Kutay, 1986; Daniels, 1985; Edgington, 1982), thus reinforcing dispersal of service activities to the suburbs. Researchers have also suggested that the services involving regular telephone contacts are likely to be more susceptible to the effects of telecommunication technology than the information-oriented services with intensive face-to-face contacts (Pye, 1979; Goddard and Morris, 1976; Goddard, 1971).

Other researchers assert that telecommunication technology will have a greater locational influence on the services involving standard, routine and repetitive tasks such as computer service and administrative work of financial services, and thus these services are likely to be further decentralized (Howells and Green, 1986; Daniels, 1985; Marshall, 1985; Edgington, 1982; Goddard, 1973). Although financial service activities, the dominant activities of the CBDs are susceptible to the effects of computer and telecommunications technology (Kutay, 1986; Daniels, 1985), the evidence of locational effects of these technologies on the financial services appear weak (Daniels, 1985).

Service Location Patterns in Future

The growth of international trade has increased producer service demand by multinational firms. In American cities, the importance of linkages between specialized services and headquarters has grown over the last two decades (Noyelle and Stanback, 1984). This leads to reinforced agglomerations of business services and headquarters in the existing business centers, as empirically found by Stanback (1979).

The increasing significance of specialized information required by business services which serve national and international markets, is also likely to strengthen the advantages of central locations. Consequently, the headquarters of high-level business services involving national and international markets exhibit an increasing centralization in large urban centers, whereas the headquarters of services serving local markets do not show locational centralization (Noyelle and Stanback, 1984).

Further centralization of high-level business services in urban centers is likely to persist into the future. The advantages of suburban locations, however,

should continue to encourage the decentralization of lower-level service activities.

CORE/ PERIPHERAL STUDIES ON URBAN SERVICE ACTIVITIES

This section reviews studies of the core/ peripheral differences of urban service activities in two aspects- service growth and service functions. In addition, the research which has been done on differences of office activities between central city and suburbs is reviewed.

Service Growth Differential

Service growth differentials between central city and suburbs during the post-war period is attributable to population suburbanization (Kellerman, 1985; Alexander and Dawson, 1979; Stanback, 1979), and in particular to the increase in demand for residential services by the middle class (Stanback, 1979). As a result, the faster service growth in the suburbs in the U.S. has mainly been led by local market-oriented services (Schneider and Fernandez, 1989; Mills, 1988; Friedrichs et al., 1987; Stanback, 1979).

On the contrary, the slower growth of the central city is largely attributable to negative externalities: traffic congestion, high land costs, high rents, lack of affordable housing, and shortage of parking (Mills, 1988; Daniels, 1985; Mills and Price, 1984; Tarpley et al., 1970; Richardson, 1969).

Service Function Differential

The status of the CBD in the U.S. as a specialized service center despite having lost traditional advantages (Muller, 1981) reflect the service function differential between central city and suburbs. Research by Friedrichs and his associates (1987) on the downtowns of Baltimore and Hamburg suggests that the overwhelming growth of office-based business services caused the downtown recoveries from the 1970s to 1980s, despite the decline of both central cities relative to their suburbs. Daniels's Washington, D.C. study indicates that accessibility to business clients is a significant factor for producer service firms in the CBD, whereas this factor was found to be insignificant for the outer suburbs (Daniels, 1985).

The distinct characteristics of services offered by central cities and suburbs are empirically indicated by a greater centralization of business services (Stanback, 1979; Manners, 1974). Since the central cities provide more specialized services than the suburbs (Friedrichs et al., 1987; Kellerman and Krakover, 1986; Stanback, 1979), relocated firms in the suburbs have continually relied on the central city's advanced services (Stanback, 1979). De Smidt's analysis suggests that urban core's contact patterns are distinct from the subcenters by providing a more diverse levels of contact intensity (De Smidt, 1984).

Office Function Differential

Office activities are differentiated in terms of functions between city and suburbs. The organizational head offices with high-level management, control and decision-making functions, are concentrated in central cities, whereas offices involving routine, repetitive and standardized tasks such as branch offices and

back offices[1] are located in the suburbs (Daniels, 1982; Manners, 1974). In another empirical study, Pivo (1990) finds that the densities of suburban office centers are less than those of CBDs, although their sizes approach those of CBDs.

SUMMARY

The location literature characterizes business services as information, organization and export oriented, causing the locational pattern of business service firms to be different from that of other service firms. The existing theories pertinent to service location indicate the distinct spatial consequences of information oriented services and consumer demand oriented services. In view of the significance of information costs, theories such as contact theory and intrametropolitan office location theory account for centralization of business service activities. Characteristics of business linkages cause different contact needs in the view of contact theory. Intrametropolitan office location theory provides insights of the location patterns of producer services whose activities mostly take place in offices. Similarly, the information benefits in the urban centers in the information diffusion, external economies of scale and rent gradient theories are attributable to centralization of business service activities.

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[1] Defined as 'a consolidation of corporate internal services that require little face-to-face contact with either the corporate personnel they support or with the extra-corporate world. Examples of such internal services are computer operations, acccunting, payroll, billing, credit card services, centralized word processing, and certain office-based (i.e. non-laboratory) tachnical or research activities' (Nelson, 1986: p. 149).

The market threshold in central place theory is useful to account for shopping center locations. The general interaction theory of consumer choice also provides insight into location patterns of retail centers. The more realistic assumptions of consumer shopping behavior in the consumer service location models imply more applications in reality for location patterns of consumer services.

The service relocation studies attribute the often short distance relocations of service firms to their great needs for the access to the central cities. The business service firms are likely to decide against relocation from central locations due to the costly relocation costs: contact (communication) costs, high-skilled labor costs, business linkages with other CBD firms and with multi-site clients. On the contrary, relocation benefits such as avoidance of the congestion of central cities and accessibility to suburban part-time female labor are often greater for retail and other consumer related firms, and for local market oriented firms such as F.I.R.E (finance, insurance and real estate), hence accounting for their decentralization.

Business services strongly linked to corporate headquarters exhibit concentration in the urban centers, whereas other services weakly tied to headquarters show a dispersed pattern. They are: local services (e.g., repair, construction and rental services), engineering services, technical services, computer services and other high tech services.

Central locations offer an aggregate set of attractive features: specialized business contacts, ease of face-to-face contacts, expertise and specialized information. This draws export services to the urban centers, acting as a centralizing pull. It also leads to service function differentials between core and peripheral locations.

The centralization of producer services in the urban centers is expected to continue in the immediate future according to the following arguments: (a) the increasing importance of linkages between business services and headquarters in the U.S. cities; (b) the increasing significance of specialized information for business service activities; (c) the increasing demand for producer services in international trade; and (d) the increasing externalization of service purchases of headquarters in the urban centers. Decentralization of service activities will, however, continue with the enhanced advantages of peripheral locations and the decentralization of population. Telecommunication technology is also likely to increase decentralization of engineering, technical, computer and other high tech services, but the evidences of its locational effect on financial services appear weak.

CHAPTER III

TREND OF LOCATION PATTERN OF URBAN SERVICE ACTIVITIES

This chapter describes the decentralization of consumer oriented and business oriented services in the 89 core counties[2] for the period from 1969 to 1989. Among urban services, both consumer oriented and business oriented services are selected as those Standard Industrial Classifications (U.S. Department of Commerce, 1989) with a major output of consumer services and of business services respectively. The consumer oriented services with their SIC codes (Beyers, 1989; Daniels, 1985; Bergsman et al., 1972):

72	Personal Services
75	Auto Repair, Services, and Parking
76	Miscellaneous Repair Services
5200-5999	Retail Trade.

Also, the business oriented services with their SIC codes (Howells, 1987; Polese, 1982; Bergsman et al., 1972):

60	Depository Institutions
73	Business Services
81	Legal Services.

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[2] Defined as the largest population counties among the component counties of U.S. metropolitan areas with three or more component counties.

The decentralization of these services for the time periods of 1969-79, 1979-89 and 1969-89 are measured as changes in location coefficients (Hoerter and Wiseman, 1988). A positive location coefficient indicates that service employment is centralizing faster than the employment average for its metropolitan area. A minus sign indicates that the core county's service employment is decentralizing faster than its metropolitan average. The location coefficients are defined as (Hoerter and Wiseman, 1988):

$$LC_{ci} = (COE_{ijt} / MCO_{jt}) / (TE_{it} / MTE_{t})$$

$$LC_{bi} = (BOE_{ijt} / MBO_{jt}) / (TE_{it} / MTE_{t})$$

where:

t = time (1969-79, 1979-89, 1969-89);

j = service type: consumer oriented and business oriented services;

i = core county;

COE = consumer oriented service employment;

BOE = business oriented service employment;

MCO = consumer oriented service employment for a core county's metropolitan area;

MBO = business oriented service employment for a core county's metropolitan area;

TE = total employment of a core county;

MTE = total employment for a core county's metropolitan area.

This chapter is divided into three sections. The first section discusses the decentralization of consumer oriented and business oriented services. The second section discusses the decentralization of these services by size of metropolitan area. The third section discusses this by region.

RANK ORDER OF CHANGES IN DECENTRALIZATION OF URBAN SERVICE ACTIVITIES

For core counties, changes in location coefficients for consumer oriented and business oriented services are calculated and interpreted by ranking of counties (Tables 3.1 through 3.6).

Rank Order Analysis: Consumer Oriented Services

Rank Order Results for Consumer Oriented Services, 1969-79. Looking at Table 3.1, the core counties with the largest gain in centralization of consumer oriented services between 1969 and 1979 are in the relatively underdeveloped service areas except for Kings and Salt Lake counties. Most top ranked counties are in small metropolitan areas with less than 1 million population; the exceptions are Kings, Salt Lake, Middlesex and Essex counties. The tendency for the greatest change in centralization appears to be strong in the core counties of the small metropolitan areas. Also, almost half of the top ranked counties are in the Northeast and East North Central regions.

Over half of the counties that experienced the largest change in decentralization of consumer oriented services for the period of 1969-79 are in medium and large metropolitan areas with 1 -2 million and over 2 million population respectively. The largest decentralization of consumer oriented services during this period is in the core counties in the urban service centers. Most top ranked counties are also in the Sunbelt region, and others in Manufacturingbelt and Rural Middle regions. The results of the top ranked counties seem to indicate the effect of urban size and the trend toward dispersion of consumer oriented services to the relatively underdeveloped areas.

TABLE 3.1

CORE COUNTIES WITH THE LARGEST CHANGE IN LOCATION PATTERN OF CONSUMER ORIENTED SERVICES, 1969-79

Centralization	Decentralization
1. Kings, NY (New York, NY) (0.11)	1. Jefferson, OH (Steubenville-Weirton, OH-WV) (-0.33)
2. Sullivan, TN (Johnson City-Kingsport-Bristol, TN-VA) (0.08)	2. Baltimore City, MD (Baltimore, MD) (-0.19)
3. Belmont, OH (Wheeling, WV-OH) (0.07)	3. Greenville, SC (Greenville-Spartanburg, SC) (-0.14)
4. Luzerne, PA (Scranton-Wilkes-Barre, PA) (0.04)	4. Mecklenburg, NC (Charlotte-Gastonia-Rock Hill, NC-SC) (-0.13)
4. Salt Lake, UT (Salt Lake City-Ogden, UT) (0.04)	5. Lehigh, PA (Allentown-Bethlehem-Easton, PA-NJ) (-0.11)
4. Middlesex, NJ (Middlesex-Somerset-Hunterdon, NJ) (0.04)	5. St. Louis, MO (St. Louis, MO-IL) (-0.11)
5. Fayette, KY (Lexington-Fayette, KY) (0.03)	5. Fulton, GA (Atlanta, GA) (-0.11)
5. Montgomery, OH (Dayton-Springfield, OH) (0.03)	6. Peoria, IL (Peoria, IL) (-0.10)
5. Wake, NC (Raleigh-Durham, NC) (0.03)	6. Lynchburg City, VA (Lynchburg, VA) (-0.10)
5. Essex, NJ (Newark, NJ) (0.03)	6. Hennepin, MN (Minneapolis-St. Paul, MN-WI) (-0.10)
5. Scott, IA (Davenport-Rock Island-Moline, IA-IL) (0.03)	7. San Francisco, CA (San Francisco, CA) (-0.09)

*Changes in location coefficient values for the 1969-79 period are in parentheses.

Rank Order Results for Consumer Oriented Services, 1979-89. Table 3.2 shows that most counties with the largest gain in centralization of consumer

oriented services for the 1979-89 period are in the small metropolitan areas, and in the relatively underdeveloped areas. The exceptions are San Francisco in the national business center, and both Monroe and Wayne in the large industrial complex centers, termed by Noyelle and Stanback (1984) the 'specialized service centers'.[3] An examination of the top ranked counties by region indicates that half of the counties are in the East North Central region characterized by manufacturing heritage, and others in South Atlantic, Pacific and Mid-Atlantic regions. Most counties with the largest decentralization of consumer oriented services between 1979 and 1989 are in the urban service centers except for Richmond and Lehigh counties (Table 3.2). Most top ranked counties are in the medium and large sized metropolitan areas. The counties in this ranking are equally divided by the regions they belong to, that is, the Sunbelt region (West and South) and Snowbelt region (Northeast and Midwest). The results of the rank order analysis for the 1979-89 period imply a tendency for the core counties in the relatively larger urban service centers to exhibit a greater decentralization of consumer oriented services.

Rank Order Results for Consumer Oriented Services, 1969-89. As Table 3.3 shows, most top ranked counties are in either the Manufacturingbelt or the Sunbelt except for two in the Rural Middle region. There is a tendency for the largest centralization shown to be in the small metropolitan areas, and in the relatively underdeveloped areas during the 1969-89 period, which is consistent

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[3]These centers comprise industrial complex center, resort-retirement center and government-education center which are each characterized by the following dominant activities: manufacturing, resort-retirement and government -education activities (state capitals, large university areas) respectively (Noyelle and Stanback, 1984).

TABLE 3.2

CORE COUNTIES WITH THE LARGEST CHANGE IN LOCATION PATTERN OF CONSUMER ORIENTED SERVICES, 1979-89

Centralization	Decentralization
1. Jefferson, OH (Steubenville-Weirton, OH-WV) (0.21)	1. Denver, CO (Denver, CO) (-0.31)
2. Belmont, OH (Wheeling, WV-OH) (0.15)	2. Richmond, GA (Augusta, GA-SC) (-0.18)
3. Cabell, WV (Huntington-Ashland, WV-KY-OH) (0.09)	3. Albany, NY (Albany-Schenectady-Troy, NY) (-0.13)
3. Lynchburg, VA (Lynchburg, VA) (0.09)	4. Mecklenburg, NC (Charlotte-Gastonia-Rock Hill, NC-SC) (-0.11)
3. San Francisco, CA (San Francisco, CA) (0.09)	5. Kings, NY (New York, NY) (-0.10)
4. Saginaw, MI (Saginaw-Bay City-Midland, MI) (0.07)	6. Fulton, GA (Atlanta, GA) (-0.09)
5. Monroe, NY (Rochester, NY) (0.06)	6. St. Louis, MO (St. Louis, MO-IL) (-0.09)
6. Wayne, MI (Detroit, MI) (0.05)	6. Lehigh, PA (Allentown-Bethlehem-Easton, PA-NJ) (-0.09)

*Changes in location coefficient values for the 1979-89 period are in parentheses.

with the findings illustrated earlier. The greater increase in the location coefficients for the core counties, especially the top three counties than the corresponding ranking counties for the 1969-79 and 1979-89 periods indicates a reinforced tendency of the greater centralization of consumer oriented services in the top ranked counties, particularly the top three counties for the 1969-89 period.

TABLE 3.3

CORE COUNTIES WITH THE LARGEST CHANGE IN LOCATION PATTERN OF CONSUMER ORIENTED SERVICES, 1969-89

Centralization	Decentralization
1. Albemarle, VA (Charlottesville, VA) (0.31)	1. Denver, CO (Denver, CO) (-0.38)
2. Belmont, OH (Wheeling, WV-OH) (0.22)	2. Baltimore, MD (Baltimore, MD) (-0.25)
3. Sullivan, TN (Johnson City-Kingsport-Bristol, TN-VA) (0.12)	3. Mecklenburg, NC (Charlotte-Gastonia-Rock Hill, NC-SC) (-0.24)
4. Cabell, WV (Huntington-Ashland, WV-KY-OH) (0.10)	3. Richmond, GA (Augusta, GA-SC) (-0.24)
5. Middlesex, NJ (Middlesex-Somerset-Hunterdon, NJ) (0.06)	4. Albany, NY (Albany-Schenectady-Troy, NY) (-0.20)
6. Stearns, MN (St. Cloud, MN) (0.05)	4. Lehigh, PA (Allentown-Bethlehem-Easton, PA-NJ) (-0.20)
7. Saginaw, MI (Saginaw-Bay City-Midland, MI) (0.04)	4. St. Louis, MO (St. Louis, MO-IL) (-0.20)
8. Jackson, MO (Kansas City, MO-KS) (0.03)	4. Fulton, GA (Atlanta, GA) (-0.20)
8. Wake, NC (Raleigh-Durham, NC) (0.03)	5. Peoria, IL (Peoria, IL) (-0.18)
8. Luzerne, PA (Scranton-Wilkes-Barre, PA) (0.03)	6. Greenville, SC (Greenville-Spartanburg, SC) (-0.16)
8. Sebastian, AR (Ft. Smith, AR-OK) (0.03)	7. Hennepin, MN (Minneapolis-St. Paul, MN-WI) (-0.14)
8. Salt Lake, UT (Salt Lake City-Ogden, UT) (0.03)	8. Jefferson, OH (Steubenville-Weirton, OH-WV) (-0.12)
8. Vanderburgh, IN (Evansville, IN-KY) (0.03)	8. Middlesex, MA (Boston, MA) (-0.12)

*Changes in location coefficient values for the 1969-89 period are in parentheses.

There is a tendency for greater decentralization of consumer oriented services in the urban service centers, and in the medium and large sized metropolitan areas which seems to change little for most top ranked counties from the one decade (Tables 3.1 and 3.2) to the two decades (Table 3.3). Table 3.3 shows, however, the much greater increase in the location coefficients for the top ranked counties during the 1969-89 period than the corresponding ranking counties during the 1969-79 and 1979-89 periods.

Rank Order Analysis: Business Oriented Services

Rank Order Results for Business Oriented Services, 1969-79. The core counties with the largest gain in centralization of business oriented services for the period 1969-79 are now examined (Table 3.4). Most top ranked counties are in the medium and large sized metropolitan areas, and in business centers (except for Dauphin, Montgomery and Richmond counties). The counties in this ranking are in either the Manufacturingbelt or the Sunbelt region except for one in the Rural Middle region. The tendency for core counties in the relatively larger business centers to exhibit a greater centralization of business oriented services seems to be related to the fact that such areas are reinforcing the comparative advantages in the business oriented services with the support of corporate activities and service infrastructure.

The largest decentralization of business oriented services for the 1969-79 period are in the small metropolitan areas, and in the manufacturing centers except for Mecklenburg and Baltimore counties (Table 3.4). The majority of the top ranked counties are in the South, and two are in the Manufacturingbelt. The tendency for greater decentralization of business oriented services is shown to be strong in the manufacturing production areas, which seems to indicate that they lack service infrastructure necessary to support business service growth.

TABLE 3.4

CORE COUNTIES WITH THE LARGEST CHANGE IN LOCATION PATTERN OF BUSINESS ORIENTED SERVICES, 1969-79

Centralization	Decentralization
1. Denver, CO (Denver, CO) (0.50)	1. Jefferson, OH (Steubenville-Weirton, OH-WV) (-0.85)
2. Middlesex, MA (Boston, MA) (0.18)	2. Greenville, SC (Greenville-Spartanburg, SC) (-0.39)
3. Dauphin, PA (Harrisburg-Lebanon-Carlisle, PA) (0.17)	3. Cabell, WV (Huntington-Ashland, WV-KY-OH) (-0.32)
4. St. Louis, MO (St. Louis, MO-IL) (0.13)	4. Sullivan, TN (Johnson City-Kingsport-Bristol, TN-VA) (-0.30)
5. Multnomah, OR (Portland, OR) (0.11)	5. Wake, NC (Raleigh-Durham, NC) (-0.28)
6. Orleans, LA (New Orleans, LA) (0.09)	6. Saginaw, MI (Saginaw-Bay City-Midland, MI) (-0.26)
6. Montgomery, OH (Dayton-Springfield, OH) (0.09)	7. Mecklenburg, NC (Charlotte-Gastonia-Rock Hill, NC-SC) (-0.23)
6. Richmond, GA (Augusta, GA-SC) (0.09)	8. Baltimore, MD (Baltimore, MD) (-0.20)

*Changes in location coefficient values for the 1969-79 period are in parentheses.

Rank Order Results for Business Oriented Services, 1979-89. Over half of the counties that experienced the largest gain in centralization of business oriented services for the 1979-89 period are in small metropolitan areas, and in the manufacturing centers; the remaining are in the developed service areas (Table 3.5). Most top ranked counties are in the Sunbelt region; two counties are in the Manufacturingbelt region; and one in the Rural Middle region.

TABLE 3.5

CORE COUNTIES WITH THE LARGEST CHANGE IN LOCATION PATTERN OF BUSINESS ORIENTED SERVICES, 1979-89

Centralization	Decentralization
1. Henrico, VA (Richmond-Petersburg, VA) (0.45)	1. Richmond, GA (Augusta, GA-SC) (-0.26)
2. Bibb, GA (Macon-Warner Robins, GA) (0.23)	2. Essex, NJ (Newark, NJ) (-0.22)
3. St. Louis, MO (St. Louis, MO-IL) (0.15)	3. Mecklenburg, NC (Charlotte-Gastonia-Rock Hill, NC-SC) (-0.18)
4. Baltimore, MD (Baltimore, MD) (0.13)	4. Orleans, LA (New Orleans, LA) (-0.16)
4. Outagamie, WI (Appleton-Oshkosh-Neenah, WI) (0.13)	5. Peoria, IL (Peoria, IL) (-0.13)
5. Cabell, WV (Huntington-Ashland, WV-KY-OH) (0.10)	6. Philadelphia, PA (Philadelphia, PA-NJ) (-0.10)
5. Jefferson, OH (Steubenville-Weirton, OH-WV) (0.10)	7. Dauphin, PA (Harrisburg-Lebanon-Carlisle, PA) (-0.09)
6. Sacramento, CA (Sacramento, CA) (0.09)	8. Albany, NY (Albany-Schenectady-Troy, NY) (-0.08)
7. Catawba, NC (Hickory-Morganton, NC) (0.08)	8. Wayne, MI (Detroit, MI) (-0.08)
7. Sullivan, TN (Johnson City-Kingsport-Bristol, TN-VA) (0.08)	8. Guilford, NC (Greensboro-Winston-Salem-High Point, NC) (-0.08)

*Changes in location coefficient values for the 1979-89 period are in parentheses.

Table 3.5 shows that most counties with the largest decentralization of business oriented services are in the developed service areas except for Richmond and Guilford counties. The counties in this ranking are equally divided by the

TABLE 3.6

CORE COUNTIES WITH THE LARGEST CHANGE IN LOCATION PATTERN OF BUSINESS ORIENTED SERVICES, 1969-89

Centralization	Decentralization
1. Denver, CO (Denver, CO) (0.43)	1. Jefferson, OH (Steubenville-Weirton, OH-WV) (-0.75)
2. Henrico, VA (Richmond-Petersburg, VA) (0.31)	2. Mecklenburg, NC (Charlotte-Gastonia-Rock Hill, NC-SC) (-0.41)
3. St. Louis, MO (St. Louis, MO-IL) (0.28)	3. Greenville, SC (Greenville-Spartanburg, SC) (-0.37)
4. Middlesex, MA (Boston, MA) (0.20)	4. Saginaw, MI (Saginaw-Bay City-Midland, MI) (-0.32)
5. Outagamie, WI (Appleton-Oshkosh-Neenah, WI) (0.16)	5. Wake, NC (Raleigh-Durham, NC) (-0.27)
6. Montgomery, OH (Dayton-Springfield, OH) (0.13)	6. Essex, NJ (Newark, NJ) (-0.24)
7. Sacramento, CA (Sacramento, CA) (0.09)	7. Wayne, MI (Detroit, MI) (-0.23)
8. Multnomah, OR (Portland, OR) (0.08)	7. Guilford, NC (Greensboro-Winston-Salem-High Point, NC) (-0.23)
8. Orange, FL (Orlando, FL) (0.08)	8. Cabell, WV (Huntington-Ashland, WV-KY-OH) (-0.22)
8. Dauphin, PA (Harrisburg-Lebanon-Carlisle, PA) (0.08)	8. Sullivan, TN (Johnson City-Kingsport-Bristol, TN-VA) (-0.22)

*Changes in location coefficient values for the 1969-89 period are in parentheses.

metropolitan size groups which they belong to, that is, the relatively larger (medium and large) metropolitan areas and small metropolitan areas. The majority of them are in the Manufacturingbelt, and the remaining are in the

South. The tendency for greater decentralization of business oriented services appears to be strong in the core counties of the older metropolitan areas.

Rank Order Results for Business Oriented Services, 1969-89. A tendency for greater centralization of business oriented services during the period of 1969-89 appears to be strong in the core counties of the medium and large metropolitan areas, and of the urban service centers (Table 3.6). Half of the top ranked counties are in the Sunbelt region; four counties are in the Manufacturingbelt region; and one in the Rural Middle region. The results indicate increasing centralization of business oriented services in the relatively larger service centers, reflecting the importance of large size and service infrastructure. This would be consistent with trends in business services observed in the large U.S. cities (Stanback et al., 1981; Daniels, 1979; Stanback, 1979).

Table 3.6 shows that a tendency for greater decentralization of business oriented services during the period of 1969-89 is strong in the Sunbelt region, and in the small metropolitan areas; the exceptions are Mecklenburg, Essex and Wayne counties. The much greater increase in the location coefficients for the top ranked counties than the corresponding ranking counties for the 1979-89 period indicates a reinforced tendency of greater decentralization of business oriented services in the top ranked counties for the 1969-89 period. There is also a definite tendency for non-business service centers to exhibit greater decentralization of business oriented services with the exception of Mecklenburg county.

CHANGES IN DECENTRALIZATION OF URBAN SERVICE ACTIVITIES AMONG METROPOLITAN SIZE GROUPS

To explore the degree to which the changes in decentralization of urban services vary across metropolitan size groups, the metropolitan areas which have three or more component counties are broken down into three size groups: the small size group has a population under 1 million. The medium size group has a population of 1-2 million, and the large size group has a population over 2 million. Also, tests of significance to determine if there are differences in the changes in decentralization (measured as changes in location coefficient means) of consumer oriented and business oriented services among metropolitan size groups, in particular, are done.

TABLE 3.7

THE CHANGE IN THE MEANS OF LOCATION COEFFICIENTS OF CONSUMER ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Metro. Size Group	LC Mean Change, Con. Serv. 1969-79	LC Mean Change, Con. Serv. 1979-89	LC Mean Change, Con. Serv. 1969-89
Large Metro. > 2 mil.	-0.05	-0.03	-0.08*
Medium Metro. 1-2 mil.	-0.02	-0.02	-0.04*
Small Metro. < 1 mil.	-0.02	0.00	-0.02

* Significant at .10

Metropolitan Analysis: Consumer Oriented Services

The largest change in the location coefficient means of consumer oriented services for the 1969-79 period (Table 3.7) is shown for the large metropolitan group. The magnitude of the change in the mean values of consumer oriented services for the 1979-89 period rises as we move from the small to the large metropolitan size group (Table 3.7). This indicates a tendency toward progressively greater decentralization of consumer oriented services, as we move from the small to the large group's counties.

Both medium and large groups show a slightly more change in the means of location coefficients of consumer oriented services for the 1969-89 period (Table 3.7). This suggests a reinforced tendency of decentralization of consumer oriented services in the core counties in both medium and large groups. The change in the mean values for large metropolitan group suggests that the core counties in the large group experience slightly greater decentralization of consumer oriented services than those in other groups, and a statistically significant (at .10 percent) change in the decentralization of consumer oriented services over the period 1969 to 1989. Table 3.7 also shows that the medium group experience slightly greater decentralization of consumer oriented services than the small group during the 1969-89 period, which is statistically significant (at .10 percent) as well.

Metropolitan Analysis: Business Oriented Services

The large group's mean changes for business oriented services for the 1969-79 period indicate that decentralization of business oriented services is greater than the medium group's, but less than the small group's. It seems that the small group experienced greater decentralization of business oriented services than the other groups, and a statistically significant (at .05 percent)

TABLE 3.8

THE CHANGE IN THE MEANS OF LOCATION COEFFICIENTS OF BUSINESS ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Metro. Size Group	LC Mean Change, Bus. Serv. 1969-79	LC Mean Change, Bus. Serv. 1979-89	LC Mean Change, Bus. Serv. 1969-89
Large Metro. > 2 mil.	-0.02	0.01	-0.02
Medium Metro. 1-2 mil.	0.04	-0.03	0.00
Small Metro. < 1 mil.	-0.08*	0.02	-0.06*

* Significant at .05

change in the decentralization of business oriented services for the 1969-79 period (Table 3.8). Meanwhile, the change in the mean values for medium metropolitan group during the 1979-89 period indicates that decentralization of business oriented services is greater than those of other groups.

The largest change in the means of location coefficients of business oriented services during the 1969-89 period is shown for the small group, followed by the large group, and no change in the magnitude for the medium group (Table 3.8). The small metropolitan group also shows a statistically significant (at .05 percent) change in the decentralization of business oriented services over the period. The results indicate that the small group experienced slightly greater decentralization of business oriented services than other groups during the 1969-89 period.

REGIONAL VARIATIONS IN DECENTRALIZATION OF URBAN SERVICE ACTIVITIES

To examine the degree to which changes in the decentralization of consumer oriented and business oriented services vary across the U.S. regions, changes in means of location coefficients for these services for the nine U.S. census regions (Figure 1) are calculated (Tables 3.9 and 3.10). These changes are also mapped across the regions (Figures 2 through 7). In addition, tests to determine if there are significant differences in the changes by the regions are done.

TABLE 3.9

THE CHANGE IN THE MEANS OF LOCATION COEFFICIENTS OF CONSUMER ORIENTED SERVICES BY REGIONS OF THE CORE COUNTIES

U.S. Regions	LC Mean Change, Con. Serv. 1969-79	LC Mean Change, Con. Serv. 1979-89	LC Mean Change, Con. Serv. 1969-89
New England	-0.02	-0.02	-0.04
W. South Central	-0.01	-0.01	-0.02
E. South Central	0.01	-0.02*	-0.01
Pacific	-0.04	0.00	-0.04
Mountain	-0.02	-0.16	-0.18
South Atlantic	-0.05	0.00	-0.04
W. North Central	-0.02	-0.01	-0.03
E. North Central	-0.03	0.01	-0.02
Mid-Atlantic	-0.01	-0.02	-0.04

* Significant at .10

Fig 1. U.S. census divisions and regions.
Source: Statistical Abstract of the U.S., 1991.

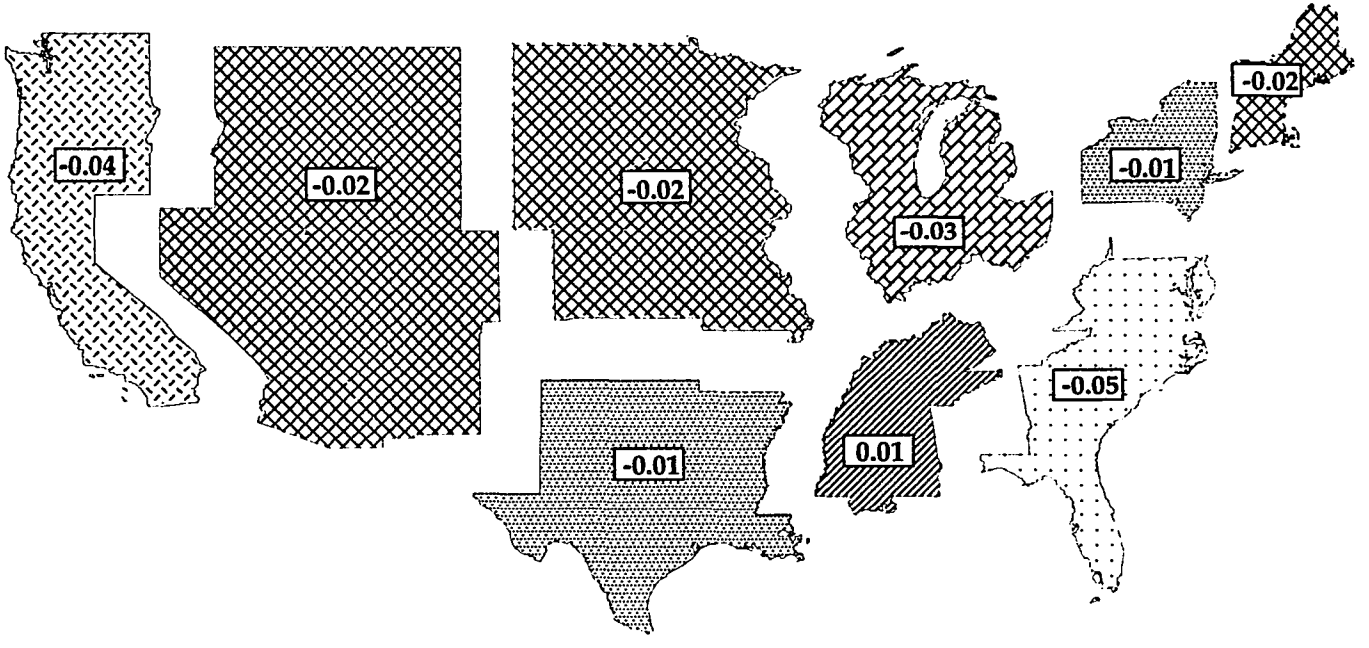

Fig 2. The change in the means of location coefficients for consumer oriented services by regions of the core counties, 1969-79.

Regional Analysis: Consumer Oriented Services

Looking at Figure 2, there is an overwhelming tendency for spatial decentralization of consumer oriented services in most regions during the 1969-79 period, ranging from South Atlantic region (with a change in location coefficient means of -0.05) to West South Central and Mid-Atlantic regions (with -0.01). The tendency for decentralization of consumer oriented services remains in most regions for the 1979-89 period (Figure 3); this tendency appears to be reinforced, especially in both Mountain and East South Central regions.

The Mountain region's counties with -0.16 which fell from -0.02 exhibit greater decentralization of consumer oriented services than the other regions. The East South Central region's counties with -0.02 which fell from 0.01 not only exhibit a tendency for decentralization of consumer oriented services for the 1979-89 period, but also show a statistically significant (at .10 percent) change in the decentralization as well (Table 3.9). Conversely, South Atlantic, East North Central and Pacific regions tend to exhibit a tendency toward centralization for the 1979-89 period (Figure 3).

All the regions show an increasing tendency for decentralization of consumer oriented services over the period 1969 to 1989 (Figure 4). The Mountain region stands out again as the leading group (with -0.18) which exhibit the greater decentralization of consumer oriented services than the other regions, followed by the Northeast, South Atlantic and Pacific regions (with -0.04).

Regional Analysis: Business Oriented Services

There is no dominant tendency for decentralization of business oriented services for the 1969-79 period (Figure 5). The Mountain region (with 0.27) exhibit greater centralization of business oriented services than both the

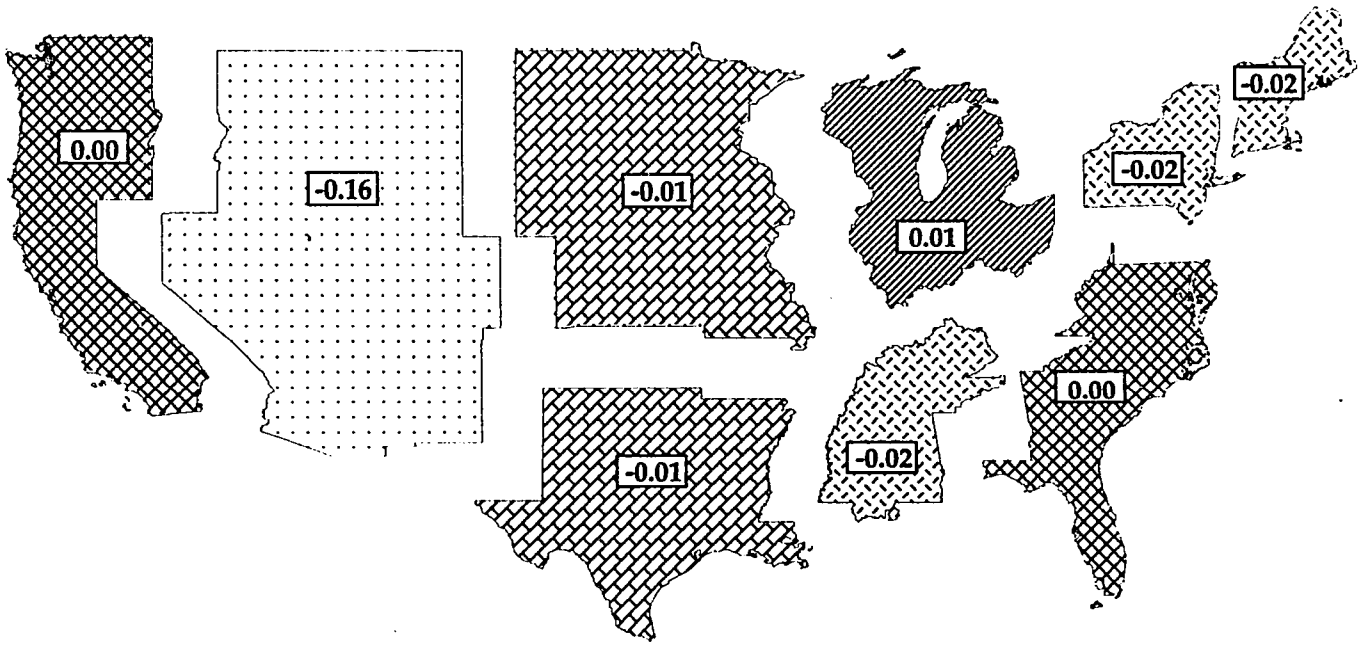

Fig 3. The change in the means of location coefficients for consumer oriented services by regions of the core counties, 1979-89.

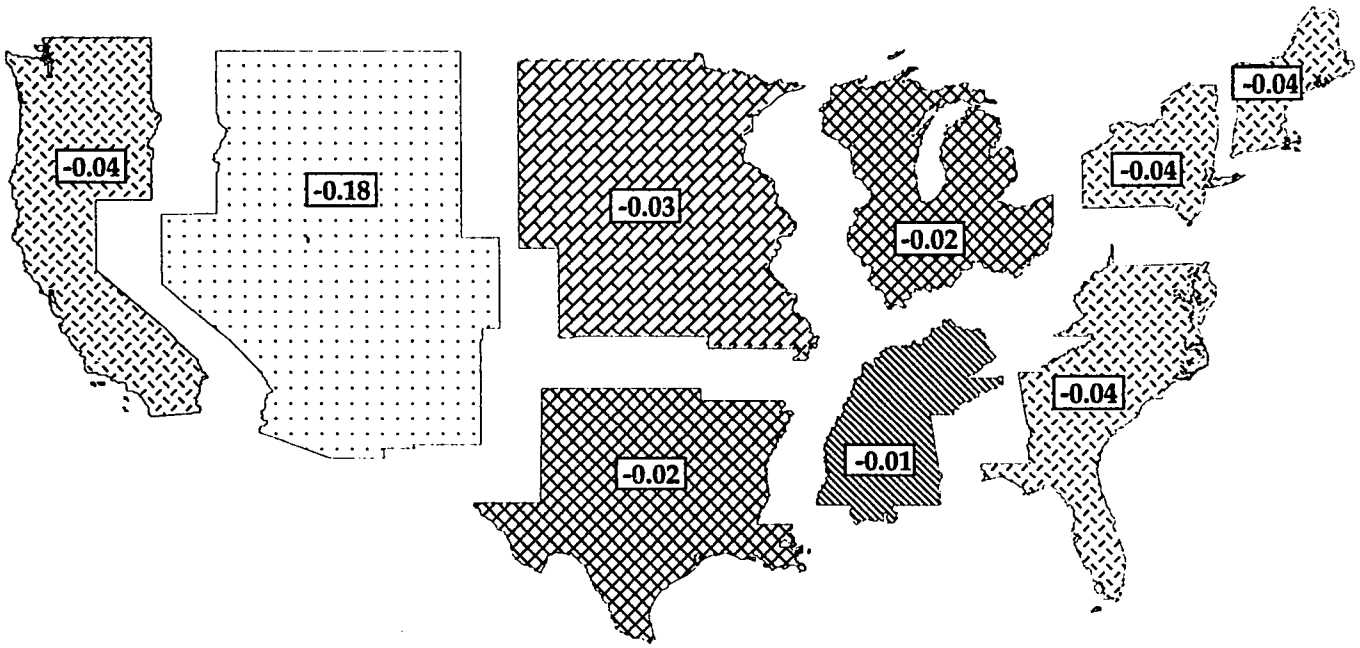

Fig 4. The change in the means of location coefficients for consumer oriented services by regions of the core counties, 1969-89.

TABLE 3.10

THE CHANGE IN THE MEANS OF LOCATION COEFFICIENTS OF BUSINESS ORIENTED SERVICES BY REGIONS OF THE CORE COUNTIES

U.S. Regions	LC Mean Change, Bus. Serv. 1969-79	LC Mean Change, Bus. Serv. 1979-89	LC Mean Change, Bus. Serv. 1969-89
New England	0.03	0.02	0.04
W. South Central	0.00	-0.01	-0.01
E. South Central	-0.07*	0.00	-0.08**
Pacific	0.03	0.04	0.06
Mountain	0.27	-0.06	0.21
South Atlantic	-0.14*	0.04	-0.10
W. North Central	0.00	0.02	0.02
E. North Central	-0.08	0.00	-0.07
Mid-Atlantic	0.01	-0.05	-0.04

** Significant at .05
* Significant at .10

Northeast (with 0.01~0.03) and Pacific (with 0.03) regions. The South Atlantic region (with -0.14), on the contrary, shows statistically significant (at .10 percent) decentralization (Table 3.10), and exhibits greater decentralization of business oriented services than both the East North Central (with -0.08) and East South Central (with -0.07) regions.

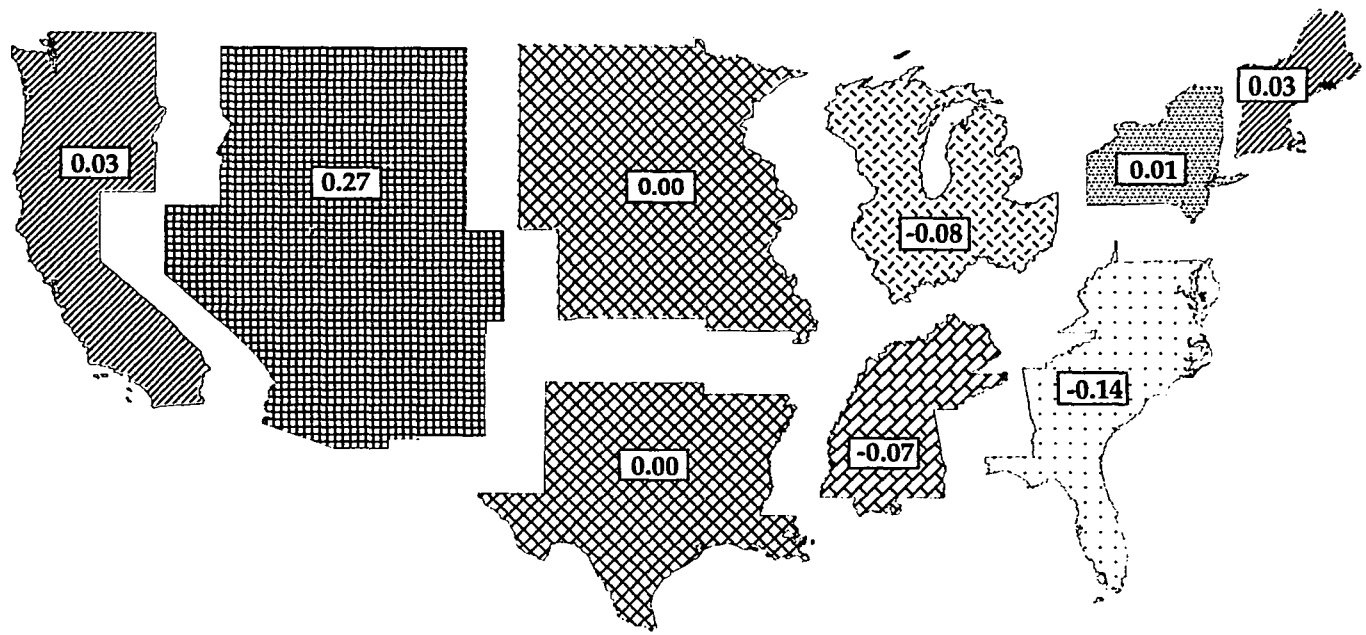

Fig 5. The change in the means of location coefficients for business oriented services by regions of the core counties, 1969-79.

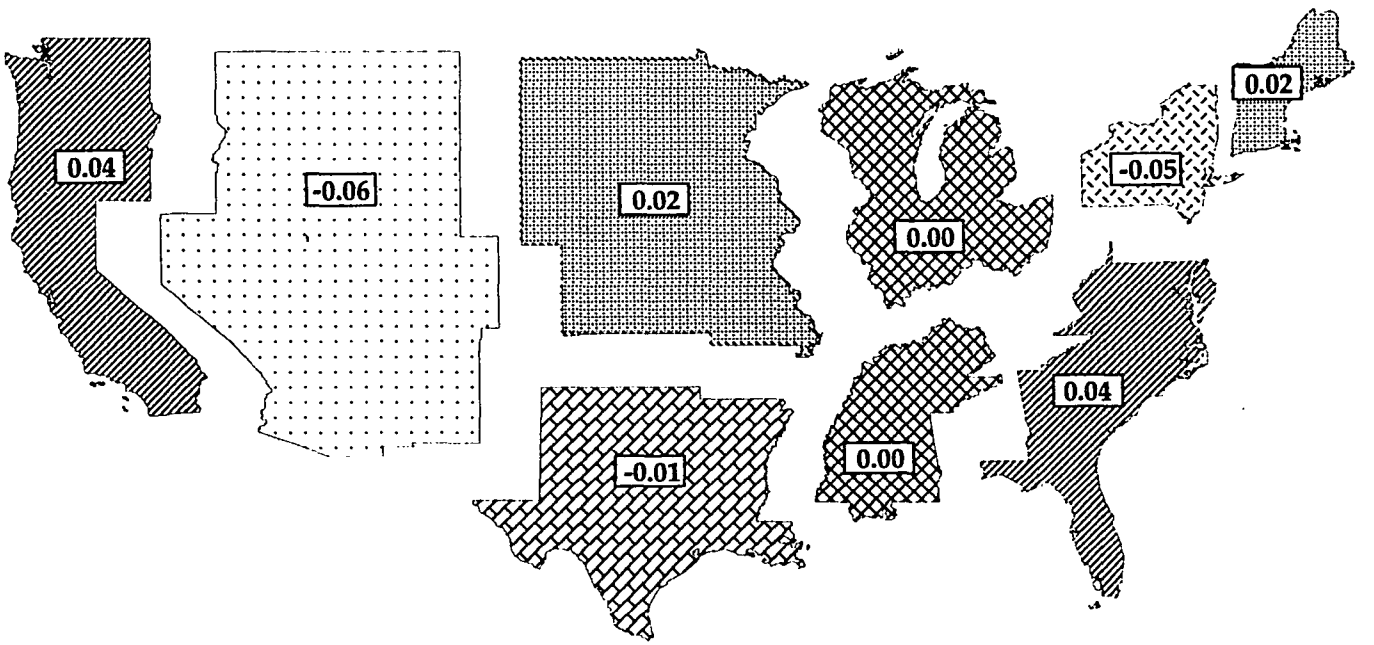

Fig 6. The change in the means of location coefficients for business oriented services by regions of the core counties, 1979-89.

The spatial tendency of business oriented services across these regions for the 1969-79 period contrasts with that for the 1979-89 period. Both Mountain and Mid-Atlantic regions exhibit a tendency toward decentralization during the 1979-89 period (Figure 6). Conversely, the South Atlantic region shows a tendency for centralization (with 0.04) of these services for the 1979-89 period.

Both Manufacturingbelt and South regions, on the whole, show a tendency for decentralization of business oriented services over the period 1969 to 1989 (Figure 7). The Mid-Atlantic and East North Central regions (with -0.04 and -0.07) respectively exhibit a tendency toward the decentralization of these services during the 1969-89 period. There is a tendency toward progressively greater decentrali-zation of business oriented services across the South, as we move from the West South Central region (with -0.01) through the East South Central region (with -0.08) to the South Atlantic region (with -0.10); the East South Central region also shows a statistically significant (at .05 percent) change in decentralization (Table 3.10) as well.

The tendency for decentralization of business oriented services in the Mid-Atlantic region appears to partially reflect the tendency for corporate activities of the Greater New York area to become more dispersed, while that for East South Central region seems to be related, in part, to a lack of major urban service centers. The Western region, on the contrary, shows a tendency for centralization of business oriented services for the 1969-89 period; the Mountain region shows a greater centralization of business oriented services (with 0.21) than the Pacific region (with 0.06).

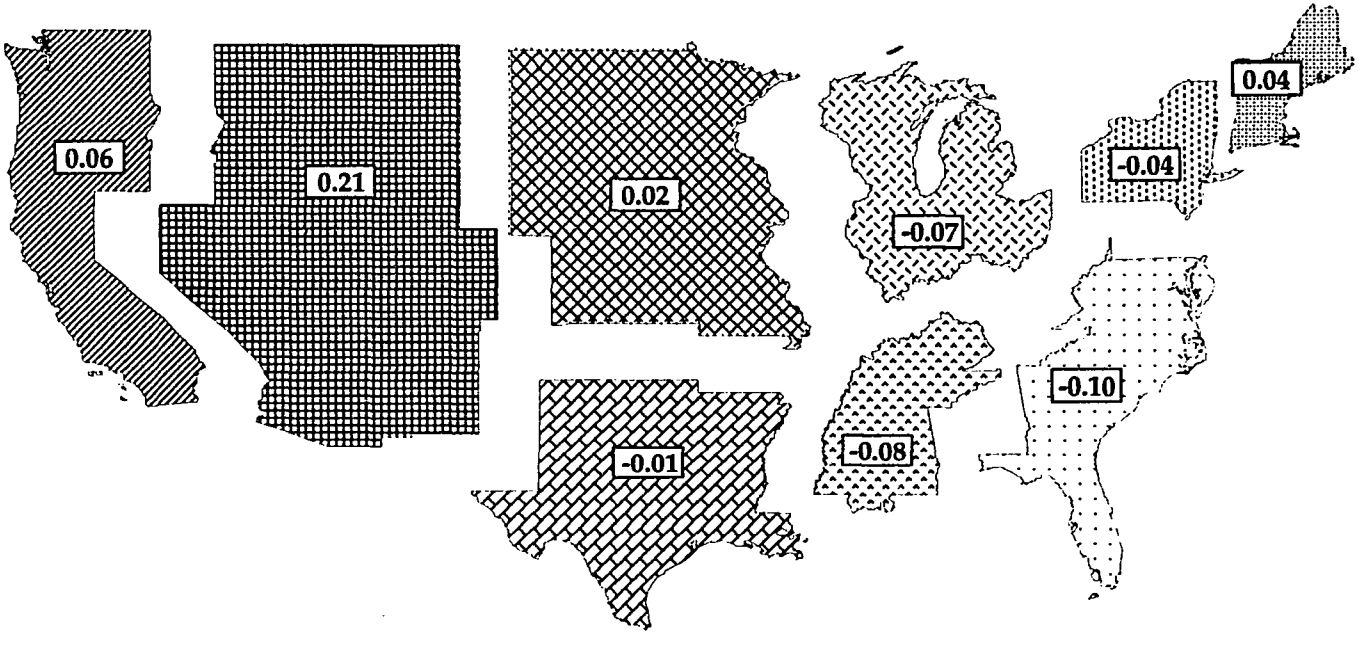

Fig 7. The change in the means of location coefficients for business oriented services by regions of the core counties, 1969-89.

SUMMARY

The analysis provides evidence for the relatively larger urban service centers to demonstrate a spatial behavior of consumer oriented services roughly opposite to that of those in the small and relatively underdeveloped service areas. There is a tendency for greater decentralization of consumer oriented services in the relatively larger urban service centers for the time periods of 1969-79, 1979-89 and 1969-89; this tendency also appears to be reinforced over the period 1969 to 1989. This reflects urban size and the trend toward dispersion of consumer oriented services to the relatively underdeveloped service areas. The greater centralization of consumer oriented services appears to be strong in the small and relatively underdeveloped service areas.

The spatial tendency for consumer oriented services contrasts with that for business oriented services. A tendency for greater centralization of business oriented services is shown for the business centers for the 1969-79 and 1969-89 periods. An increasing trend for greater decentralization of business oriented services appears for the small and relatively underdeveloped service areas during these periods, which indicates the importance of size and service infrastructure necessary to support growth of business oriented services.

The analysis of changes in the means of location coefficients among metropolitan size groups suggests that the large metropolitan group experienced slightly greater decentralization of consumer oriented services than other groups for the one and two decade periods. The tendency of decentralization of consumer oriented services appears to be reinforced in both medium and large size groups over the period 1969 to 1989. Meanwhile, the small metropolitan group shows slightly greater decentralization of business oriented services than

other groups, and a statistically significant change in the decentralization for the 1969-79 and 1969-89 periods.

The analysis shows that the tendency for spatial decentralization of consumer oriented services appears to be reinforced in most regions. There is no consistent spatial tendency of business oriented services for the 1969-79 and 1979-89 periods. An increasing tendency for decentralization of business oriented services in most regions, however, appears for the 1969-89 period; the Manufacturingbelt and the South show a tendency toward decentralization during this period.

CHAPTER IV

METHODOLOGY OF MULTIPLE REGRESSION ANALYSIS

This chapter will analyze how the changes in metropolitan decentralization of service activities are related to economic structural changes, inertia of the existing spatial pattern, communications activity, decentralization of manufacturing, corporate influence, racial composition, level of demand, and regional location. These relationships are analyzed for the core counties which are the largest population counties among the component counties of the U.S. metropolitan areas with three or more component counties for the periods from 1969 to 1989. There is a lot of variation in the extent to which the core county is built out; What is the extent to which core counties can be considered 'central'? This was considered in designing the sample of metropolitan areas. The sample was selected to distinguish core and peripheral counties in metropolitan areas. Since the core counties also tend to be varied by geographical size, this research analyzes regional variables. In this research the unit of analysis is the county.

CONCEPTUAL MODELS

Conceptual Model of Decentralization of Consumer Oriented Services

The changes in decentralization of consumer oriented services in the core counties can be seen as a function of economic structural changes, inertia of the existing spatial pattern, racial composition, the level of service demand and regional location. Stated as a conceptual model:

$$LCC = F(MPC, CE, INER, MB, PI, REG)$$

where:

LCC = change in decentralization of consumer oriented services in a core county;

MPC = change in a core county's metropolitan population;

CE = change in consumer oriented service employment;

INER = inertia of the existing decentralization of consumer oriented services;

MB = change in a core county's metropolitan black population;

PI = change in real per capita income;

REG = regional dummy.

The decentralization of consumer oriented services is attributable to the accessibility to consumer clients and to employee residences (Mills, 1988; Daniels, 1985; Stanback, 1979), and, therefore, is directly linked with the decentralization of both consumers and employees. Thus, changes in the decentralization of consumer oriented services will depend on metropolitan population changes (MPC) and county employment changes (CE) which represent structural changes.

Firms seek cost-effective relocation by comparison between their relocation costs and relocation benefits (Pye, 1977); the geographical inertia of the firms implies relocation costs. Thus, the changes in the decentralization of consumer oriented services will depend on the inertia (INER) of the existing decentralization of consumer oriented services, which reflects the geographical inertia of the consumer oriented service firms.

Consumer service location models are largely based on demand considerations such as access to market, traffic flows, and the level of service demand (Dudey, 1990; Stahl, 1987; Greene, 1980; White, 1975). Thus, the

changes in metropolitan decentralization of consumer oriented services will depend on changes in metropolitan black population (MB) and in per capita income (PI).

The Sunbelt (South and West) cities do not face a tough structural change from a manufacturing oriented economy to a service oriented economy. Thus, they experience faster service growth than the older Northeastern cities (Noyelle and Stanback, 1984). The county sizes also tend to become larger from Eastern region towards Western region, hence the Western region is likely to experience less decentralization of services than the Eastern region. Therefore, the changes in decentralization of consumer oriented service firms will depend on the regional location (REG) of the firms.

Conceptual Model of Decentralization of Business Oriented Services

The changes in decentralization of business oriented services can be seen as a function of economic structural changes, inertia of the existing spatial pattern, communications activity, decentralization of manufacturing, corporate influence, racial composition, the level of service demand and regional location. Stated as a conceptual model:

LCB = F (MPC, BE, INER, MAN, COM, HQ, CS, MB, PI, REG)

where:

LCB = change in decentralization of business oriented services in a core county;

MPC = change in metropolitan population;

BE = change in business oriented service employment;

INER = inertia of the existing decentralization of business oriented services;

MAN = change in decentralization of manufacturing;

COM = change in employment in communications;

HQ = corporate headquarters dummy;

CS = corporate sales;

MB = change in metropolitan black population;

PI = change in real per capita income;

REG = regional dummy.

The accessibility to better educated employees in the suburbs has encouraged relocation of office-based business service firms from central cities (Cervero, 1986; Daniels, 1985). Thus, changes in the decentralization of business oriented services will depend on metropolitan population changes (MPC) and county employment changes (BE), which represent structural changes.

The stable pattern of centralization of business services in the large urban centers reflects the geographical inertia of business service firms (Pred, 1977, 1974); the inertia of the existing decentralization of business oriented services reflects the geographical inertia of business oriented service firms. Given the locational effects of the inertia, the changes in metropolitan decentralization of business oriented services will depend on the inertia (INER) of the existing decentralization of business oriented services.

Since information is a major input and output for business service firms, communications benefits are important locational factors (Price and Blair, 1989; Noyelle and Stanback, 1984; Daniels, 1979). Thus, changes in the decentralization of business oriented services will depend on changes in communications activity (COM). Business service firms provide inputs required in the production process of manufacturing firms (Daniels, 1984; Marshall, 1982); the link between business services and manufacturing appears to explain the locations of both business services and manufacturing in central cities (Mills,

1988). Thus, changes in metropolitan decentralization of business oriented services will depend on changes in decentralization of manufacturing activity (MAN).

Business service locations are tied to corporate headquarter locations since business service firms provide inputs for headquarter activity (Gillespie and Green, 1987; Wheeler, 1986; Noyelle and Stanback, 1984). Corporate headquarters with high-level decision-making functions significantly influence these locations through control of service purchases (Gillespie and Green, 1987; Daniels, 1983, 1979). Thus, the changes in the metropolitan decentralization of business oriented services will depend on headquarter locations (HQ) and corporate sales (CS) which represent corporate influence.

It is hypothesized that the relocation of firms from central cities is partly attributable to racial factors (Mills, 1988). Thus, changes in metropolitan decentralization of business oriented service firms will depend on changes in metropolitan black populations (MB). The decentralization of service activity is also tied to the decentralization of residents, especially, the middle and upper income groups (Mills, 1988; Stanback, 1979). It is hypothesized that changes in decentralization of business oriented services will depend on changes in per capita income (PI).

The older Northeastern cities with manufacturing heritage are expected to show slower service growth than Sunbelt cities (Noyelle and Stanback, 1984). County sizes in the Western region also tend to be larger than those of Eastern region, implying the locational effects of geographical size. Therefore, changes in decentralization of business oriented service firms will be likely depend on the regional location (REG) of the firms.

OPERATIONAL MODELS

Operational Models of Decentralization of Consumer Oriented Services

The models of decentralization of consumer oriented services take the following linear form:

$LCC_{it} = a+bMPC_{it*}+cCE_{it}+dINER_{it**}+eMB_{it*}+fPI_{it}+gREG_i$

where:

LCC_{it} = change in the location coefficient of consumer oriented services in a core county i and time t;

MPC_{it*} = change in metropolitan population;

CE_{it} = change in consumer oriented service employment;

$INER_{it**}$ = inertia of the existing decentralization: the LCC_{it**};

MB_{it*} = change in metropolitan black population;

PI_{it} = change in real per capita income (per capita income expressed in constant 1989 values by using the Consumer Price Index);

REG_i = regional dummies: one if core county is in Northeast, West, South, Midwest region, otherwise zero;

t = time (1969-79, 1979-89, 1969-89);

t* = time (1970-80, 1980-90, 1970-90);

t** = time (1959-69, 1969-79, 1959-79);

a = intercept;

b - g = the slope coefficient.

Operational Models of Decentralization of Business Oriented Services

The models of decentralization of business oriented services take the following linear form:

$LCB_{it} = a+bMPC_{it*}+cBE_{it}+dINER_{it**}+eMAN_{it}+fCOM_{it}+gHQ_i+hCS_i+iMB_{it*}$
$+jPI_{it}+kREG_i$

where:

LCB_{it} = change in the location coefficient of business oriented services in a core county i and time t;

MPC_{it*} = change in metropolitan population;

BE_{it} = change in business oriented service employment;

$INER_{it**}$ = inertia of the existing decentralization: the LCB_{it**};

MAN_{it} = change in the location coefficient of manufacturing (SIC 2000-3999): the $LC(manufacturing)_{it}$;

COM_{it} = change in employment of communications (SIC 4800);

HQ_i = corporate headquarters dummy: one for core county's metropolitan area with 'Fortune' 500 corporate headquarter, otherwise zero in each 1969 and 1979;

CS_i = corporate sales (in million dollars): the sales for 'Fortune' 500 industrial corporations in core county's metropolitan area in each 1969 and 1979;

MB_{it*} = change in metropolitan black population;

PI_{it} = change in real per capita income (per capita income expressed in constant 1989 values by using the Consumer Price Index);

REG_i = regional dummies: one if core county is in Northeast, West, South, Midwest region, otherwise zero;

t = time (1969-79, 1979-89, 1969-89);

t* = time (1970-80, 1980-90, 1970-90);

t** = time (1959-69, 1969-79, 1959-79);

a = intercept;

b - k = the slope coefficient.

Expected Signs of Variables

The expected coefficient signs of the explanatory variables are presented in Table 4.1. The accessibility to clients in the suburbs given the population decentralization has encouraged relocation of consumer service firms from central cities (Daniels, 1985; Stanback, 1979); The faster the population growth, the more the consumer oriented services are likely to decentralize. Thus, the change in the location coefficients of consumer oriented services is hypothesized to be inversely related to the changes in metropolitan populations (POPUC), as indicated by the minus sign (Table 4.1).

TABLE 4.1

AN EXPECTED SIGN OF THE VARIABLES
ASSOCIATED WITH THE CHANGE IN DECENTRALIZATION
OF CONSUMER ORIENTED AND BUSINESS ORIENTED SERVICES

		Coef. of Hypothesized Sign with Dependent Variable	
Variable	Symbol	Change in Decentr. of Con. O. Serv.	Change in Decentr. of Bus. O. Serv.
Metro Population Change	POPUC	–	–
Inertia of the Existing Decentralization	INERTIA	–	–
Change in Employment of Cons. O. Serv.	COSEMPC	+	
Change in Employment of Bus. O. Serv.	BUSEMPC		+

TABLE 4.1
(continued)

AN EXPECTED SIGN OF THE VARIABLES
ASSOCIATED WITH THE CHANGE IN DECENTRALIZATION
OF CONSUMER ORIENTED AND BUSINESS ORIENTED SERVICES

Change in Decentr. of Manufacturing	MANUFC		–
Change in Employment of Communications	COMEMPC		+
Corporate Headquarter	HQUARTER		+
Corporate Sales	CPSALES		+
Metro Black Change	BLACKC	–	–
Per Capita Income Change	PERINCC	–	–
Northeast	NORTHEAST	–	–
Midwest	MIDWEST	–	–
West	WEST	+	+

The relocation of business oriented service firms from central cities is attributable to accessibility to employee residences in the suburbs (Cervero, 1986; Daniels, 1985). The faster the residential growth, the more likely the firms relocate to the suburbs. Thus, it is hypothesized that the change in the location coefficients of business oriented services is inversely related to the changes in metropolitan populations (POPUC).

The locations of service firms are tied to the firms' geographical inertia, which implies their relocation costs (Pred, 1977, 1974). It is hypothesized that the change in the location coefficients of consumer oriented services is inversely related to the inertia (INERTIA) of the existing decentralization of the services, as indicated by the minus sign (Table 4.1). Likewise, the change in the location coefficients of business oriented services is hypothesized to be inversely related to the inertia (INERTIA) of the existing decentralization of the services.

Service activity is subject to external economies of scale as average production costs decrease and as the spatial clustering of the linked service firms increases (Price and Blair, 1989; Stanback et al., 1981; Meyer, 1980). The faster the service employment growth, the more external economies of scale increase. It is hypothesized that the change in the location coefficients of consumer oriented services is positively related to the change in employment of consumer oriented services (COSEMPC). Likewise, the change in the location coefficients of business oriented services is hypothesized to be positively related to the change in employment of business oriented services (BUSEMPC), as indicated by the plus sign (Table 4.1).

The locations of business services seem to be tied to the locations of manufacturing activity, partly, due to their linkages (Mills, 1988; Daniels, 1984; Marshall, 1982); the faster the growth of manufacturing activity, the activity given the trend of manufacturing decentralization (Stanback et al., 1981) is more likely to decentralize. Thus, it is hypothesized that the change in the location coefficients of business oriented services is inversely related to the change in decentralization of manufacturing activity (MANUFC).

Communication costs are a major locational factor of business service firms (Stanback, 1979; Goddard and Pye, 1977; Goddard and Morris, 1976). The faster the growth of communications activity, the more likely the

communication economies of scale increases, hence lowering communication costs (Pred, 1974). Thus, the change in the location coefficients of business oriented services is hypothesized to be positively related to changes in communications activity (COMEMPC), as indicated by the plus sign (Table 4.1).

Due to business links, the locations of business services are closely tied to the locations of corporate headquarters (Gillespie and Green, 1987; Wheeler, 1986; Noyelle and Stanback, 1984); these linkages reinforce agglomeration benefits, such as specialized information and expertise (Stanback, 1979). The greater the corporate demand for service inputs, the more these agglomeration benefits increase. Therefore, the change in the location coefficients of business oriented services is hypothesized to be positively related to headquarter locations (HQUARTER) and to corporate sales (CPSALES), which represent corporate demand.

The decentralization of consumer service activity that relies on access to households is tied to the decentralization of residents (Kellerman, 1985; Alexander and Dawson, 1979; Stanback, 1979). The concentration of black populations in the central cities seems to either induce relocation of employers to the suburbs or reflect the consequences of such relocation (Mills, 1988). Thus, the change in the location coefficients of consumer oriented services is hypothesized to be inversely related to the change in black population (BLACKC), as indicated by the minus sign (Table 4.1). Likewise, the change in the location coefficients of business oriented services is hypothesized to be inversely related to the change in black population (BLACKC).

The location of consumer services is attributable to the level of service demand (Dudey, 1990; Stahl, 1987; Greene, 1980; White, 1975). The faster the growth of per capita income, the greater the service activity trend of decentralization (Stanback, 1979). Therefore, it is hypothesized that the change

in the location coefficients of consumer oriented services is inversely related to per capita income (PERINCC). Likewise, the change in the location coefficients of business oriented services is hypothesized to be inversely related to per capita income (PERINCC), as indicated by the minus sign (Table 4.1).

The Manufacturingbelt cities are experiencing slow service growth, due partly to a difficult structural transition to a service oriented economy (Noyelle and Stanback, 1984). The fast growing economy in the Sunbelt reflects the region's fast service growth (Hall, 1988). The faster growth of service activity is likely to produce greater agglomeration economies, thus resulting in relatively more centralization of service activity in the West. The geographical sizes of counties also tend to be larger in the Western region. While plus signs are expected on the coefficients of WEST, minus signs are expected for the coefficients of the NORTHEAST and MIDWEST, regional variables (Table 4.1).

VARIABLE MEASUREMENT AND DATA SOURCES

For the core-peripheral classification, all U.S. metropolitan areas with three or more component counties were included in the initial sample, giving 94 metropolitan areas and 471 counties (94 core counties and 377 peripheral counties). The metropolitan statistical area (MSA) sample was from Rand McNally Atlas (1992). Because of the four counties which belong to the multiple metropolitan areas and one county with missing data, the initial sample was reduced to 455 counties (89 core counties and 366 peripheral counties), and 89 metropolitan areas.[4]

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[4] The sample contains 69 metropolitan areas classified as MSAs, and the rest classified as PMSAs (Primary Metropolitan Statistical Areas).

Employment data provided by the 1969, 1979, and 1989 *County Business Patterns* (CBP) was used to create the data on location coefficients of business oriented and consumer oriented services: LCC_i (1969-79); LCC_i (1979-89); LCC_i (1969-89); LCB_i (1969-79); LCB_i (1979-89); and LCB_i (1969-89). Since the consumer oriented and business oriented services are classified by SIC codes as illustrated earlier, the CBP data is appropriate for this study.

The CBP data is also necessary for the computation of the employment-based location coefficients. With these reasons, the 1969, 1979, and 1989 CBP data was used to create the manufacturing spatial pattern variable (MANUFC), measured in terms of change in the values of location coefficients of manufacturing for the time period of 1969-79, 1979-89 and 1969-89 ($LC(manufacturing)_i$, 1969-79, 1979-89, 1969-89).

To reflect the business relocation cost, two variables were created, one for INERTIA and one for communications (COMEMPC). The INERTIA variable was created based on the 1959, 1964, 1969, and 1979 CBP. Since CBP data was combined for several counties until its 1962 publication, data for some of the individual counties could not be obtained, thus affecting the sample size. Hence, the 1964 CBP data was included here to make the sample size for the LCB_i (1969-89) model to be more compatible with that of the LCB_i (1979-89) model. Like the dependent variables, the 1969, 1979, and 1989 CBP were used to create the data for the COMEMPC, which is measured in terms of change in the employment of communications (SIC 4800) in the core counties. The advantage of the CBP data is that the longitudinal comparisons of communications establishments' locational changes over time are possible.

Since *Fortune* magazine has consistently published detailed data for corporate headquarters, the Fortune 500 Directory for 1969 and 1979 was used here to develop two corporate influence variables. The first is a corporate

headquarter dummy variable (HQUARTER) which equals one for metropolitan areas with a 'Fortune 500' corporate headquarter, and zero otherwise. The second variable (CPSALES) is sales (in million dollars) for 'Fortune 500' industrial corporations located in the metropolitan area in 1969 and 1979 (Fortune, 1970, 1980).

The Consumer Price Index was used to adjust 1969 and 1979 per capita income to 1989 values, hence creating real per capita income variable (PERINCC), measured in terms of change in real per capita income in the core counties for the 1969-79, 1979-89 and 1969-89 periods, reflecting level of service demand. The data for PERINCC was extracted from the 1970 and 1980 Census of Population, and 1990 Census of Population and Housing. To compute the change in the metropolitan black population (BLACKC), the data was also developed from the information provided by the 1970 Census of Population, and 1980 and 1990 Census of Population and Housing.

To create variables for economic structural change (POPUC, COSEMPC and BUSEMPC) two sources were used. The 1970, 1980, and 1990 Census of Population were used to calculate the change in a core county's metropolitan population (POPUC). The data for both COSEMPC and BUSEMPC variables, which are each measured in terms of the change in consumer oriented and business oriented service employment, 1969-79, 1979-89 and 1969-89, were provided by the 1969, 1979, and 1989 County Business Patterns. Finally, the U.S. region variables were broken down into four dichotomous variables representing the census geographic divisions: Northeast, Midwest, South, and West.

ANALYSIS OF DATA

Multiple-regression analysis is used to analyze the data for the variables in the models of decentralization of consumer oriented and business oriented services. The normality test is carried out to examine whether these models hold the assumption of normal distribution. The test statistic (Greene, 1990: p. 135) is:

$$L=n[\text{skewness}^2/ 6 + (\text{kurtosis}-3)^2/ 24]$$

where:

n: number of observations;

skewness: a measure of asymmetric distribution, i.e. $E[(x-\mu)^3]$ ($E[x]$=the expected value of a random variable x, μ=mean of a random variable);

kurtosis: a measure of the thickness of the distribution's tails, i.e. $E[(x-\mu)^4]$ (Greene, 1990: p. 60).

These measures are calculated from the ordinary least squares analysis. If the calculated L statistic does not exceed the critical chi-square value with two degrees of freedom, the models satisfy the assumption of normal distribution.

To determine whether these models have problems of heteroskedasticity (i.e., unequal variances for different observations), the Breusch-Pagan (B-P) and White tests are conducted. These tests are appropriate when the models satisfy the normality assumption; if the models violate normality, the Koenkar-Basset (K-B) test is more reasonable (Greene, 1990). The heteroskedasticity test procedures are as follows:

$$y=a + bx + e \quad \text{(OLS model)} \qquad \text{(eq.1-1)}$$

where:

a: intercept; b:slope coefficient; e:error.

e^2=a + bx + ee (derived from the eq.1-1) (eq.1-2)

The B-P statistic is: ESS/ 2[(sum(e^2)/N)^2]

where:

ESS:explained sum of square; N: number of observations; ee: error (Greene, 1990: p. 421).

The K-B statistic is: ESS/ [sum(e^2-s^2)^2/N]

where: s^2= sum(e^2)/N (Greene, 1990: p. 422).

e^2=a + bx + cx^2 + d(cross-product among x)+ u (eq.1-3)

The White statistic is: N*R-square

where,

u: error; N: number of observations (Greene, 1990: p. 420).

If these calculated statistics are greater than the critical chi-square values (degrees of freedom: number of explanatory variables), heteroskedasticity is present in the models. As a correction weighted least squares (WLS) analysis is conducted. The weight is specified as follows:

weight= 1/ fitted bp, fitted bp= ee2/ s2 (from the eq.1-2)

where: ee2 (fitted e^2)=e^2-ee; s2=mean(e^2).

The WLS analysis is carried out by the GAUSS Least Squares econometric program.[5]

SUMMARY

This study examines changes in decentralization of consumer oriented and business oriented services in the core counties in U.S. metropolitan areas with three or more component counties for the periods from 1969 to 1989. The variables for this study are used in multiple regression analyses. Data for 455 counties (89 core counties and 366 peripheral counties) are from various sources which consist of an Atlas, Fortune 500 Directory, and the Census publications for various years.

The dependent variables are the changes in decentralization of consumer oriented and business oriented services in a core county. The independent variables consist of economic structural changes, inertia of the existing location pattern, communications activity, location pattern of manufacturing, corporate influence, racial composition, level of service demand, and regional location. The results of multiple regression analyses for the period from 1969 to 1989 are presented in the following chapter.

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[5] The sources: Applied Data Associates, P.O. Box 8976, Portland, OR 97207; Aptech Systems, Inc., 26250 196th Place S.E., Kent, WA 98042.

CHAPTER V

RESULTS OF MULTIPLE REGRESSION ANALYSES

The models of decentralization of consumer oriented and business oriented services were estimated separately for the two sub-periods (1969-79, 1979-89) and the total period (1969-89). The results for the sub-periods are discussed in the first section of this chapter, and for the total period in the second section.

There are no significant violations of regression assumptions such as orthogonality, normality and collinearity in the model of decentralization of business oriented services for the period of 1969-79, and in the model of decentralization of consumer oriented services for the 1969-89 period. Meanwhile, the Koenkar-Basset test was carried out for the model of decentralization of consumer oriented services for the 1969-79 and 1979-89 periods, which do not satisfy the normality assumption. The test was also conducted for the models of decentralization of business oriented services for the periods 1979-89 and 1969-89.

The Koenkar-Basset test indicates that heteroskedasticity is not present in the model of decentralization of consumer oriented services for the 1969-79 period, and in the models of decentralization of business oriented services for the period of 1979-89 and model II for the period of 1969-89. But the Koenkar-Basset test indicates the presence of heteroskedasticity in the model of decentralization of consumer oriented services for the 1979-89 period and in the model I of decentralization of business oriented services for the 1969-89 period.

The Breusch-Pagan and White tests were conducted for the model II of decentralization of business oriented services, 1969-79 and for the model of

decentralization of consumer oriented services, 1969-89. The results show the presence of heteroskedasticity in these models. The available techniques (weighted least squares) as discussed in Chapter IV were used to correct for the heteroskedasticity problem. The results of weighted least squares (WLS) for both models show much higher R^2 values and greater heteroskedasticity as compared to those of ordinary least squares (OLS), hence the results of OLS estimations are discussed here (see Appendix D for the WLS results).

Based on the article by Hoerter and Wiseman (1988) the location coefficients were calculated for the dependent variables. For clarification, this location coefficient represents a measure of relative concentration or deconcentration of jobs in core counties as compared to their metropolitan areas. For instance, the outcome of the centralization tendency of the core county's jobs may be a result of one of the four possible processes. That is, the jobs grow more in the core counties than in the rest of the metropolitan area. The second one is that jobs are growing in the core counties, but not growing in the rest of the metropolitan area. The third one is that jobs are not declining as much in the core counties as in the rest of the metropolitan area. The last one is that jobs are stable in the core counties, but are declining in the rest of the metropolitan area.

The models, on the whole, explain a fair portion of the variability in decentralization of consumer oriented and business oriented services for the sub-periods (1969-79, 1979-89) and for the total period (1969-89), as indicated by the adjusted R^2 values. They also show a low standard error of estimate. Most of the coefficients have the expected signs, and many are statistically significant.

RESULTS OF SERVICE DECENTRALIZATION MODELS, 1969-79 and 1979-89

This section discusses the results of the models of decentralization of consumer oriented and business oriented services for the sub-periods (1969-79, 1979-89). The OLS results for these models and the test statistics are summarized in Table 5.1. Since the 1969 CBP data for some of core counties shows a complete centralization of consumer oriented services (i.e., $COE_{ijt} = MCO_{jt}$ in the LC_{ci}), the sample size (Table 5.1) was reduced in the model of decentralization of consumer oriented services for the period of 1969-79 from that of the model for the period of 1979-89. The corporate sales variable in the model I of decentralization of business oriented services for the periods of 1969-79 and 1979-89 causes the sample sizes (Table 5.1) to drop from those of the model II for both periods.

Structural Change Variables

The effects of the structural change variables on change in decentralization of consumer oriented and business oriented services for the 1969-79 and 1979-89 periods are summarized in Table 5.1. The coefficients of POPUC have the expected signs except for the consumer oriented services for the 1969-79 period. The minus sign on the POPUC measuring metropolitan structural change supports its hypothesized relationship with the changes in decentralization of consumer oriented and business oriented services. In the POPUC, the result shows much larger coefficients with a much higher significance (at .01 percent) in the models for the 1979-89 period than for the 1969-79 period. This indicates that metropolitan population growth has a much greater effect on the decentralization of consumer oriented and business oriented

services between 1979 and 1989 as compared to the preceding period, 1969-79. The coefficients of POPUC are -4.7920 for the consumer oriented services for the 1979-89 period, and -0.2283 for the business oriented services for the 1969-79 period and -4.7409 for the 1979-89 period. Thus 1 percent increase in the core county's metropolitan population decreases the location coefficient value of consumer oriented services by 4.7920 percent, and the value of business oriented services by 0.2283 percent and by 4.7409 percent.

In comparison, the differences in coefficients on POPUC lead to different conclusions about the probable effects of faster growth of metropolitan populations that increase decentralization of business oriented services. The coefficient of POPUC in the model of decentralization of business oriented services for the 1969-79 period implies that the business oriented services slightly decentralize if metropolitan populations increase 1 percent. The POPUC variable in the models of decentralization of consumer oriented and business oriented services for the period of 1979-1989 indicates that the changes in decentralization of consumer oriented and business oriented services in the core counties are very responsive to the rates of growth of their metropolitan populations.

The COSEMPC and BUSEMPC variables, which represent a core county's structural change, are significant in all models and have the expected signs. The small positive coefficients on COSEMPC for the period of 1969-79 and on BUSEMPC for the 1969-79 and 1979-89 periods imply that the service employment growth causes consumer oriented and business oriented services to centralize slightly. But, it results in greater centralization of consumer oriented services for the 1979-89 period.

TABLE 5.1

OLS RESULTS USING THE CHANGES OF DECENTRALIZATION OF CONSUMER ORIENTED AND BUSIENSS ORIENTED SERVICES OF THE CORE COUNTIES, 1969-79 AND 1979-89

Variable	Con.O. Serv. 1969-79	Con.O. Serv. 1979-89	Bus.O. Serv. I 1969-79	Bus.O. Serv. I 1979-89	Bus.O. Serv. II 1969-79	Bus.O. Serv. II 1979-89
constant	-0.0579**	-0.0400**	-0.1083*	-0.0813**	-0.0885*	-0.0441*
	(-2.2945)	(-2.4456)	(-1.8335)	(-2.4910)	(-1.3444)	(-1.3203)
popuc			-0.2283*		-0.1002	
			(-1.5107)		(-0.7520)	
popuc>>	0.9862	-4.7920***		-1.8730		-4.7409**
	(1.0636)	(-3.7173)		(-0.5972)		(-2.1469)
cosempc	0.0502*					
	(1.1674)					
cosempc>>		4.8696***				
		(12.080)				
busempc			0.1057**	0.1133***	0.0867**	0.0917***
			(2.6741)	(3.4100)	(2.3038)	(2.9732)
inertia	0.2328*	-0.1437*	-0.7789***	-0.1376*	-0.6496***	-0.1677*
	(1.5360)	(-1.1942)	(-3.9523)	(-1.2913)	(-3.8086)	(-1.6101)
comempc				0.0214		0.0705*
				(0.5047)		(1.8042)
manufc			-0.5835***	-0.6599***	-0.1683	-0.0786
			(-2.7998)	(-3.9557)	(-0.9314)	(-0.7968)
perincc>>	0.1495	-3.5833***	-0.4659	0.1563	-3.4880*	-0.0972
	(0.1248)	(-3.6814)	(-0.1604)	(0.0966)	(-1.4431)	(-0.0643)
blackc				0.0385		0.0204
				(0.5753)		(0.3466)

TABLE 5.1
(continued)

OLS RESULTS USING THE CHANGES OF DECENTRALIZATION OF CONSUMER ORIENTED AND BUSIENSS ORIENTED SERVICES OF THE CORE COUNTIES, 1969-79 AND 1979-89

blackc>>	0.0251	-0.6166**	0.2596		0.9679*	
	(0.0722)	(-2.1428)	(0.3368)		(1.3145)	
cpsales			8.6360e-07*	1.6777e-07		
			(1.2353)	(0.7815)		
hquarter					0.0371	0.0132
					(1.0838)	(0.5419)
Northeast	0.0285*	0.0282*	0.0737*	-0.0150	0.0653*	-0.0390
	(1.2164)	(1.1908)	(1.3495)	(-0.3602)	(1.3257)	(-0.9990)
Midwest	0.0206	0.0213	0.0386	-0.0105	0.0070	-0.0168
	(1.1289)	(1.0978)	(0.8619)	(-0.2990)	(0.1730)	(-0.5270)
West	-0.0051	0.01209	0.2208***	0.0527	0.1662***	0.0382
	(-0.1865)	(0.4003)	(3.1316)	(0.8697)	(2.8894)	(0.7906)
R^2	0.1821	0.6769	0.5514	0.5060	0.4331	0.2815
AdjR^2	0.0782	0.6433	0.4363	0.3701	0.3353	0.1540
L statistic	51.1576	12.50	3.66	23.4	10.28	142.398
B-P statistic			19.167		32.93	
White statistic			32.14		54.55	
K-B statistic	6.5956	28.019		18.1557		15.8668
Stand. Error	0.0534	0.0608	0.1020	0.0790	0.1082	0.0865
No. of Cases	72	86	50	52	69	74

Statistics not in parentheses are estimated coefficients.
*** Significant at .01 (t-statistics in parentheses)
** Significant at .05
* Significant at or below .10
>> Logged variables

Relocation Cost Variables

The coefficients of INERTIA have the expected signs except for consumer oriented services for the 1969-79 period, and are significant in all models. The result shows larger coefficients with a much higher significance in the models of business oriented services than in the models for consumer oriented services. The results of the INERTIA variable which reflects the geographical inertia of the services may be due to the greater effects of business relocation cost on the changes of decentralization of business oriented services than on those of consumer oriented services. This supports the findings that the geographical inertia of the services which implies service relocation costs influences the locations of services (Pred, 1977, 1974).

The significant coefficients on INERTIA for the time periods of 1969-79 and 1979-89 support the hypotheses that changes in the location coefficients of consumer oriented and business oriented services are inversely related to the inertia of the existing decentralization of consumer oriented and business oriented services. The significant effect of the existing decentralization trend has implications on service decentralization policy. The less restrictive policy that encourages going against decentralization trend might encourage more decentralization of urban services given the significance of the existing decentralization trend.

The coefficient of COMEMPC for the 1979-89 period indicates that the location coefficient value of business oriented services will increase by 0.0705 percent if the core county's communications employment increases by 1 percent. The coefficient on COMEMPC, a proxy for communications activity supports the hypothesis that change in the location coefficients of business oriented services is positively related to changes in communications activity.

The growth of communications activity causes the communication economies of scale to increase, and thus leads to lowering communication costs, a major locational factor for business services (Stanback, 1979; Goddard and Pye, 1977; Goddard and Morris, 1976). Thus, communications investment policy in the core counties might promote communications industry, hence influencing their business oriented services to locate there.

Manufacturing Decentralization Variable

The MANUFC variable in the models of business oriented services for the time periods of 1969-79 and 1979-89 indicates the significant effect of decentralization of manufacturing activity on decentralization of business oriented services. The significant coefficients on MANUFC support the hypothesis that change in the location coefficients of business oriented services is inversely related to change in decentralization of manufacturing activity.

The effect of manufacturing decentralization may be due to the business linkages between business services and manufacturing activity (Daniels, 1984; Marshall, 1982). The results of the MANUFC variable support Mills' (1988) speculations about the locational effects of related activities. The findings on MANUFC imply that the core counties with a greater decentralization of manufacturing activity are also likely to experience a greater decentralization of their business oriented services.

Service Demand Variable

The coefficients of PERINCC are -3.5833 for consumer oriented services for the 1979-89 period, and -3.4880 for business oriented services for the 1969-79 period. Thus 1 percent increase in the core county's real per capita income decreases the location coefficient value of consumer oriented services by 3.5833

percent, and the value of business oriented services by 3.4880 percent. This indicates that the growth of real per capita income results in greater decentralization of consumer oriented and business oriented services. The results support the hypotheses that changes in the location coefficients of consumer oriented and business oriented services are inversely related to changes in real per capita income.

The significant coefficients on PERINCC, a proxy for the level of service demand imply that relocations of consumer oriented and business oriented services are very responsive to relocation of higher income population. Hence, the greater decentralization of middle and high income residents (Stanback, 1979) will cause the more urban services to relocate from the core counties. Therefore, the counties with a large proportion of low income residents are in greater disadvantage to keep or attract urban service activity.

Racial Composition Variable

The coefficients of BLACKC in the models show the effects of black populations on changes in decentralization of each consumer oriented and business oriented services. The coefficients are -0.6166 for consumer oriented services for the 1979-89 period, and 0.9679 for business oriented services for the 1969-79 period. This indicates that 1 percent increase in the metropolitan black populations decreases the location coefficient value of consumer oriented services by 0.6166 percent, and increases the value of business oriented services by 0.9679 percent. The minus sign on the BLACKC supports its hypothesized relationship with the change in decentralization of consumer oriented services.

The findings on BLACKC variable in the model of consumer oriented services imply that core counties with a faster growth of their metropolitan black populations are likely to experience a greater decentralization among these black

populations, causing further dispersal in the consumer oriented services. Also, the BLACKC variable, a proxy for racial tension, would indicate that consumer oriented services are relocating from core counties to avoid racial tension.

The positive coefficient of BLACKC in the model of business oriented services implies that growth of metropolitan black populations does not induce business oriented services to move away from the core counties. Perhaps business service firms take greater considerations of other locational needs, such as specialized information and linkages with other firms in urban centers (Daniels, 1985; Marshall, 1985).

Corporate Influence Variables

The CPSALES variable in the model of business oriented services between 1969 and 1979 indicates that a core county with a higher initial level of corporate sales is likely to experience slightly more centralization of business oriented services. The positive coefficient on CPSALES supports the hypothesis that change in the location coefficients of business oriented services is positively related to corporate sales. The findings on CPSALES variable, which represents corporate demand, suggest that the larger corporate demand causes more centralization of business oriented services.

The corporate headquarter variables, HQUARTER have the expected positive signs, thus supporting the hypothesized positive relationship between the headquarter locations and the change in the location coefficients of business oriented services. But, the influence of the presence of corporate headquarters on the centralization of business oriented services appears weak, as indicated by the insignificant coefficients on HQUARTER. Although others report the close locational linkage between business services and corporate headquarters

(Gillespie and Green, 1987; Wheeler, 1986), the results here show that corporate influence is better represented by sales than by the presence of headquarters.

Regional Location Variables

The coefficients of the regional variables representing the Northeast and Midwest have the expected signs in the models of business oriented services for the period of 1979-89, but are insignificant. Meanwhile, the coefficients of Northeast are positive and significant in the models of consumer oriented services for the periods of 1969-79 and 1979-89 and in the models for business oriented services for the 1969-79 period. These coefficients indicate that core counties in the Northeast are likely to experience slightly greater centralization of consumer oriented and business oriented services than those in the South.

The coefficients for MIDWEST are very similar to those of NORTHEAST, but lack statistical significance. The coefficients of WEST have the expected signs, except for the consumer oriented services for the period of 1969-79. The positive and significant coefficients of WEST in the models of business oriented services for the 1969-79 period indicate that the centralization of business oriented services would be relatively greater in the core counties in the West than those in the South. The results support the hypothesis that the core counties in the West are likely to experience relatively more centralization of business oriented services than those in the South.

The effects of the regional dummies, classical control variables, suggest that a core county's prospect of urban service growth is associated with its region. For example, the core counties in the West are in relatively greater advantage to keep their service activities as compared to those in the South.

RESULTS OF SERVICE DECENTRALIZATION MODELS, 1969-89

This section discusses the results of the models of decentralization of consumer oriented and business oriented services for the total period (1969-89). The results of the OLS analysis and the test statistics are presented in Table 5.2.

Structural Change Variables

The coefficients of POPUC variable in the models of consumer oriented and business oriented services for the period of 1969-89 have the expected signs. The coefficients of POPUC are -1.1371 for consumer oriented services, and -1.5314 for business oriented services. Thus a 1 percent increase in a metropolitan population decreases the location coefficient value of consumer oriented services by 1.1371 percent, and the value of business oriented services by 1.5314 percent. This indicates that the changes in decentralization of consumer oriented and business oriented services in the core counties are very responsive to the rates of growth of their metropolitan populations. The findings of POPUC variable support the hypotheses that changes in the location coefficients of consumer oriented and business oriented services are inversely related to changes in metropolitan populations.

The coefficient of COSEMPC for the 1969-89 period indicates that the location coefficient value of consumer oriented services will increase by 0.0457 percent if the core county's consumer oriented service employment increases by 1 percent. The small, but significant coefficients on the BUSEMPC variables for the period of 1969-89 suggest that the business oriented services slightly centralize if the business oriented service employment increases 1 percent. The

TABLE 5.2

OLS RESULTS USING THE CHANGES OF DECENTRALIZATION OF CONSUMER ORIENTED AND BUSIENSS ORIENTED SERVICES OF THE CORE COUNTIES, 1969-89

Variable	Con.O. Serv. 1969-89	Bus.O. Serv. I 1969-89	Bus.O. Serv. II 1969-89
constant	0.0278 (0.7299)	-0.0097 (-0.1379)	-0.0032 (-0.0522)
popuc>>	-1.1371* (-1.2292)	-1.5044 (-1.0528)	-1.5314* (-1.3846)
cosempc	0.0457* (1.4581)		
busempc		0.0473*** (4.1163)	0.0390*** (3.7387)
inertia	0.6935*** (6.3785)	0.6719*** (4.6335)	0.7029*** (5.7157)
manufc		-0.0706 (-0.4643)	0.0165 (0.1209)
perincc		-0.3135* (-1.7927)	-0.2891** (-2.1483)
perincc>>	-1.5563* (-1.2311)		
blackc	-0.0228* (-1.3463)	0.0322 (1.0702)	0.0161 (0.6135)
cpsales		4.0953e-07 (0.6229)	
hquarter			0.0159 (0.5344)

TABLE 5.2
(continued)

OLS RESULTS USING THE CHANGES OF DECENTRALIZATION OF CONSUMER ORIENTED AND BUSIENSS ORIENTED SERVICES OF THE CORE COUNTIES, 1969-89

Northeast	0.0131	-0.0459	-0.0391
	(0.4941)	(-0.8680)	(-0.9022)
Midwest	0.0119	-0.0229	-0.0151
	(0.4401)	(-0.4554)	(-0.3846)
West	-0.0273	0.1982***	0.1107**
	(-0.7920)	(2.8591)	(2.0839)
R^2	0.5159	0.6555	0.5938
AdjR^2	0.4544	0.5671	0.5238
L statistic	7.36	19.896	127.27
B-P statistic	41.17		
White statistic	38.59		
K-B statistic		30.344	20.003
Stand. Error	0.065	0.099	0.097
No. of Cases	72	50	69

Statistics not in parentheses are estimated coefficients.
*** Significant at .01 (t-statistics in parentheses)
** Significant at .05
* Significant at or below .10
>> Logged variables

plus signs on these variables support their hypothesized relationships with the changes in centralization of consumer oriented and business oriented services.

Relocation Cost Variables

The positive and significant coefficients of INERTIA in all models indicate that the inertia of the existing locational patterns of consumer oriented and

business oriented services exerts a greater influence on the trend of centralization of consumer oriented and business oriented services over a longer time span.

The findings on the INERTIA imply that business relocation costs are a major factor encouraging centralization of consumer oriented and business oriented services over a longer time span. The effects of business relocation costs have implications for service decentralization policy. Service activities are likely to be reinforced in the service developed counties; the investment programs to promote service infrastructure in the peripheral areas might induce service activities to locate there.

Manufacturing Decentralization Variable

The minus sign on MANUFC in the model I of business oriented services for the period of 1969-89 supports the hypothesized negative relationship between the change in decentralization of manufacturing activity and the change in the location coefficients of business oriented services. The influence of decentralization of manufacturing activity on decentralization of business oriented services, however, appears weak as indicated by the insignificant coefficient on MANUFC. It may be that business oriented services become significantly influenced by other major locational forces such as relocation costs (e.g., costs of information and expertise) (Pye, 1977; Goddard and Pye, 1977; Manners, 1974). This might result in a decline of the locational effects of business linkages between business services and manufacturing activity (Daniels, 1984; Marshall, 1982) over a longer time span.

Service Demand Variable

In the PERINCC, the result shows much larger coefficient in the model of consumer oriented services for the period of 1969-89 than in the models of business oriented services for the 1969-89 period. The coefficients of PERINCC are -1.5563 in the model of consumer oriented services, and -0.3135 in the model I and -0.2891 in the model II of business oriented services. Thus 1 percent increase in the core county's real per capita income decreases the location coefficient value of consumer oriented services by 1.5563 percent, and the value of business oriented services by 0.3135 and 0.2891 percent. The findings on the PERINCC variable support the hypotheses that changes in the location coefficients of consumer oriented and business oriented services are inversely related to changes in the real per capita income.

In comparison, the differences in coefficients on PERINCC lead to different conclusions about the probable effects of growth of per capita income and decentralization of business oriented services. The coefficients of PERINCC in the models of decentralization of business oriented services indicate that growth of per capita income causes a small increase in decentralization of business oriented services. The results of PERINCC, a proxy for the level of service demand demonstrate that the level of service demand exerts a much stronger influence on the decentralization of consumer oriented services than on business oriented services. This seems to support the consumer service location models which are overwhelmingly consumer demand based (Dudey, 1990; Stahl, 1987; Greene, 1980; White, 1975). Meanwhile, the significant effects of service demand imply that the relocation of urban services, especially, consumer oriented services relying, particularly, on linkages with households (Noyelle and Stanback, 1984) are very responsive to relocation of higher income populations. Consequently, relatively low income counties would face greater difficulty in

maintaining urban service activities, and will, therefore, experience more decentralization of their service activities, particularly, consumer related services.

Racial Composition Variable

The coefficient of BLACKC for the 1969-89 period indicates that the location coefficient value of consumer oriented services will decrease by 0.0228 percent if the core county's metropolitan black population increases by 1 percent. The negative coefficient on BLACKC supports the hypothesis that changes in the location coefficients of consumer oriented services are inversely related to changes in the black population. The coefficient of BLACKC in the model of decentralization of consumer oriented services for the period of 1969-89 implies that the consumer oriented services slightly decentralize if the black population increases 1 percent.

It may be that the faster growth of black populations causes the black populations to decentralize. That obviously leads to more dispersal in the consumer oriented services. The effects of black population growth on changes in decentralization of consumer oriented services could be also caused by these services giving consideration to racial tension when relocating from the core counties. This is consistent with the findings of Mills (1988) about the racial effects on job relocations.

Corporate Influence Variables

The coefficients of the corporate influence (CPSALES, HQUARTER) variables have the expected signs. The plus sign on CPSALES supports the hypothesized positive relationships between the corporate sales and the change in the location coefficients of business oriented services. The effects of corporate

sales on the changes in centralization of business oriented services appear weak, as indicated by the insignificant coefficient on CPSALES. Business oriented services may give greater locational considerations on other advantages such as business linkages with specialized service activities (Muller, 1981; Stanback, 1979), thus having a greater locational need for the access to the urban centers (Daniels, 1985).

A plus sign accompanies the coefficient for the headquarter dummy, HQUARTER, thus supporting the hypothesized positive relationships between the headquarter locations and the change in the location coefficients of business oriented services. The HQUARTER lacks statistical significance, and therefore the locational influence of the presence of corporate headquarters on the changes in centralization of business oriented services appears weak. It may be that locations of business oriented service firms relying on information, the major input and output are more affected by other needs such as maintenance of contacts with other related firms (Stanback, 1979; Goddard and Pye, 1977; Goddard and Morris, 1976). This might lead to a decline of the effects of the locational linkage between business oriented services and corporate headquarters (Gillespie and Green, 1987; Wheeler, 1986) over a longer time span.

Regional Location Variables

The coefficients of the regional location variables, NORTHEAST and MIDWEST have the expected minus signs except for the consumer oriented services for the period of 1969-89, but lack statistical significance. In the WEST, the result shows slightly larger coefficient with a higher significance in the model I of decentralization of business oriented services for the 1969-89 period than in the model II for the 1969-89 period. The positive and significant coefficients on

WEST indicate that the centralization of business oriented services would be relatively greater in the core counties in the West than those in the South. This is consistent with Hall's (1988) finding that the West exhibits strong performance of information services due to its high population growth.

ANALYTICAL IMPLICATIONS AND LIMITATION OF DATA

Since the U.S. Census Bureau reports detailed employment data by SIC (Standard Industrial Classification) and by county, the location pattern variables in this study could not be measured at local level. Despite the County Business Patterns' detailed information on employment of establishments, the employment data is not specified by levels of skills. Hence, a more detailed measure of the location pattern variables was not obtained. Considering business oriented service firms which are highly dependent on high skilled employment, the changes in location patterns of business oriented service firms in the core counties are expected to be sensitive to the rates of growth of their high skilled employment in service industries. Due to the limitation of such a more detailed measure, this could not be analyzed in this research.

The data for the corporate influence variables was obtained from the Fortune 500 Directory. The measures for these variables are, therefore, based on Fortune 500 corporations instead of all corporations in the metropolitan areas. Despite the limitation of corporate data, the corporate influence measures used in this study were proved to be adequate to reflect the conceptual effects.

In spite of the shortcomings as discussed here, it is apparent that the measures used for the location pattern variables are useful in analyzing the changes in location patterns of consumer oriented and business oriented service firms.

SUMMARY

The regression analysis of metropolitan structural changes by time periods indicates different spatial implications: metropolitan population growth results in greater decentralization of consumer oriented and business oriented services for the 1979-89 period than for the preceding period, 1969-79. The analysis for the total period (1969-89) shows that decentralization of consumer oriented and business oriented services is responsive to the rate of growth of metropolitan population. The analysis of employment change implies that service employment growth causes a much greater centralization of consumer oriented services for the 1979-89 period than for the 1969-79 period, and causes business oriented services to centralize slightly. The analysis for the 1969-89 period shows that the service employment growth results in slightly greater centralization of consumer oriented and business oriented services.

The analysis of inertia effects for the 1969-79 and 1979-89 periods indicates stronger effects of inertia on the decentralization of business oriented services than on consumer oriented services. The inertia results for the 1969-89 period imply that business relocation costs are a major factor encouraging centralization of consumer oriented and business oriented services over a longer time span. Analysis of communications activity indicates a close correspondence between the growth of communications activity and the changes in the centralization of business oriented services.

Regression analysis for the 1969-79 and 1979-89 time periods indicates that decentralization of manufacturing activity has a significant effect on decentralization of business oriented services. The analysis for the 1969-89 period implies that linkages between business oriented services and manufacturing activity decline over a longer time span.

The analysis of service demand for the 1969-79 and 1979-89 periods shows that decentralization of consumer oriented and business oriented services in the core counties was very responsive to the growth of real per capita income. The service demand results for the 1969-89 period demonstrate that the level of service demand exerts a much stronger influence on the decentralization of consumer oriented services than on business oriented services.

The analysis of the effects of black population growth for the two sub-periods (1969-79 and 1979-89) by consumer oriented and business oriented services indicates that metropolitan black populations are significant factors encouraging decentralization of consumer oriented services, but affecting the changes in centralization of business oriented services in the core counties. The analysis for the 1969-89 period shows that decentralization of consumer oriented services in the core counties was responsive to the growth of their metropolitan black populations.

The analysis of the corporate demand effects implies that the level of corporate demand is an important factor encouraging more centralization of business oriented services. The results of corporate influences support their expected relationships with changes in centralization of business oriented services, but the corporate influences (corporate demand and presence of corporate headquarters) appear weak for the 1969-89 period.

The significant effects of the Northeast for the two sub-periods (1969-79 and 1979-89) indicate that the centralization of consumer oriented and business oriented services would be relatively greater in the core counties in the Northeast than those in the South. The results also demonstrate that the core counties in the West experienced relatively greater centralization of business oriented services than those in the South. Finally, analysis of regional effects for the 1969-89 period shows that the performance of the West stands out. The West

exhibited greater centralization of business oriented services compared to the other regions.

CHAPTER VI

SUMMARY AND CONCLUSIONS

SUMMARY

This research has analyzed the dynamics of locational structure of services in U.S. metropolitan areas from 1969 to 1989. Models for decentralization of consumer oriented and business oriented services provide insights about the determinants of service sector decentralization.

The spatial tendency of consumer oriented services in the relatively larger urban service centers appears to be opposite to that in the small and relatively underdeveloped service areas. This analysis indicates a tendency for greater centralization of consumer oriented services in small and relatively underdeveloped service areas. Decentralization of consumer oriented services is greater in the relatively larger urban service centers.

The analysis also provides evidence to demonstrate a spatial shifting of consumer oriented services roughly opposite to that of business oriented services. The top ranked business centers tend to exhibit a tendency toward greater centralization. There is a countervailing tendency toward decentralization of business oriented services in small and relatively underdeveloped service areas.

The descriptive analysis of changes in the location coefficients over time suggests that the greatest decentralization of consumer oriented services took place in the large metropolitan group. The analysis for business oriented services suggests that the greatest decentralization took place in the small metropolitan group.

According to the regional analysis, there is no clear tendency of business oriented services for the 1969-79 and 1979-89 periods. The tendency for decentralization of business oriented services, however, appears to be strong for the 1969-89 period, especially for the Manufacturingbelt and South.

The regression results for consumer and business services show that most variables have the expected signs, and many are statistically significant. The comparison of structural changes for the 1969-79 and 1979-89 periods indicates that metropolitan population changes exert a much stronger influence on decentralization of consumer and business services for the 1979-89 period than for the preceding period, 1969-79; and that service employment changes exert a much stronger influence on centralization of consumer services for the 1979-89 period than for the 1969-79 period. For the total period (1969-89), population growth results in greater decentralization of consumer and business services. Service employment growth, on the contrary, causes consumer and business services to centralize slightly.

Comparison of inertia effects for the 1969-79 and 1979-89 periods shows that existing locational patterns have a stronger effect on the decentralization of business services than on consumer services. The effects of relocation costs may be greater for business services than for consumer services, which would explain slower decentralization of business services (Kellerman and Krakover, 1986; Daniels, 1985; Stanback, 1979). This interpretation is also supported by the analysis of communications activity: the growth of communications activity has a significant effect on the centralization of business oriented services. The analysis of the 1969-89 period shows the reinforced inertia effects for consumer services, and significant inertia effects for business services as well. The analysis implies that relocation costs are factors encouraging more centralization of consumer and business services over a longer time span.

The analysis of the service demand for the 1969-79 and 1979-89 periods shows that the growth of real per capita income results in greater decentralization of both consumer and business services. A higher income population appears to have a higher propensity to decentralize, thus encouraging more decentralization of services. The analysis for the 1969-89 period demonstrates that the level of service demand has a much stronger effect on decentralization of consumer services than on business services. Consumer services appear to be very responsive to the relocation of population.

Growth of the black population is strongly related to the decentralization of consumer services, and to centralization of business services. The decentralization of manufacturing activity has a significant effect on decentralization of business services. Thus, the linkages between business services and manufacturing activity appear to be strong. Regression results for the 1969-79 and 1979-89 periods also support Mills' (1988) speculations about the location of these related activities. The linkages between business services and manufacturing activity seem to decline over a longer time period, as suggested by the analysis for the 1969-89 period.

The analysis of corporate sales, a proxy for corporate demand, shows that corporate demand is a significant factor encouraging centralization of business services. The locational effects of the corporate demand appear weaker over a longer time span, as suggested by the results for the 1969-89 period. The analysis of the headquarters effects shows that the presence of corporate headquarters is weakly related to centralization of business services. Corporate influence seems to be better represented by sales than by the presence of headquarters.

The analysis of regional effects shows that the Northeast region exhibits relatively greater centralization of consumer and business services compared to

the South. The centralization of business services is also relatively greater in the West than in the South. This finding is supported by the analysis for the 1969-89 period: increasing centralization in the West seems to be related to its more rapid growth and increasing use of information services (Hall, 1988).

CONCLUSIONS

From the above summary, several conclusions about the locational dynamics of service activities are presented.

1. Structural changes for the 1969-79 period differ from those for the 1979-89 period. Metropolitan structural changes have a much stronger influence on decentralization of consumer and business services for the 1979-89 period than for the 1969-79 period. Service employment changes are likely to cause centralization of consumer oriented services for the 1979-89 period than for the 1969-79 period.

2. The results indicate that the spatial dynamics of business services are different from those of consumer services. Relocation costs appear to be greater for business services than for consumer services. By contrast, service demand and racial composition seem to have a greater influence on decentralization of consumer services than on business services.

3. The centralization of consumer and business services was found to be relatively greater in the Northeast than in the South. The Western region also appears to exhibit relatively greater centralization of business services compared to the South.

4. The results imply that relocation costs are likely to encourage more centralization of consumer and business services over a longer time span.

The locational effects of corporate demand and decentralization of manufacturing activity, on the contrary, appear to weaken over a longer time span.

THE SIGNIFICANCE OF THIS STUDY

This study provides a better understanding of factors that are critical in determining dynamic locational patterns of service activities in U.S. metropolitan areas. This research finds significant evidence that factors such as the level of service demand and racial composition affect locational patterns of business services differently from consumer services. It thus provides insight into distinctions between business and consumer services. Moreover, the analysis adds to our understanding of the determinants of decentralization of these services and how they differ over time.

THEORY IMPLICATIONS

The effects of corporate demand and manufacturing activity in this research indicate that their locational effects on business services are significant, and thus the linkages of business services with corporate demand and manufacturing activity appear strong. In view of agglomeration economies, these related activities are locationally tied to each other. This notion was reinforced by the corporate demand factor findings in this research. The empirical results indicate that the centralizing pull of corporate demand acting as an agglomerating force, draws business services.

The significant effects of inertia imply that relocation costs have a stronger locational effect on business services than on consumer services, and

their centralization effects become stronger over a longer time span. It appears to support the notion of intrametropolitan office location and rent gradient theories that communication cost savings in central locations account for centralization of business services.

The significant effect of communications activity indicates that the growth of communications encourages centralization of business services. Evidence from the communications activity factor provides empirical support for contact and intrametropolitan office location theories, which emphasize information costs.

In this study, the level of service demand has a much stronger effect on decentralization of consumer services than on business services. Consumer services have a greater need for access to the consumer market. Thus, consumer service location models are overwhelmingly consumer demand based. The results of the level of service demand seem to empirically support the demand oriented models. Finally, the different outcomes by time period in this research indicate a need for a framework to account for short and long-term locational trends of urban services.

POLICY IMPLICATIONS

The relocations of consumer and business services were found to be very responsive to the relocations of higher income population. Considering this population with a higher propensity for decentralization (Stanback, 1979), the relatively low income counties are likely to have a more difficulty to attract service activities. Thus, when making an urban development strategy, thought should also be given to inducing higher income population as well.

This study has shown that locational behavior of business services is affected by corporate demand. This implies that the ability of a core county to maintain and promote growth of business service activities is dependent on the corporate decision makers' locational decisions. If the policy promotes business amenity or corporate incentives, it might induce more corporate activity which could encourage centralization of business services. Thus, planners and policy makers need to consider both business services and corporate activity when making a service growth policy.

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APPENDIX A

LOCATIONAL PATTERN CHANGES OF SERVICE ACTIVITIES AMONG METROPOLITAN SIZE GROUPS

The changes in locational patterns of each consumer oriented and business oriented services by metropolitan size groups for the time periods of 1969-79, 1979-89 and 1969-89 are illustrated in Tables 7.1 through 7.6.

TABLE 7.1

LOCATION COEFFICIENT CHANGE, 1969-79 FOR CONSUMER ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Core County's Metropolitan Statistical Areas	LocationCoefficient 1969	1979	LC Change 1969-79
Large Metropolitan Areas, more than 2 mil.	population (1990)		
New York, NY	1.27	1.38	0.11
Houston, TX	0.98	0.99	0.01
Chicago, IL	0.98	0.98	0.00
Dallas, TX	0.98	0.97	-0.01
Pittsburgh, PA	0.98	0.96	-0.02
Detroit, MI	0.94	0.91	-0.03
Boston, MA	0.99	0.95	-0.04
Tampa-St. Petersberg-Clearwater, FL	1.12	1.07	-0.05
Philadelphia, PA-NJ	0.89	0.81	-0.08
Minneapolis-St. Paul, MN-WI	1.06	0.96	-0.10
Atlanta, GA	1.00	0.89	-0.11
St. Louis, MO-IL	1.24	1.13	-0.11
Baltimore, MD	0.92	0.73	-0.19
Medium Metropolitan Areas, 1 to 2 mil.	population		
Salt Lake City-Ogden, UT	0.90	0.94	0.04
Middlesex-Somerset-Hunterdon, NJ	0.96	1.00	0.04
Newark, NJ	0.98	1.01	0.03
Columbus, OH	1.02	1.04	0.02
Milwaukee, WI	0.99	1.00	0.01
Kansas City, MO-KS	0.93	0.94	0.01
Ft Worth-Arlington, TX	0.98	0.99	0.01
Indianapolis, IN	0.94	0.94	0.00
San Antonio, TX	1.01	1.01	0.00
Cincinnati, OH-KY-IN	0.90	0.90	0.00
Sacramento, CA	1.01	1.00	-0.01
Portland, OR	0.97	0.96	-0.01

TABLE 7.1
(continued)

LOCATION COEFFICIENT CHANGE, 1969-79 FOR CONSUMER ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Cleveland, OH	0.98	0.96	-0.02
Hartford, CT	0.96	0.94	-0.02
Orlando, FL	0.99	0.95	-0.04
Rochester, NY	0.93	0.88	-0.05
Denver, CO	0.89	0.82	-0.07
New Orleans, LA	0.94	0.86	-0.08
San Francisco, CA	0.88	0.79	-0.09
Charlotte-Gastonia-Rock Hill, NC-SC	1.21	1.08	-0.13
Small Metropolitan Areas, less than 1 mil.	population		
Johnson City-Kingsport-Bristol, TN-VA	0.87	0.95	0.08
Wheeling, WV-OH	1.01	1.08	0.07
Scranton-Wilkes-Barre, PA	0.97	1.01	0.04
Lexington-Fayette, KY	1.04	1.07	0.03
Dayton-Springfield, OH	0.96	0.99	0.03
Raleigh-Durham, NC	1.04	1.07	0.03
Davenport-Rock Island-Moline, IA-IL	1.00	1.03	0.03
Greensboro-Winston-Salem-High Point, NC	1.11	1.13	0.02
Baton Rouge, LA	0.99	1.01	0.02
Manchester, NH	0.89	0.91	0.02
Ft. Wayne, IN	1.01	1.03	0.02
Burlington, VT	0.97	0.99	0.02
St. Cloud, MN	1.01	1.03	0.02
Ft. Smith, AR-OK	0.92	0.94	0.02
Nashville, TN	0.99	1.01	0.02
Birmingham, AL	0.99	1.00	0.01
Jackson, MS	1.02	1.03	0.01
Charleston, SC	1.04	1.05	0.01
Austin, TX	1.00	1.01	0.01
Macon-Warner Robins, GA	0.93	0.94	0.01
Huntington-Ashland, WV-KY-OH	1.04	1.05	0.01
Des Moines, IA	0.97	0.98	0.01
Tulsa, OK	0.98	0.99	0.01
Little Rock-North Little Rock, AR	1.01	1.02	0.01
Memphis, TN-AR-MS	0.98	0.99	0.01
Omaha, NE-IA	0.94	0.94	0.00
Syracuse, NY	0.96	0.96	0.00

TABLE 7.1
(continued)

LOCATION COEFFICIENT CHANGE, 1969-79 FOR CONSUMER ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Evansville, IN-KY	1.02	1.02	0.00
Montgomery, AL	1.00	1.00	0.00
Chattanooga, TN-GA	1.02	1.02	0.00
Appleton-Oshkosh-Neenah, WI	1.07	1.07	0.00
Hickory-Morganton, NC	1.09	1.08	-0.01
Lansing-East Lansing, MI	0.95	0.93	-0.02
Toledo, OH	1.02	1.00	-0.02
Oklahoma City, OK	0.95	0.93	-0.02
Harrisburg-Lebanon-Carlisle, PA	0.92	0.90	-0.02
Saginaw-Bay City-Midland, MI	1.03	1.00	-0.03
Wilmington, DE-NJ-MD	1.02	0.99	-0.03
Jacksonville, FL	1.00	0.97	-0.03
Athens, GA	1.11	1.07	-0.04
Louisville, KY-IN	1.01	0.97	-0.04
Knoxville, TN	1.07	1.02	-0.05
Augusta, GA-SC	1.32	1.26	-0.06
Beaumont-Port Arthur, TX	1.04	0.98	-0.06
Providence, RI	0.90	0.83	-0.07
Albany-Schenectady-Troy, NY	1.10	1.02	-0.08
Charlottesville, VA	0.63	0.55	-0.08
Richmond-Petersburg, VA	1.23	1.15	-0.08
Lynchburg, VA	1.07	0.97	-0.10
Peoria, IL	1.10	1.00	-0.10
Allentown-Bethlehem-Easton, PA-NJ	1.22	1.11	-0.11
Greenville-Spartanburg, SC	1.11	0.97	-0.14
Steubenville-Weirton, OH-WV	1.44	1.11	-0.33

* The location coefficient change values were calculated from the location coefficient values (four places of decimals), and then the fractions were automatically rounded off to two decimal places by computer (EXCEL program).

TABLE 7.2

LOCATION COEFFICIENT CHANGE, 1979-89 FOR CONSUMER ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Core County's Metropolitan Statistical Areas	Location Coefficient 1979	1989	LC Change 1979-89*
Large Metropolitan Areas, more than 2 mil.	population (1990)		
Detroit, MI	0.91	0.95	0.05
Philadelphia, PA-NJ	0.82	0.85	0.03
Chicago, IL	0.98	0.98	0.00
Houston, TX	1.00	0.99	-0.01
Pittsburgh, PA	0.96	0.95	-0.01
Tampa-St. Petersberg-Clearwater, FL	1.07	1.05	-0.02
Dallas, TX	0.97	0.95	-0.02
Minneapolis-St. Paul, MN-WI	0.96	0.92	-0.04
Baltimore, MD	0.73	0.68	-0.05
Boston, MA	0.95	0.87	-0.08
St. Louis, MO-IL	1.13	1.04	-0.09
Atlanta, GA	0.89	0.80	-0.09
New York, NY	1.38	1.28	-0.10
Medium Metropolitan Areas, 1 to 2 mil.	population		
San Francisco, CA	0.79	0.88	0.09
Rochester, NY	0.88	0.94	0.06
Middlesex-Somerset-Hunterdon, NJ	1.00	1.02	0.02
Kansas City, MO-KS	0.94	0.96	0.02
Hartford, CT	0.94	0.94	0.00
Indianapolis, IN	0.94	0.94	0.00
Cincinnati, OH-KY-IN	0.91	0.90	-0.01
Milwaukee, WI	1.00	0.99	-0.01
San Antonio, TX	1.01	1.00	-0.01
Ft. Worth-Arlington, TX	0.99	0.98	-0.01
Salt Lake City-Ogden, UT	0.94	0.93	-0.01
Cleveland, OH	0.96	0.95	-0.01
Columbus, OH	1.04	1.02	-0.02
Sacramento, CA	1.00	0.98	-0.02
Newark, NJ	1.01	0.98	-0.03
New Orleans, LA	0.87	0.84	-0.03
Orlando, FL	0.95	0.90	-0.05

TABLE 7.2
(continued)

LOCATION COEFFICIENT CHANGE, 1979-89 FOR CONSUMER ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Portland, OR	0.96	0.90	-0.06
Charlotte-Gastonia-Rock Hill, NC-SC	1.08	0.97	-0.11
Denver, CO	0.82	0.51	-0.31
Small Metropolitan Areas, less than 1 mil. population			
Charlottesville, VA	0.55	0.94	0.39
Steubenville-Weirton. OH-WV	1.11	1.32	0.21
Wheeling, WV-OH	1.08	1.23	0.15
Huntington-Ashland, WV-KY-OH	1.05	1.14	0.09
Lynchburg, VA	0.97	1.06	0.09
Saginaw-Bay City-Midland, MI	0.99	1.06	0.07
Johnson City-Kingsport-Bristol, TN-VA	0.95	0.99	0.04
St. Cloud, MN	1.03	1.06	0.03
Richmond-Petersburg, VA	1.15	1.18	0.03
Evansville, IN-KY	1.02	1.05	0.03
Athens, GA	1.08	1.10	0.02
Knoxville, TN	1.03	1.05	0.02
Ft. Smith, AR-OK	0.94	0.95	0.01
Memphis, TN-AR-MS	0.99	1.00	0.01
Beaumont-Port Arthur, TX	0.99	0.99	0.00
Omaha, NE-IA	0.94	0.94	0.00
Tulsa, OK	0.99	0.99	0.00
Des Moines, IA	0.99	0.99	0.00
Appleton-Oshkosh-Neenah, WI	1.07	1.07	0.00
Raleigh-Durham, NC	1.08	1.08	0.00
Louisville, KY-IN	0.97	0.97	0.00
Syracuse, NY	0.96	0.96	0.00
Providence, RI	0.83	0.83	0.00
Chattanooga, TN-GA	1.02	1.02	0.00
Toledo, OH	1.00	1.00	0.00
Scranton-Wilkes-Barre, PA	1.02	1.01	-0.01
Manchester, NH	0.92	0.91	-0.01
Burlington, VT	0.99	0.98	-0.01
Wilmington, DE-NJ-MD	0.99	0.98	-0.01
Montgomery, AL	1.00	0.99	-0.01
Oklahoma City, OK	0.92	0.91	-0.01

TABLE 7.2
(continued)

LOCATION COEFFICIENT CHANGE, 1979-89 FOR CONSUMER ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Hickory-Morganton, NC	1.08	1.06	-0.02
Baton Rouge, LA	1.02	1.00	-0.02
Greenville-Spartanburg, SC	0.97	0.95	-0.02
Little Rock-North Little Rock, AR	1.02	1.00	-0.02
Birmingham, AL	1.00	0.98	-0.02
Harrisburg-Lebanon-Carlisle, PA	0.90	0.88	-0.02
Dayton-Springfield, OH	0.99	0.97	-0.02
Macon-Warner Robins, GA	0.94	0.92	-0.02
Davenport-Rock Island-Moline, IA-IL	1.03	1.01	-0.02
Ft. Wayne, IN	1.03	1.01	-0.02
Charleston, SC	1.05	1.03	-0.02
Austin, TX	1.01	0.98	-0.03
Lansing-East Lansing, MI	0.93	0.90	-0.03
Lexington-Fayette, KY	1.07	1.03	-0.04
Jacksonville, FL	0.97	0.92	-0.05
Greensboro-Winston-Salem-High Point, NC	1.13	1.08	-0.05
Jackson, MS	1.03	0.97	-0.06
Peoria, IL	1.00	0.92	-0.08
Nashville, TN	1.01	0.93	-0.08
Allentown-Bethlehem-Easton, PA-NJ	1.11	1.02	-0.09
Albany-Schenectady-Troy, NY	1.03	0.90	-0.13
Augusta, GA-SC	1.26	1.08	-0.18

* The location coefficient change values were calculated from the location coefficient values (four places of decimals), and then the fractions were automatically rounded off to two decimal places by computer (EXCEL program).

TABLE 7.3

LOCATION COEFFICIENT CHANGE, 1969-89 FOR CONSUMER ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Core County's Metropolitan Statistical Areas	Location Coefficient 1969	1989	LC Change 1969-89*
Large Metropolitan Areas, more than 2 mil.	population (1990)		
Detroit, MI	0.93	0.95	0.02
New York, NY	1.26	1.28	0.02
Houston, TX	0.99	0.99	0.00
Chicago, IL	0.98	0.98	0.00
Pittsburgh, PA	0.98	0.95	-0.03
Dallas, TX	0.97	0.94	-0.03
Philadelphia, PA-NJ	0.89	0.85	-0.04
Tampa-St. Petersberg-Clearwater, FL	1.11	1.04	-0.07
Boston, MA	0.99	0.87	-0.12
Minneapolis-St. Paul, MN-WI	1.06	0.92	-0.14
Atlanta, GA	1.00	0.80	-0.20
St. Louis, MO-IL	1.24	1.04	-0.20
Baltimore, MD	0.92	0.67	-0.25
Medium Metropolitan Areas, 1 to 2 mil.	population		
Middlesex-Somerset-Hunterdon, NJ	0.96	1.02	0.06
Kansas City, MO-KS	0.93	0.96	0.03
Salt Lake City-Ogden, UT	0.90	0.93	0.03
Rochester, NY	0.93	0.94	0.01
Milwaukee, WI	0.99	1.00	0.01
Newark, NJ	0.98	0.98	0.00
Indianapolis, IN	0.94	0.94	0.00
Columbus, OH	1.02	1.02	0.00
Ft. Worth-Arlington, TX	0.98	0.98	0.00
San Francisco, CA	0.88	0.88	0.00
San Antonio. TX	1.01	1.00	-0.01
Cincinnati, OH-KY-IN	0.91	0.90	-0.01
Hartford, CT	0.96	0.93	-0.03
Sacramento, CA	1.01	0.98	-0.03
Cleveland, OH	0.98	0.95	-0.03
Portland, OR	0.97	0.90	-0.07
Orlando, FL	0.99	0.90	-0.09
New Orleans, LA	0.94	0.83	-0.11
Charlotte-Gastonia-Rock Hill, NC-SC	1.21	0.97	-0.24

TABLE 7.3
(continued)

LOCATION COEFFICIENT CHANGE, 1969-89 FOR CONSUMER ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Denver, CO	0.89	0.51	-0.38
Small Metropolitan Areas, less than 1 mil.	population		
Charlottesville, VA	0.63	0.94	0.31
Wheeling, WV-OH	1.01	1.23	0.22
Johnson City-Kingsport-Bristol, TN-VA	0.87	0.99	0.12
Huntington-Ashland, WV-KY-OH	1.04	1.14	0.10
St. Cloud, MN	1.01	1.06	0.05
Saginaw-Bay City-Midland, MI	1.02	1.06	0.04
Raleigh-Durham, NC	1.05	1.08	0.03
Scranton-Wilkes-Barre, PA	0.98	1.01	0.03
Ft. Smith, AR-OK	0.92	0.95	0.03
Evansville, IN-KY	1.02	1.05	0.03
Manchester, NH	0.90	0.91	0.01
Dayton-Springfield, OH	0.96	0.97	0.01
Des Moines, IA	0.97	0.98	0.01
Tulsa, OK	0.98	0.99	0.01
Burlington, VT	0.97	0.98	0.01
Memphis, TN-AR-MS	0.98	0.99	0.01
Omaha, NE-IA	0.93	0.94	0.01
Baton Rouge, LA	0.99	1.00	0.01
Davenport-Rock Island-Moline, IA-IL	1.00	1.00	0.00
Syracuse, NY	0.96	0.96	0.00
Appleton-Oshkosh-Neenah, WI	1.07	1.07	0.00
Ft. Wayne, IN	1.01	1.01	0.00
Chattanooga, TN-GA	1.02	1.02	0.00
Lynchburg, VA	1.07	1.07	0.00
Birmingham, AL	0.99	0.98	-0.01
Lexington-Fayette, KY	1.04	1.03	-0.01
Charleston, SC	1.04	1.03	-0.01
Macon-Warner Robins, GA	0.93	0.92	-0.01
Little Rock-North Little Rock, AR	1.01	1.00	-0.01
Montgomery, AL	0.99	0.98	-0.01
Athens, GA	1.12	1.10	-0.02
Toledo, OH	1.02	1.00	-0.02
Austin, TX	1.00	0.98	-0.02
Knoxville, TN	1.07	1.05	-0.02
Hickory-Morganton, NC	1.08	1.06	-0.02

TABLE 7.3
(continued)

LOCATION COEFFICIENT CHANGE, 1969-89 FOR CONSUMER ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Greensboro-Winston-Salem-High Point, NC	1.10	1.07	-0.03
Oklahoma City, OK	0.95	0.91	-0.04
Louisville, KY-IN	1.01	0.97	-0.04
Harrisburg-Lebanon-Carlisle, PA	0.92	0.88	-0.04
Wilmington, DE-NJ-MD	1.02	0.98	-0.04
Jackson, MS	1.02	0.97	-0.05
Lansing-East Lansing, MI	0.95	0.90	-0.05
Richmond-Petersburg, VA	1.23	1.18	-0.05
Beaumont-Port Arthur, TX	1.05	0.99	-0.06
Nashville, TN	0.99	0.93	-0.06
Providence, RI	0.90	0.83	-0.07
Jacksonville, FL	1.01	0.93	-0.08
Steubenville-Weirton, OH-WV	1.44	1.32	-0.12
Greenville-Spartanburg, SC	1.11	0.95	-0.16
Peoria, IL	1.10	0.92	-0.18
Allentown-Bethlehem-Easton, PA-NJ	1.22	1.02	-0.20
Albany-Schenectady-Troy, NY	1.10	0.90	-0.20
Augusta, GA-SC	1.32	1.08	-0.24

* The location coefficient change values were calculated from the location coefficient values (four places of decimals), and then the fractions were automatically rounded off to two decimal places by computer (EXCEL program).

TABLE 7.4

LOCATION COEFFICIENT CHANGE, 1969-79 FOR BUSINESS ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Core County's Metropolitan Statistical Areas	Location Coefficient 1969	1979	LC Change 1969-79*
Large Metropolitan Areas, more than 2 mil.	**population (1990)**		
Boston, MA	0.91	1.09	0.18
St. Louis, MO-IL	0.82	0.95	0.13
New York, NY	0.35	0.38	0.03
Dallas, TX	1.02	1.04	0.02
Houston, TX	1.02	1.03	0.01
Chicago, IL	1.01	1.02	0.01
Minneapolis-St. Paul, MN-WI	1.20	1.20	0.00
Pittsburgh, PA	1.14	1.13	-0.01
Atlanta, GA	1.39	1.29	-0.10
Tampa-St. Petersberg-Clearwater, FL	0.91	0.81	-0.10
Philadelphia, PA-NJ	1.32	1.22	-0.10
Detroit, MI	1.16	1.01	-0.15
Baltimore, MD	1.34	1.14	-0.20
Medium Metropolitan Areas, 1 to 2 mil.	**population**		
Denver, CO	0.75	1.25	0.50
Portland, OR	1.16	1.27	0.11
New Orleans, LA	1.13	1.22	0.09
Sacramento, CA	1.04	1.12	0.08
Milwaukee, WI	1.09	1.13	0.04
Kansas City, MO-KS	1.19	1.22	0.03
Salt Lake City-Ogden, UT	1.03	1.06	0.03
Orlando, FL	1.06	1.09	0.03
Middlesex-Somerset-Hunterdon, NJ	0.97	1.00	0.03
Indianapolis, IN	1.04	1.06	0.02
Cleveland, OH	1.04	1.06	0.02
Ft Worth-Arlington, TX	1.00	1.01	0.01
Hartford, CT	1.14	1.15	0.01
Rochester, NY	1.10	1.10	0.00
Columbus, OH	1.15	1.15	0.00
San Antonio, TX	1.05	1.04	-0.01
Cincinnati, OH-KY-IN	1.08	1.07	-0.01
Newark, NJ	1.25	1.24	-0.01
San Francisco, CA	1.21	1.18	-0.03

TABLE 7.4
(continued)

LOCATION COEFFICIENT CHANGE, 1969-79 FOR BUSINESS ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Charlotte-Gastonia-Rock Hill, NC-SC	1.72	1.49	-0.23
Small Metropolitan Areas, less than 1 mil.	population		
Harrisburg-Lebanon-Carlisle, PA	1.17	1.34	0.17
Dayton-Springfield, OH	0.96	1.05	0.09
Augusta, GA-SC	1.30	1.39	0.09
Manchester, NH	1.00	1.07	0.07
Scranton-Wilkes-Barre, PA	1.04	1.08	0.04
Appleton-Oshkosh-Neenah, WI	1.10	1.14	0.04
Memphis, TN-AR-MS	1.00	1.03	0.03
Albany-Schenectady-Troy, NY	1.21	1.24	0.03
Oklahoma City, OK	1.02	1.05	0.03
Des Moines, IA	1.00	1.03	0.03
Toledo, OH	1.05	1.07	0.02
Syracuse, NY	1.06	1.08	0.02
Lansing-East Lansing, MI	1.13	1.14	0.01
Wilmington, DE-NJ-MD	1.10	1.10	0.00
Omaha, NE-IA	1.07	1.06	-0.01
Birmingham, AL	1.09	1.08	-0.01
Chattanooga, TN-GA	1.15	1.13	-0.02
Tulsa, OK	1.07	1.04	-0.03
Burlington, VT	1.07	1.04	-0.03
Austin, TX	1.11	1.08	-0.03
Peoria, IL	1.30	1.25	-0.05
Nashville, TN	1.21	1.15	-0.06
Louisville, KY-IN	1.14	1.08	-0.06
Beaumont-Port Arthur, TX	1.10	1.03	-0.07
Wheeling, WV-OH	0.75	0.67	-0.08
Hickory-Morganton, NC	1.19	1.10	-0.09
Knoxville, TN	1.31	1.22	-0.09
Evansville, IN-KY	1.18	1.09	-0.09
Lexington-Fayette, KY	1.28	1.19	-0.09
Providence, RI	1.19	1.09	-0.10
Allentown-Bethlehem-Easton, PA-NJ	1.30	1.19	-0.11
Richmond-Petersburg, VA	0.96	0.82	-0.14
Greensboro-Winston-Salem-High Point, NC	1.31	1.17	-0.14
Davenport-Rock Island-Moline, IA-IL	1.42	1.25	-0.17
Macon-Warner Robins, GA	1.04	0.87	-0.17

TABLE 7.4
(continued)

LOCATION COEFFICIENT CHANGE, 1969-79 FOR BUSINESS ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Saginaw-Bay City-Midland, MI	1.30	1.04	-0.26
Raleigh-Durham, NC	1.50	1.22	-0.28
Johnson City-Kingsport-Bristol, TN-VA	1.24	0.94	-0.30
Huntington-Ashland, WV-KY-OH	1.52	1.20	-0.32
Greenville-Spartanburg, SC	1.29	0.90	-0.39
Steubenville-Weirton, OH-WV	2.04	1.19	-0.85

* The location coefficient change values were calculated from the location coefficient values (four places of decimals), and then the fractions were automatically rounded off to two decimal places by computer (EXCEL program).

TABLE 7.5

LOCATION COEFFICIENT CHANGE, 1979-89 FOR BUSINESS ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Core County's Metropolitan Statistical Areas	Location Coefficient 1979	1989	LC Change 1979-89*
Large Metropolitan Areas, more than 2 mil.	population (1990)		
St. Louis, MO-IL	0.95	1.11	0.16
Baltimore, MD	1.14	1.27	0.13
Pittsburgh, PA	1.13	1.15	0.02
Boston, MA	1.09	1.11	0.02
Chicago, IL	1.01	1.03	0.02
New York, NY	0.38	0.39	0.01
Houston, TX	1.03	1.02	-0.01
Tampa-St. Petersberg-Clearwater, FL	0.81	0.80	-0.01
Dallas, TX	1.04	1.03	-0.01
Atlanta, GA	1.29	1.28	-0.01
Minneapolis-St. Paul, MN-WI	1.19	1.13	-0.06
Detroit, MI	1.01	0.93	-0.08
Philadelphia, PA-NJ	1.22	1.12	-0.10
Medium Metropolitan Areas, 1 to 2 mil.	population		
San Francisco, CA	1.19	1.24	0.05

TABLE 7.5
(continued)

LOCATION COEFFICIENT CHANGE, 1979-89 FOR BUSINESS ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Orlando, FL	1.09	1.14	0.05
Cleveland, OH	1.05	1.09	0.04
Middlesex-Somerset-Hunterdon, NJ	1.00	1.03	0.03
Indianapolis, IN	1.06	1.08	0.02
Cincinnati, OH-KY-IN	1.07	1.09	0.02
Sacramento, CA	1.12	1.13	0.01
Ft. Worth-Arlington, TX	1.01	1.01	0.00
San Antonio, TX	1.04	1.04	0.00
Milwaukee, WI	1.13	1.12	-0.01
Hartford, CT	1.15	1.14	-0.01
Portland, OR	1.27	1.24	-0.03
Salt Lake City-Ogden, UT	1.07	1.03	-0.04
Rochester, NY	1.10	1.06	-0.04
Columbus, OH	1.14	1.07	-0.07
Kansas City, MO-KS	1.22	1.15	-0.07
Denver, CO	1.25	1.18	-0.07
Orlando, FL	1.11	1.14	0.03
Denver, CO	1.20	1.17	-0.03
New Orleans, LA	1.22	1.06	-0.16
Charlotte-Gastonia-Rock Hill, NC-SC	1.49	1.31	-0.18
Newark, NJ	1.24	1.02	-0.22
Small Metropolitan Areas, less than 1 mil. population			
Richmond-Petersburg, VA	0.81	1.26	0.45
Macon-Warner Robins, GA	0.87	1.10	0.23
Appleton-Oshkosh-Neenah, WI	1.14	1.27	0.13
Huntington-Ashland, WV-KY-OH	1.20	1.30	0.10
Steubenville-Weirton, OH-WV	1.19	1.29	0.10
Hickory-Morganton, NC	1.11	1.19	0.08
Johnson City-Kingsport-Bristol, TN-VA	0.94	1.02	0.08
Wheeling, WV-OH	0.67	0.73	0.06
Providence, RI	1.09	1.15	0.06
Omaha, NE-IA	1.06	1.12	0.06
Davenport-Rock Island-Moline, IA-IL	1.25	1.30	0.05
Lansing-East Lansing, MI	1.14	1.18	0.04
Oklahoma City, OK	1.05	1.08	0.03
Dayton-Springfield, OH	1.05	1.08	0.03
Beaumont-Port Arthur, TX	1.03	1.06	0.03

TABLE 7.5
(continued)

LOCATION COEFFICIENT CHANGE, 1979-89 FOR BUSINESS ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Greenville-Spartanburg, SC	0.90	0.92	0.02
Toledo, OH	1.07	1.09	0.02
Burlington, VT	1.04	1.05	0.01
Louisville, KY-IN	1.08	1.09	0.01
Raleigh-Durham, NC	1.21	1.22	0.01
Wilmington, DE-NJ-MD	1.09	1.10	0.01
Memphis, TN-AR-MS	1.03	1.04	0.01
Birmingham, AL	1.07	1.07	0.00
Tulsa, OK	1.04	1.04	0.00
Manchester, NH	1.07	1.07	0.00
Austin, TX	1.08	1.08	0.00
Scranton-Wilkes-Barre, PA	1.08	1.08	0.00
Des Moines, IA	1.04	1.03	-0.01
Knoxville, TN	1.23	1.22	-0.01
Evansville, IN-KY	1.09	1.08	-0.01
Syracuse, NY	1.08	1.06	-0.02
Allentown-Bethlehem-Easton, PA-NJ	1.19	1.17	-0.02
Nashville, TN	1.15	1.12	-0.03
Chattanooga, TN-GA	1.13	1.09	-0.04
Lexington-Fayette, KY	1.18	1.13	-0.05
Saginaw-Bay City-Midland, MI	1.05	0.98	-0.07
Greensboro-Winston-Salem-High Point, NC	1.17	1.09	-0.08
Albany-Schenectady-Troy, NY	1.24	1.16	-0.08
Harrisburg-Lebanon-Carlisle, PA	1.34	1.25	-0.09
Peoria, IL	1.25	1.12	-0.13
Augusta, GA-SC	1.39	1.13	-0.26

* The location coefficient change values were calculated from the location coefficient values (four places of decimals), and then the fractions were automatically rounded off to two decimal places by computer (EXCEL program).

TABLE 7.6

LOCATION COEFFICIENT CHANGE, 1969-89 FOR BUSINESS ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Core County's Metropolitan Statistical Areas	Location Coefficient 1969	1989	LC Change 1969-89*
Large Metropolitan Areas, more than 2 mil.	population (1990)		
St. Louis, MO-IL	0.82	1.11	0.29
Boston, MA	0.91	1.11	0.20
New York, NY	0.35	0.39	0.04
Chicago, IL	1.01	1.03	0.02
Pittsburgh, PA	1.14	1.15	0.01
Dallas, TX	1.02	1.03	0.01
Houston, TX	1.03	1.03	0.00
Minneapolis-St. Paul, MN-WI	1.20	1.14	-0.06
Baltimore, MD	1.34	1.27	-0.07
Atlanta, GA	1.39	1.28	-0.11
Tampa-St. Petersberg-Clearwater, FL	0.91	0.80	-0.11
Philadelphia, PA-NJ	1.32	1.12	-0.20
Detroit, MI	1.16	0.93	-0.23
Medium Metropolitan Areas, 1 to 2 mil.	population		
Denver, CO	0.75	1.18	0.43
Sacramento, CA	1.04	1.13	0.09
Portland, OR	1.16	1.24	0.08
Orlando, FL	1.06	1.14	0.08
Middlesex-Somerset-Hunterdon, NJ	0.97	1.03	0.06
Cleveland, OH	1.03	1.09	0.06
Indianapolis, IN	1.04	1.08	0.04
Milwaukee, WI	1.09	1.12	0.03
San Francisco, CA	1.22	1.24	0.02
Ft. Worth-Arlington, TX	1.00	1.01	0.01
Cincinnati, OH-KY-IN	1.08	1.09	0.01
Hartford, CT	1.14	1.14	0.00
Salt Lake City-Ogden, UT	1.04	1.03	-0.01
San Antonio, TX	1.05	1.04	-0.01
Kansas City, MO-KS	1.19	1.15	-0.04
Rochester, NY	1.10	1.06	-0.04

TABLE 7.6
(continued)

LOCATION COEFFICIENT CHANGE, 1969-89 FOR BUSINESS ORIENTED SERVICES BY METROPOLITAN SIZE GROUPS

Columbus, OH	1.15	1.08	-0.07
New Orleans, LA	1.13	1.06	-0.07
Newark, NJ	1.25	1.01	-0.24
Charlotte-Gastonia-Rock Hill, NC-SC	1.72	1.31	-0.41
Small Metropolitan Areas, less than 1 mil.	population		
Richmond-Petersburg, VA	0.95	1.26	0.31
Appleton-Oshkosh-Neenah, WI	1.10	1.26	0.16
Dayton-Springfield, OH	0.96	1.09	0.13
Harrisburg-Lebanon-Carlisle, PA	1.16	1.24	0.08
Manchester, NH	1.00	1.07	0.07
Macon-Warner Robins, GA	1.04	1.10	0.06
Oklahoma City, OK	1.03	1.09	0.06
Lansing-East Lansing, MI	1.13	1.18	0.05
Omaha, NE-IA	1.06	1.11	0.05
Memphis, TN-AR-MS	1.00	1.04	0.04
Scranton-Wilkes-Barre, PA	1.04	1.08	0.04
Toledo, OH	1.05	1.09	0.04
Des Moines, IA	1.01	1.03	0.02
Wilmington, DE-NJ-MD	1.10	1.11	0.01
Syracuse, NY	1.06	1.06	0.00
Hickory-Morganton, NC	1.20	1.19	-0.01
Birmingham, AL	1.09	1.08	-0.01
Burlington, VT	1.07	1.05	-0.02
Wheeling, WV-OH	0.75	0.73	-0.02
Tulsa, OK	1.07	1.05	-0.02
Austin, TX	1.11	1.08	-0.03
Beaumont-Port Arthur, TX	1.10	1.06	-0.04
Providence, RI	1.19	1.15	-0.04
Louisville, KY-IN	1.14	1.09	-0.05
Albany-Schenectady-Troy, NY	1.21	1.15	-0.06
Chattanooga, TN-GA	1.15	1.09	-0.06
Nashville, TN	1.21	1.13	-0.08
Knoxville, TN	1.31	1.22	-0.09
Evansville, IN-KY	1.18	1.08	-0.10
Davenport-Rock Island-Moline, IA-IL	1.42	1.30	-0.12
Allentown-Bethlehem-Easton, PA-NJ	1.31	1.17	-0.14

TABLE 7.6
(continued)

LOCATION COEFFICIENT CHANGE, 1969-89 FOR BUSINESS ORIENTED SERVICES BY.METROPOLITAN SIZE GROUPS

Lexington-Fayette, KY	1.28	1.14	-0.14
Augusta, GA-SC	1.30	1.12	-0.18
Peoria, IL	1.30	1.12	-0.18
Johnson City-Kingsport-Bristol, TN-VA	1.24	1.02	-0.22
Huntington-Ashland, WV-KY-OH	1.52	1.30	-0.22
Greensboro-Winston-Salem-High Point, NC	1.32	1.09	-0.23
Raleigh-Durham, NC	1.50	1.23	-0.27
Saginaw-Bay City-Midland, MI	1.30	0.98	-0.32
Greenville-Spartanburg, SC	1.30	0.93	-0.37
Steubenville-Weirton, OH-WV	2.04	1.29	-0.75

* The location coefficient change values were calculated from the location coefficient values (four places of decimals), and then the fractions were automatically rounded off to two decimal places by computer (EXCEL program).

APPENDIX B

GAUSS ECONOMETRIC PROGRAMS FOR MULTIPLE REGRESSION ANALYSES

```
use lsq;
output file=b:\di2d1 reset;
n=73;
load w[n,10]=b:\dib1.asc;
load x[n,10]=b:\dic1.asc;
load y[n,12]=b:\did1.asc;
load y1[n,9]=b:\die1.asc;
load z[n,9]=b:\dif1.asc;
print "Model of Decentralization (1969-79) of C-O Service";
format 9,7;
@ set data @
cone79=w[2:n,4];@ employment of C-O service, 1979 @
mpop90=w[2:n,5];@ metropolitan population, 1990 @
te79=w[2:n,7];    @ total employment, 1979 @
mce79=w[2:n,9];@ metro employment of C-O services, '79 @
te69=w[2:n,10]; @ total employment, 1969 @
mte79=x[2:n,7]; @ metropolitan total employment in 1979 @
noe=y[2:n,2];   @ Northeast Region @
mdw=y[2:n,3];   @ Midwest Region @
w=y[2:n,4];     @ West Region @
s=y[2:n,5];     @ South Region @
mblk80=y[2:n,6]; @ metropolitan black population in 1980 @
cone69=y[2:n,7];@ employment of C-O services, 1969 @
mblk70=y[2:n,11]; @ metropolitan black population in 1970 @
cone59=y[2:n,12];@ employment of C-O service, 1959 @
pcpc=z[2:n,2];@ percent change of metropolitan population @
pinc79=z[2:n,3]; @ per capita income, 1979 @
mce69=z[2:n,5];@ metro employment of C-O services, '69 @
mte69=z[2:n,6]; @ metro total employment in 1969 @
mpop70=z[2:n,7]; @ metro population, 1970 @
pinc69=z[2:n,8]; @ per capita income, 1969 @
mce59=z[2:n,9];@ metro employment of C-O services, '59 @
@ calculate location coefficients @
lo59=cone59./mce59;
lor59=te59./mte59;
lcon59=lo59./lor59; @ LC of C-O services, 1959 @
lo69=cone69./mce69;
lor69=te69./mte69;
lcon69=lo69./lor69; @ LC of C-O services, 1969 @
lo79=cone79./mce79;
lor79=te79./mte79;
lcon79=lo79./lor79; @ LC of C-O services, 1979 @
mpop80=(mpop90.*100)./(pcpc+100);
lmp80=ln(mpop80);
lmp70=ln(mpop70);
lpcpcon=((lmp80-lmp70)./lmp70);@ change of metro pop. @
pcclc=((lcon79-lcon69)./lcon69);@ change of LC, 1969-79 @
ainc69=pinc69.*1.978;@ expressed in constant 1979 values @
inerlc=((lcon69-lcon59)./lcon59); @ the existing inertia @
pcecon=((cone79-cone69)./cone69);@ service emp. change @
linc79=ln(pinc79);
linc69=ln(ainc69);
lpccinc=((linc79-linc69)./linc69);@per capita inc. change @
```

```
lmb80=ln(mblk80);
lmb70=ln(mblk70);
lpcblk=((lmb80-lmb70)./lmb70);@ change of metro black pop.@
@ calculate mean and s.d of location coefficients @
y59=meanc(lcon59);
y69=meanc(lcon69);
y79=meanc(lcon79);
pcy=meanc(pcclc);
yooo=stdc(lcon59);
yoo=stdc(lcon69);
yo=stdc(lcon79);
pcyy=stdc(pcclc);
/*print "lcon69 lcon79";
print lcon69~lcon79;*/
print "mean:";
print "lcon59 lcon69 lcon79 pcclc";
print y59~y69~y79~pcy;
print "standard deviation:";
print yooo~yoo~yo~pcyy;
dep=pcclc;
indep=lpcpcon~pcecon~lpccinc~lpcblk~inerlc~noe~mdw~w;
let ns=dep lpcpcon pcecon lpccinc lpcblk inerlc noe mdw w;
_vcov=1;
_rstat=1;
{b,e}=estimate(dep,indep,ns);
@ Normality Test @
print "Heteroskedasticity Test (Koenkar-Basset Test)";
one=ones(rows(dep),1);
s2=meanc(e^2);
e2=e^2;
ko=meanc((e2-s2)^2);
print "ko";
print ko; @ to calculate ESS/ko @
let ns=e2 lpcpcon pcecon lpccinc lpcblk inerlc noe mdw w;
{bb,ee}=estimate(e2,indep,ns);       @ to calculate ESS @
end;
```

```
use lsq;
output file=b:\di2d2 reset;
n=87;
load w[n,9]=b:\dib.asc;
load x[n,9]=b:\dic.asc;
load y[n,11]=b:\did.asc;
load z[n,9]=b:\dif.asc;
print "Model of Decentralization (1979-89) of C-O Service";
format 8,4;
@ set data@
met=w[2:n,1];     @ core county's metropolitan area @
cone89=w[2:n,2];   @ employment of C-O services, 1989 @
cone79=w[2:n,3];  @ employment of C-O services, 1979 @
mpop90=w[2:n,4]; @ metropolitan population, 1990 @
te89=w[2:n,5];      @ total employment, 1989 @
te79=w[2:n,6];      @ total employment, 1979 @
mce89=w[2:n,7];@ metro employment of C-O services, '89 @
mce79=w[2:n,8];@ metro employment of C-O services, '79 @
te69=w[2:n,9]; @ total employment, 1969 @
mte89=x[2:n,5]; @ metropolitan total employment in 1989 @
mte79=x[2:n,6]; @ metropolitan total employment in 1979 @
mblk90=x[2:n,9]; @ metropolitan black population in 1990 @
noe=y[2:n,1];    @ Northeast Region @
mdw=y[2:n,2];    @ Midwest Region @
w=y[2:n,3];      @ West Region @
s=y[2:n,4];      @ South Region @
mblk80=y[2:n,5]; @ metropolitan black population in 1980 @
cone69=y[2:n,6]; @ employment of C-O service, 1969 @
pcpc=z[2:n,1];  @ percent change of metro population @
pinc79=z[2:n,2]; @ per capita income, 1979 @
pinc89=z[2:n,3]; @ per capita income, 1989 @
mce69=z[2:n,4];@ metro employment of C-O services, '69 @
mte69=z[2:n,5]; @ metropolitan total employment in 1969 @
@ calculate location coefficients@
lo69=cone69./mce69;
lor69=te69./mte69;
lcon69=lo69./lor69; @ LC of C-O services, 1969 @
lo79=cone79./mce79;
lor79=te79./mte79;
lcon79=lo79./lor79;@ LC of C-O services, 1979 @
lo89=cone89./mce89;
lor89=te89./mte89;
lcon89=lo89./lor89;@ LC of C-O services, 1989 @
mpop80=(mpop90.*100)./(pcpc+100);
lmp90=ln(mpop90);
lmp80=ln(mpop80);
lpcpcon=((lmp90-lmp80)./lmp80);@ metro pop. change @
pcclc=((lcon89-lcon79)./lcon79);@ change of LC, 1979-89 @
ainc79=pinc79.*1.708;@expressed in constant 1989 values @
inerlc=((lcon79-lcon69)./lcon69); @ the existing inertia @
lcone89=ln(cone89);
lcone79=ln(cone79);
lpcecon=((lcone89-lcone79)./lcone79);@service emp. change@
```

```
linc89=ln(pinc89);
linc79=ln(ainc79);
lpccinc=((linc89-linc79)./linc79);@per capita inc. change @
lmb90=ln(mblk90);
lmb80=ln(mblk80);
lpcblk=((lmb90-lmb80)./lmb80);@ change of metro black pop.@
@calculate mean and s.d of location coefficients @
y69=meanc(lcon69);
y79=meanc(lcon79);
y89=meanc(lcon89);
pcy=meanc(pcclc);
yoo=stdc(lcon69);
yo=stdc(lcon79);
yn=stdc(lcon89);
pcyy=stdc(pcclc);
/*print "lcon 69 lcon79 lcon89";
print lcon69~lcon79~lcon89;*/
print "mean:";
print "lcon69 lcon79 lcon89 pcclc";
print y69~y79~y89~pcy;
print "standard deviation:";
print yoo~yo~yn~pcyy;
dep=pcclc;
indep=lpcpcon~inerlc~lpcecon~lpccinc~lpcblk~noe~mdw~w;
let ns=dep lpcpcon inerlc lpcecon lpccinc lpcblk noe mdw w;
_vcov=1;
_rstat=1;
{b,e}=estimate(dep,indep,ns);
@ Normality Test @
print " Heteroskedasticity Test (Koenkar-Basset Test) ";
one=ones(rows(dep),1);
s2=meanc(e^2);
e2=e^2;
ko=meanc((e2-s2)^2);
print "ko";
print ko; @ to calculate ESS/ko @
let ns=e2 lpcpcon inerlc lpcecon lpccinc lpcblk noe mdw w;
{bb,ee}=estimate(e2,indep,ns);       @ to calculate ESS @
print "=== Weighted L-SQ Model ==="; @ ESTIMATION @
_vcov=1;
_rstat=1;
ee2=e2-ee;  @ fitted e2 @
_weight=(1/(ee2./s2));
indep=lpcpcon~inerlc~lpcecon~lpccinc~lpcblk~noe~mdw~w;
let ns=dep lpcpcon inerlc lpcecon lpccinc lpcblk noe mdw w;
{b,e}=estimate(dep,indep,ns);
print " Heteroskedasticity Re-Test (Koenkar-Basset Test) ";
one=ones(rows(dep),1);
s2=meanc(e^2);
e2=e^2;
ko=meanc((e2-s2)^2);
print "ko";
print ko; @ to calculate ESS/ko @
```

```
let ns=e2 lpcpcon inerlc lpcecon lpccinc lpcblk noe mdw w;
{bb,ee}=estimate(e2,indep,ns);        @ to calculate ESS @
end;
```

```
use lsq;
output file=b:\di1g4a reset;
n=51;
load w[n,10]=b:\dib5a.asc;
load x[n,10]=b:\dic5a.asc;
load y[n,12]=b:\did5a.asc;
load y1[n,10]=b:\die5a.asc;
load z[n,10]=b:\dif5a.asc;
load z1[n,10]=b:\diga.asc;
print "Model I of Decent. (1969-79) of B-O Service";
format 8,6;
@ set data@
mpop90=w[2:n,5]; @ metropolitan population, 1990 @
te79=w[2:n,7];     @ total employment, 1979@
te69=w[2:n,10]; @ total employment, 1969 @
buse79=x[2:n,3];@buse79:employment of B-O services, 1979 @
mbe79=x[2:n,5]; @ metro employment of B-O services,'79 @
mte79=x[2:n,7]; @ metro total employment in 1979 @
man79=x[2:n,8]; @ manufacturing employment, 1979 @
noe=y[2:n,2];   @noe:Northeast Region @
mdw=y[2:n,3];   @mdw:Midwest Region @
w=y[2:n,4];     @w:West Region @
s=y[2:n,5];     @s:South Region @
mblk80=y[2:n,6]; @ metro black population in 1980 @
com79=y[2:n,9];@ employment of communication, 1979 @
com69=y[2:n,10]; @ employment of communication, 1969 @
mblk70=y[2:n,11]; @ metro black population in 1970 @
mman79=y1[2:n,2];@ metro employment of manufacturing, '79 @
man69=y1[2:n,4];@ manufacturing employment, 1969 @
mman69=y1[2:n,5];@ metro employment of manufacturing, '69 @
buse69=y1[2:n,10];@ employment of B-O services, 1969 @
pcpc=z[2:n,2];@ percent change of metropolitan population @
pinc79=z[2:n,3]; @ per capita income, 1979 @
mte69=z[2:n,6];@ metro total employment in 1969 @
mpop70=z[2:n,7];@ metro population, 1970 @
pinc69=z[2:n,8]; @ per capita income, 1969 @
mbe69=z[2:n,10];@ metro employment of B-O services, '69 @
mhqo=z1[2:n,5]; @ location of 'Fortune 500' headquarters @
mhq69=z1[2:n,6]; @ sales (1969) of 'Fortune 500' firms @
te64=z1[2:n,7]; @ total employment, 1964 @
buse64=z1[2:n,8];@ employment of B-O services, 1964 @
mte64=z1[2:n,9];@ metro total employment in 1964 @
mbe64=z1[2:n,10];@ metro employment of B-O services, '64 @
@ calculate location coefficients@
lo64=buse64./mbe64;
lor64=te64./mte64;
lcb64=lo64./lor64; @ LC of B-O services, 1964 @
lo69=buse69./mbe69;
lor69=te69./mte69;
lcb69=lo69./lor69;@ LC of B-O services, 1969 @
lo79=buse79./mbe79;
lor79=te79./mte79;
lcb79=lo79./lor79; @ LC of B-O services, 1979 @
```

```
pcblc=((lcb79-lcb69)./lcb69);@ change of LC, 1969-79 @
lom69=man69./mman69;
lomr69=te69./mte69;
lcm69=lom69./lomr69;@ LC of manufacturing, 1969 @
lom79=man79./mman79;
lomr79=te79./mte79;
lcm79=lom79./lomr79;@ LC of manufacturing, 1979 @
pclcm=((lcm79-lcm69)./lcm69);
pceb=((buse79-buse69)./buse69);@ service emp. change @
inertia=((lcb69-lcb64)./lcb64); @the existing inertia @
mpop80=(mpop90.*100)./(pcpc+100);
pctcp=((mpop80-mpop70)./mpop70); @ metro pop. change @
ainc69=pinc69.*1.978;@ expressed in constant 1979 values @
lpinc79=ln(pinc79);
lainc69=ln(ainc69);
lpcinc=((lpinc79-lainc69)./lainc69); @ income change @
lmb80=ln(mblk80);
lmb70=ln(mblk70);
lpcblk=((lmb80-lmb70)./lmb70);@change of metro black pop.@
@calculate mean and s.d of location coefficients @
y64=meanc(lcb64);
y69=meanc(lcb69);
y79=meanc(lcb79);
pcy=meanc(pcblc);
yooo=stdc(lcb64);
yoo=stdc(lcb69);
yo=stdc(lcb79);
pcyy=stdc(pcblc);
/*print "lcb69 lcb79";
print lcb69~lcb79;*/
print "mean:";
print "lcb64 lcb69 lcb79 pcblc";
print y64~y69~y79~pcy;
print "standard deviation:";
print yooo~yoo~yo~pcyy;
corpsls=mhq69;
dep=pcblc;
indep=pceb~inertia~pclcm~pctcp~lpcinc~corpsls~lpcblk~
noe~mdw~w;
let ns=dep pceb inertia pclcm pctcp lpcinc corpsls lpcblk
noe mdw w;
_vcov=1;
_rstat=1;
{b,e}=estimate(dep,indep,ns);
@ Normality Test @
print "Heteroskedasticity Test (Breusch-Pagan Test)";
one=ones(rows(dep),1);
s2=meanc(e^2);
print "s2";
print s2; @ to calculate ESS/2(s2)^2 @
e2=e^2;
let ns=e2 pceb inertia pclcm pctcp lpcinc corpsls lpcblk
noe mdw w;
```

```
{bb,ee}=estimate(e2,indep,ns);
print "=== Heteroskedasticity Test (White Test) ===";
indep=pceb~inertia~pclcm~pctcp~lpcinc~corpsls~lpcblk~noe~
mdw~w~(pceb^2)~(inertia^2)~(pclcm^2)~(pctcp^2)~(lpcinc^2)~
(corpsls^2)~(lpcblk^2)~(pceb.*inertia)~(inertia.*pclcm)~
(pclcm.*pctcp)~(pctcp.*lpcinc)~(lpcinc.*corpsls)~
(corpsls.*lpcblk);
let ns=e2 pceb inertia pclcm pctcp lpcinc corpsls lpcblk
noe mdw w pceb^2 inertia^2 pclcm^2 pctcp^2 lpcinc^2
corpsls^2 lpcblk^2 pceb.*inertia inertia.*pclcm
pclcm.*pctcp pctcp.*lpcinc lpcinc.*corpsls corpsls.*lpcblk;
call estimate(e2,indep,ns);
end;
```

```
use lsq;
output file=b:\di1g4 reset;
n=70;
load w[n,10]=b:\dib5.asc;
load x[n,10]=b:\dic5.asc;
load y[n,12]=b:\did5.asc;
load y1[n,10]=b:\die5.asc;
load z[n,10]=b:\dif5.asc;
load z1[n,10]=b:\dig.asc;
print "Model II of Decentra. (1969-79) of B-O Service";
format 8,6;
@ set data@
mpop90=w[2:n,5]; @ metropolitan population, 1990 @
te79=w[2:n,7];     @ total employment, 1979 @
te69=w[2:n,10]; @ total employment, 1969 @
buse79=x[2:n,3]; @ employment of B-O services, 1979 @
mbe79=x[2:n,5]; @ metro employment of B-O services, '79 @
mte79=x[2:n,7]; @ metro total employment in 1979 @
man79=x[2:n,8]; @ manufacturing employment, 1979 @
noe=y[2:n,2];   @noe:Northeast Region @
mdw=y[2:n,3];   @mdw:Midwest Region @
w=y[2:n,4];     @w:West Region @
s=y[2:n,5];     @s:South Region @
mblk80=y[2:n,6]; @ metro black population in 1980 @
com79=y[2:n,9]; @ employment of communication, 1979 @
com69=y[2:n,10]; @ employment of communication, 1969 @
mblk70=y[2:n,11]; @ metro black population in 1970 @
mman79=y1[2:n,2];@ metro employment of manufacturing, '79 @
man69=y1[2:n,4];@ manufacturing employment, 1969 @
mman69=y1[2:n,5];@ metro employment of manufacturing, '69 @
buse69=y1[2:n,10]; @ employment of B-O services, 1969 @
pcpc=z[2:n,2]; @percent change of metropolitan population @
pinc79=z[2:n,3]; @per capita income, 1979 @
mte69=z[2:n,6]; @ metro total employment in 1969 @
mpop70=z[2:n,7]; @ metro population, 1970 @
pinc69=z[2:n,8]; @per capita income, 1969 @
mbe69=z[2:n,10];@ metro employment of B-O services, '69 @
mhqo=z1[2:n,5]; @location of 'Fortune 500' headquarters @
mhq69=z1[2:n,6]; @sales (1969) of 'Fortune 500' firms @
te64=z1[2:n,7]; @te64:total employment, 1964 @
buse64=z1[2:n,8]; @ employment of B-O services, 1964 @
mte64=z1[2:n,9]; @ metro total employment in 1964 @
mbe64=z1[2:n,10];@ metro employment of B-O services, '64 @
@ calculate location coefficients@
lo64=buse64./mbe64;
lor64=te64./mte64;
lcb64=lo64./lor64; @ LC of B-O services, 1964 @
lo69=buse69./mbe69;
lor69=te69./mte69;
lcb69=lo69./lor69; @ LC of B-O services, 1969 @
lo79=buse79./mbe79;
lor79=te79./mte79;
lcb79=lo79./lor79;@ LC of B-O services, 1979 @
```

```
pcblc=((lcb79-lcb69)./lcb69); @ change of LC, 1969-79 @
lom69=man69./mman69;
lomr69=te69./mte69;
lcm69=lom69./lomr69;@ LC of manufacturing, 1969 @
lom79=man79./mman79;
lomr79=te79./mte79;
lcm79=lom79./lomr79;@ LC of manufacturing, 1979 @
pclcm=((lcm79-lcm69)./lcm69);
pceb=((buse79-buse69)./buse69);@ service emp. change @
inertia=((lcb69-lcb64)./lcb64); @ the existing inertia @
mpop80=(mpop90.*100)./(pcpc+100);
pctcp=((mpop80-mpop70)./mpop70);@ change of metro pop. @
ainc69=pinc69.*1.978;@ expressed in constant 1979 values @
lpinc79=ln(pinc79);
lainc69=ln(ainc69);
lpcinc=((lpinc79-lainc69)./lainc69);@ income change @
lmb80=ln(mblk80);
lmb70=ln(mblk70);
lpcblk=((lmb80-lmb70)./lmb70);@change of metro black pop. @
@calculate mean and s.d of location coefficients @
y64=meanc(lcb64);
y69=meanc(lcb69);
y79=meanc(lcb79);
pcy=meanc(pcblc);
yooo=stdc(lcb64);
yoo=stdc(lcb69);
yo=stdc(lcb79);
pcyy=stdc(pcblc);
/*print "lcb69 lcb79";
print lcb69~lcb79;*/
print "mean:";
print "lcb64 lcb69 lcb79 pcblc";
print y64~y69~y79~pcy;
print "standard deviation:";
print yooo~yoo~yo~pcyy;
methq=mhqo;
dep=pcblc;
indep=pceb~inertia~pclcm~pctcp~lpcinc~methq~lpcblk~noe~
mdw~w;
let ns=dep pceb inertia pclcm pctcp lpcinc methq lpcblk
noe mdw w;
_vcov=1;
_rstat=1;
{b,e}=estimate(dep,indep,ns);
@ Normality Test @
print " Heteroskedasticity Test (Breusch-Pagan Test) ";
one=ones(rows(dep),1);
s2=meanc(e^2);
print "s2";
print s2; @ to calculate ESS/2(s2)^2 @
e2=e^2;
let ns=e2 pceb inertia pclcm pctcp lpcinc methq lpcblk
noe mdw w;
```

```
{bb,ee}=estimate(e2,indep,ns);
print "=== Heteroskedasticity Test (White Test) ===";
indep=pceb~inertia~pclcm~pctcp~lpcinc~methq~lpcblk~
noe~mdw~w~(pceb^2)~(inertia^2)~(pclcm^2)~(pctcp^2)~
(lpcinc^2)~(lpcblk^2)~(pceb.*inertia)~(inertia.*pclcm)~
(pclcm.*pctcp)~(pctcp.*lpcinc)~(lpcinc.*lpcblk);
let ns=e2 pceb inertia pclcm pctcp lpcinc methq lpcblk
noe mdw w pceb^2 inertia^2 pclcm^2 pctcp^2 lpcinc^2 lpcblk^2
pceb.*inertia inertia.*pclcm pclcm.*pctcp pctcp.*lpcinc
lpcinc.*lpcblk;
call estimate(e2,indep,ns);
@ set estimation @
print "=== Weighted L-SQ Model ===";
_vcov=1;
_rstat=1;
ee2=e2-ee;  @ fitted e2 @
_weight=(1/(ee2./s2));
indep=pceb~inertia~pclcm~pctcp~lpcinc~methq~lpcblk~noe~
mdw~w;
let ns=dep pceb inertia pclcm pctcp lpcinc methq lpcblk noe
mdw w;
{b,e}=estimate(dep,indep,ns);
print " Heteroskedasticity Re-Test (Breusch-Pagan Test) ";
one=ones(rows(dep),1);
s2=meanc(e^2);
print "s2";
print s2; @ to calculate ESS/2(s2)^2 @
e2=e^2;
let ns=e2 pceb inertia pclcm pctcp lpcinc methq lpcblk
noe mdw w;
{bb,ee}=estimate(e2,indep,ns);
print "=== Heteroskedasticity Re-Test (White Test) ===";
indep=pceb~inertia~pclcm~pctcp~lpcinc~methq~lpcblk~noe~
mdw~w~(pceb^2)~(inertia^2)~(pclcm^2)~(pctcp^2)~(lpcinc^2)~
(lpcblk^2)~(pceb.*inertia)~(inertia.*pclcm)~(pclcm.*pctcp)~
(pctcp.*lpcinc)~(lpcinc.*lpcblk);
let ns=e2 pceb inertia pclcm pctcp lpcinc methq lpcblk
noe mdw w pceb^2 inertia^2 pclcm^2 pctcp^2 lpcinc^2
lpcblk^2 pceb.*inertia inertia.*pclcm pclcm.*pctcp
pctcp.*lpcinc lpcinc.*lpcblk;
call estimate(e2,indep,ns);
end;
```

```
use lsq;
output file=b:\di1g1a reset;
n=53;
load w[n,10]=b:\dib2a.asc;
load x[n,10]=b:\dic2a.asc;
load y[n,12]=b:\did2a.asc;
load y1[n,10]=b:\die2a.asc;
load z[n,10]=b:\dif2a.asc;
load z1[n,10]=b:\dig2a.asc;
print "Model I of Decentral. (1979-89) of B-O Service";
format 8,6;
@ set data@
mpop90=w[2:n,5]; @mpop90:metropolitan population, 1990 @
te89=w[2:n,6];     @te89:total employment, 1989@
te79=w[2:n,7]; @te79:total employment, 1979 @
te69=w[2:n,10]; @te69:total employment, 1969 @
buse89=x[2:n,2];@ emp. of business oriented service, 1989 @
buse79=x[2:n,3];@ emp. of business oriented service, 1979 @
mbe89=x[2:n,4];@ employment of B-O service(metro area '89)@
mbe79=x[2:n,5];@ employment of B-O service(metro area '79)@
mte89=x[2:n,6]; @ metropolitan total employment in 1989 @
mte79=x[2:n,7];@ metropolitan total employment in 1979 @
man79=x[2:n,8];@ manufacturing employment, 1979 @
man89=x[2:n,9];@ manufacturing employment, 1989 @
mblk90=x[2:n,10];@ metropolitan black population in 1990 @
noe=y[2:n,2];    @noe:Northeast Region @
mdw=y[2:n,3];    @mdw:Midwest Region @
w=y[2:n,4];      @w:West Region @
s=y[2:n,5];      @s:South Region @
mblk80=y[2:n,6];@ metro black population in 1980 @
com89=y[2:n,8];@ employment of communication, 1989 @
com79=y[2:n,9];@ employment of communication, 1979 @
mblk70=y[2:n,11];@ metropolitan black population in 1970 @
mman79=y1[2:n,2];@ emp. of manufacturing(metro area '79)@
mman89=y1[2:n,3];@ emp. of manufacturing(metro area '89)@
man69=y1[2:n,4];@ manufacturing employment, 1969 @
mman69=y1[2:n,5];@ emp. of manufacturing(metro area '69)@
buse69=y1[2:n,10];@ emp. of B-O service, 1969 @
pcpc=z[2:n,2];@percent change of metropolitan population @
pinc79=z[2:n,3]; @per capita income, 1979 @
pinc89=z[2:n,4]; @per capita income, 1989 @
mte69=z[2:n,6];@ metro total employment in 1969 @
mpop70=z[2:n,7];@ metro population, 1970 @
pinc69=z[2:n,8]; @per capita income, 1969 @
mbe69=z[2:n,10];@ emp. of B-O service(metro area '69)@
mhq=z1[2:n,2]; @location of 'Fortune 500' headquarters @
mhq79=z1[2:n,3]; @sales (1979) of 'Fortune 500' firms @
mhq69=z1[2:n,6]; @sales (1969) of 'Fortune 500' firms @
te64=z1[2:n,7]; @ total emplcyment, 1964 @
buse64=z1[2:n,8]; @ employment of B-O service, 1964 @
mte64=z1[2:n,9];@ metro total employment in 1964 @
mbe64=z1[2:n,10];@ emp. of B-O service(metro area '64)@
@ calculate location coefficients@
```

```
lo64=buse64./mbe64;
lor64=te64./mte64;
lcb64=lo64./lor64; @ LC of B-O services, 1964 @
lo69=buse69./mbe69;
lor69=te69./mte69;
lcb69=lo69./lor69; @ LC of B-O services, 1969 @
lo79=buse79./mbe79;
lor79=te79./mte79;
lcb79=lo79./lor79; @ LC of B-O services, 1979 @
lo89=buse89./mbe89;
lor89=te89./mte89;
lcb89=lo89./lor89; @ LC of B-O services, 1989 @
pcblc=((lcb89-lcb79)./lcb79); @ LC change, 1979-89 @
lom69=man69./mman69;
lomr69=te69./mte69;
lcm69=lom69./lomr69; @ LC of manufacturing, 1969 @
lom79=man79./mman79;
lomr79=te79./mte79;
lcm79=lom79./lomr79; @ LC of manufacturing, 1979 @
lom89=man89./mman89;
lomr89=te89./mte89;
lcm89=lom89./lomr89; @ LC of manufacturing, 1989 @
pclcm=((lcm89-lcm79)./lcm79);
pceb=((buse89-buse79)./buse79);
inertia=((lcb79-lcb69)./lcb69); @the existing inertia @
pccom=((com89-com79)./com79);@communications emp. change @
mpop80=(mpop90.*100)./(pcpc+100);
lmpop90=ln(mpop90);
lmpop80=ln(mpop80);
lmpopc=((lmpop90-lmpop80)./lmpop80);@metro pop. change @
ainc79=pinc79.*1.708;@ expressed in constant 1989 values @
lpinc89=ln(pinc89);
lainc79=ln(ainc79);
lpcinc=((lpinc89-lainc79)./lainc79);@ income change @
metblkc=((mblk90-mblk80)./mblk80);@change of black pop. @
@ calculate mean and s.d of location coefficients @
y69=meanc(lcb69);
y79=meanc(lcb79);
y89=meanc(lcb89);
pcy=meanc(pcblc);
yoo=stdc(lcb69);
yo=stdc(lcb79);
yn=stdc(lcb89);
pcyy=stdc(pcblc);
print "lcb69 lcb79 lcb89 pcblc";
print y69~y79~y89~pcy;
print "standard deviation:";
print yoo~yo~yn~pcyy;
corpsls=mhq79;
dep=pcblc;
indep=pceb~inertia~pclcm~pccom~lmpopc~lpcinc~corpsls~
metblkc~noe~mdw~w;
let ns=dep pceb inertia pclcm pccom lmpopc lpcinc corpsls
```

```
metblkc noe mdw w;
_vcov=1;
_rstat=1;
{b,e}=estimate(dep,indep,ns);
print " Heteroskedasticity Test (Koenkar-Basset Test) ";
one=ones(rows(dep),1);
s2=meanc(e^2);
e2=e^2;
ko=meanc((e2-s2)^2);
print "ko";
print ko; @ to calculate ESS/ko @
let ns=e2 pceb inertia pclcm pccom lmpopc lpcinc corpsls
metblkc noe mdw w;
{bb,ee}=estimate(e2,indep,ns);   @ to calculate ESS @
end;
```

```
use lsq;
output file=b:\di1g1 reset;
n=75;
load w[n,10]=b:\dib2.asc;
load x[n,10]=b:\dic2.asc;
load y[n,12]=b:\did2.asc;
load y1[n,10]=b:\die2.asc;
load z[n,10]=b:\dif2.asc;
load z1[n,10]=b:\dig2.asc;
print "Model II of Decentr. (1979-89) of B-O Service";
format 8,6;
@ set data@
mpop90=w[2:n,5]; @ metropolitan population, 1990 @
te89=w[2:n,6];     @ total employment, 1989@
te79=w[2:n,7]; @ total employment, 1979 @
te69=w[2:n,10]; @ total employment, 1969 @
buse89=x[2:n,2];@ employment of B-O service, 1989 @
buse79=x[2:n,3]; @ employment of B-O service, 1979 @
mbe89=x[2:n,4];@ employment of B-O service(metro area '89)@
mbe79=x[2:n,5];@ employment of B-O service(metro area '79)@
mte89=x[2:n,6]; @ metropolitan total employment in 1989 @
mte79=x[2:n,7]; @ metropolitan total employment in 1979 @
man79=x[2:n,8]; @ manufacturing employment, 1979 @
man89=x[2:n,9]; @ manufacturing employment, 1989 @
mblk90=x[2:n,10]; @ metro black population in 1990 @
noe=y[2:n,2];   @ Northeast Region @
mdw=y[2:n,3];   @ Midwest Region @
w=y[2:n,4];     @ West Region @
s=y[2:n,5];     @ South Region @
mblk80=y[2:n,6]; @ metro black population in 1980 @
com89=y[2:n,8]; @ employment of communication, 1989 @
com79=y[2:n,9]; @ employment of communication, 1979 @
mman79=y1[2:n,2];@emp. of manufacturing(metro area '79)@
mman89=y1[2:n,3];@emp. of manufacturing(metro area '89)@
buse69=y1[2:n,10];@emp. of business oriented service, 1969@
pcpc=z[2:n,2];@percent change of metropolitan population @
pinc79=z[2:n,3]; @per capita income, 1979 @
pinc89=z[2:n,4]; @per capita income, 1989 @
mte69=z[2:n,6]; @ metro total employment in 1969 @
mbe69=z[2:n,10];@employment of B-O service(metro area '69)@
mhq=z1[2:n,2]; @location of 'Fortune 500' headquarters @
@ calculate location coefficients@
lo69=buse69./mbe69;
lor69=te69./mte69;
lcb69=lo69./lor69;@ LC of business oriented service, 1969 @
lo79=buse79./mbe79;
lor79=te79./mte79;
lcb79=lo79./lor79;@ LC of business oriented service, 1979 @
lo89=buse89./mbe89;
lor89=te89./mte89;
lcb89=lo89./lor89;@ LC of business oriented service, 1989 @
pcblc=((lcb89-lcb79)./lcb79); @change of LC, 1979-89 @
lom79=man79./mman79;
```

```
lomr79=te79./mte79;
lcm79=lom79./lomr79; @ LC of manufacturing, 1979 @
lom89=man89./mman89;
lomr89=te89./mte89;
lcm89=lom89./lomr89; @ LC of manufacturing, 1989 @
pclcm=((lcm89-lcm79)./lcm79);
pceb=((buse89-buse79)./buse79);
inertia=((lcb79-lcb69)./lcb69); @the existing inertia @
pccom=((com89-com79)./com79);@ communications emp. change @
mpop80=(mpop90.*100)./(pcpc+100);
lmpop90=ln(mpop90);
lmpop80=ln(mpop80);
lmpopc=((lmpop90-lmpop80)./lmpop80);@ metro pop. change @
ainc79=pinc79.*1.708;@ expressed in constant 1989 values @
lpinc89=ln(pinc89);
lainc79=ln(ainc79);
lpcinc=((lpinc89-lainc79)./lainc79);@ income change @
metblkc=((mblk90-mblk80)./mblk80);@ change of black pop. @
@ calculate mean and s.d of location coefficients @
y69=meanc(lcb69);
y79=meanc(lcb79);
y89=meanc(lcb89);
pcy=meanc(pcblc);
yoo=stdc(lcb69);
yo=stdc(lcb79);
yn=stdc(lcb89);
pcyy=stdc(pcblc);
/*print "lcb79 lcb89";
print lcb79~lcb89~lmpopc;*/
print "mean:";
print "lcb69 lcb79 lcb89 pcblc";
print y69~y79~y89~pcy;
print "standard deviation:";
print yoo~yo~yn~pcyy;
methq=mhq;
dep=pcblc;
indep=pceb~inertia~pclcm~pccom~lmpopc~lpcinc~methq~
metblkc~noe~mdw~w;
let ns=dep pceb inertia pclcm pccom lmpopc lpcinc methq
metblkc noe mdw w;
_vcov=1;
_rstat=1;
{b,e}=estimate(dep,indep,ns);
print " Heteroskedasticity Test (Koenkar-Basset Test) ";
one=ones(rows(dep),1);
s2=meanc(e^2);
e2=e^2;
ko=meanc((e2-s2)^2);
print "ko";
print ko; @ to calculate ESS/ko @
let ns=e2 pceb inertia pclcm pccom lmpopc lpcinc methq
metblkc noe mdw w;
{bb,ee}=estimate(e2,indep,ns);      @ to calculate ESS @
```

```
end;
```

```
use lsq;
output file=b:\di2d3 reset;
n=73;
load w[n,10]=b:\dib1.asc;
load x[n,10]=b:\dic1.asc;
load y[n,12]=b:\did1.asc;
load y1[n,9]=b:\die1.asc;
load z[n,9]=b:\dif1.asc;
print "Model of Decentr. (1969-89) of C-O Service";
format 8,4;
@ set data@
cone89=w[2:n,3]; @ employment of C-O service, 1989 @
cone79=w[2:n,4];@ employment of C-O service, 1979 @
mpop90=w[2:n,5]; @ metropolitan population, 1990 @
te89=w[2:n,6];     @ total employment, 1989 @
te79=w[2:n,7];     @ total employment, 1979 @
mce89=w[2:n,8];@ employment of C-O service(metro area '89)@
mce79=w[2:n,9];@ employment of C-O service(metro area '79)@
te69=w[2:n,10]; @ total employment, 1969 @
mte89=x[2:n,6];@ metropolitan total employment in 1989 @
mte79=x[2:n,7];@ metropolitan total employment in 1979 @
mblk90=x[2:n,10];@ metropolitan black population in 1990 @
noe=y[2:n,2];   @ Northeast Region @
mdw=y[2:n,3];   @ Midwest Region @
w=y[2:n,4];     @ West Region @
s=y[2:n,5];     @ South Region @
mblk80=y[2:n,6]; @ metro black population in 1980 @
cone69=y[2:n,7];@ employment of C-O service, 1969 @
mblk70=y[2:n,11];@ metro black population in 1970 @
cone59=y[2:n,12];@ employment of C-O service, 1959 @
te59=y1[2:n,7];  @ total employment, 1959 @
mte59=y1[2:n,8]; @ metro total employment in 1959 @
pcpc=z[2:n,2];@ percent change (1980-1990) of metro pop. @
pinc79=z[2:n,3]; @ per capita income, 1979 @
pinc89=z[2:n,4]; @ per capita income, 1989 @
mce69=z[2:n,5];@ employment of C-O service(metro area '69)@
mte69=z[2:n,6]; @metropolitan total employment in 1969 @
mpop70=z[2:n,7]; @ metropolitan population, 1970 @
pinc69=z[2:n,8]; @per capita income, 1969 @
mce59=z[2:n,9];@ employment of C-O service(metro area '59)@
@ calculate location coefficients@
lo59=cone59./mce59;
lor59=te59./mte59;
lcon59=lo59./lor59;@ LC of consumer oriented service, 1959@
lo69=cone69./mce69;
lor69=te69./mte69;
lcon69=lo69./lor69;@ LC of consumer oriented service, 1969@
lo79=cone79./mce79;
lor79=te79./mte79;
lcon79=lo79./lor79;@ LC of consumer oriented service, 1979@
lo89=cone89./mce89;
lor89=te89./mte89;
lcon89=lo89./lor89;@ LC of consumer oriented service, 1989@
```

```
lmp90=ln(mpop90);
lmp70=ln(mpop70);
lpcpcon=((lmp90-lmp70)./lmp70);@ change of metro pop. @
pcclc=((lcon89-lcon69)./lcon69); @change of LC, 1969-89 @
ainc69=pinc69.*3.379;@ expressed in constant 1989 values @
inerlc=((lcon79-lcon59)./lcon59); @the existing inertia @
pcecon=((cone89-cone69)./cone69); @ service emp. change @
linc89=ln(pinc89);
linc69=ln(ainc69);
lpccinc=((linc89-linc69)./linc69); @ income change @
pcblk=((mblk90-mblk70)./mblk70);@ change of black pop. @
@calculate mean and s.d of location coefficients @
y59=meanc(lcon59);
y69=meanc(lcon69);
y79=meanc(lcon79);
y89=meanc(lcon89);
pcy=meanc(pcclc);
yooo=stdc(lcon59);
yoo=stdc(lcon69);
yo=stdc(lcon79);
yn=stdc(lcon89);
pcyy=stdc(pcclc);
print "mean:";
print "lcon59 lcon69 lcon79 lcon89 pcclc";
print y59~y69~y79~y89~pcy;
print "standard deviation:";
print yooo~yoo~yo~yn~pcyy;
dep=pcclc;
indep=lpcpcon~inerlc~pcecon~lpccinc~pcblk~noe~mdw~w;
let ns=dep lpcpcon inerlc pcecon lpccinc pcblk noe mdw w;
_vcov=1;
_rstat=1;
{b,e}=estimate(dep,indep,ns);
print "Heteroskedasticity Test (Breusch-Pagan Test)";
one=ones(rows(dep),1);
s2=meanc(e^2);
print "s2";
print s2; @ to calculate ESS/2(s2)^2 @
e2=e^2;
let ns=e2 lpcpcon inerlc pcecon lpccinc pcblk noe mdw w;
{bb,ee}=estimate(e2,indep,ns);
print " Heteroskedasticity Test (White Test) ";
indep=lpcpcon~inerlc~pcecon~lpccinc~pcblk~noe~mdw~w~
(lpcpcon^2)~(inerlc^2)~(pcecon^2)~(lpccinc^2)~(pcblk^2)~
(lpcpcon.*inerlc)~(inerlc.*pcecon)~(pcecon.*lpccinc)~
(lpccinc.*pcblk);
let ns=e2 lpcpcon inerlc pcecon lpccinc pcblk noe mdw w
lpcpcon^2 inerlc^2 pcecon^2 lpccinc^2 pcblk^2
lpcpcon.*inerlc inerlc.*pcecon pcecon.*lpccinc
lpccinc.*pcblk;
call estimate(e2,indep,ns);
print "=== Weighted L-SQ Model ===";    @ ESTIMATION @
```

```
_vcov=1;
_rstat=1;
ee2=e2-ee;  @ fitted e2 @
_weight=(1/(ee2./s2));
indep=lpcpcon~inerlc~pcecon~lpccinc~pcblk~noe~mdw~w;
let ns=dep lpcpcon inerlc pcecon lpccinc pcblk noe mdw w;
{b,e}=estimate(dep,indep,ns);
print " Heteroskedasticity Re-Test (Breusch-Pagan Test) ";
one=ones(rows(dep),1);
s2=meanc(e^2);
print "s2";
print s2; @ to calculate ESS/2(s2)^2 @
e2=e^2;
let ns=e2 lpcpcon inerlc pcecon lpccinc pcblk noe mdw w;
{bb,ee}=estimate(e2,indep,ns);
print "=== Heteroskedasticity Re-Test (White Test) ===";
indep=lpcpcon~inerlc~pcecon~lpccinc~pcblk~noe~mdw~w~
(lpcpcon^2)~(inerlc^2)~(pcecon^2)~(lpccinc^2)~(pcblk^2)~
(lpcpcon.*inerlc)~(inerlc.*pcecon)~(pcecon.*lpccinc)~
(lpccinc.*pcblk);
let ns=e2 lpcpcon inerlc pcecon lpccinc pcblk noe mdw w
lpcpcon^2 inerlc^2 pcecon^2 lpccinc^2 pcblk^2
lpcpcon.*inerlc inerlc.*pcecon pcecon.*lpccinc
lpccinc.*pcblk;
call estimate(e2,indep,ns);
end;
```

```
use lsq;
output file=b:\di1g3a reset;
n=51;
load w[n,10]=b:\dib5a.asc;
load x[n,10]=b:\dic5a.asc;
load y[n,12]=b:\did5a.asc;
load y1[n,10]=b:\die5a.asc;
load z[n,10]=b:\dif5a.asc;
load z1[n,10]=b:\diga.asc;
print "Model I of Decentr. (1969-89) of B-O Service";
format 8,6;
@ set data@
mpop90=w[2:n,5]; @ metropolitan population, 1990 @
te89=w[2:n,6];     @ total employment, 1989@
te79=w[2:n,7];     @ total employment, 1979@
te69=w[2:n,10]; @ total employment, 1969 @
buse89=x[2:n,2]; @ employment of B-O service, 1989 @
buse79=x[2:n,3];@ employment of B-O service, 1979 @
mbe89=x[2:n,4];@ employment of B-O service(metro area '89)@
mbe79=x[2:n,5];@ employment of B-O service(metro area '79)@
mte89=x[2:n,6];@ metro total employment in 1989 @
mte79=x[2:n,7];@ metro total employment in 1979 @
man89=x[2:n,9];@ manufacturing employment, 1989 @
mblk90=x[2:n,10];@ metro black population in 1990 @
noe=y[2:n,2];   @ Northeast Region @
mdw=y[2:n,3];   @ Midwest Region @
w=y[2:n,4];     @ West Region @
s=y[2:n,5];     @ South Region @
com89=y[2:n,8];@employment of communication (SIC 48), 1989@
com69=y[2:n,10]; @ employment of communication, 1969 @
mblk70=y[2:n,11];@ metro black population in 1970 @
mman89=y1[2:n,3];@ emp. of manufacturing(metro area '89) @
man69=y1[2:n,4];@ manufacturing employment, 1969 @
mman69=y1[2:n,5];@ emp. of manufacturing(metro area '69) @
buse69=y1[2:n,10];@ employment of B-O service, 1969 @
pcpc=z[2:n,2];  @percent change of metro population @
pinc89=z[2:n,4]; @per capita income, 1989 @
mte69=z[2:n,6]; @ metropolitan total employment in 1969 @
mpop70=z[2:n,7]; @ metropolitan population, 1970 @
pinc69=z[2:n,8]; @ per capita income, 1969 @
mbe69=z[2:n,10];@ emp. of B-O service(metro area '69) @
mhqo=z1[2:n,5]; @location of 'Fortune 500' headquarters @
mhq69=z1[2:n,6]; @sales (1969) of 'Fortune 500' firms @
te64=z1[2:n,7]; @ total employment, 1964 @
buse64=z1[2:n,8];@ employment of B-O service, 1964 @
mte64=z1[2:n,9];@ metro total employment in 1964 @
mbe64=z1[2:n,10];@ emp. of B-O service(metro area '64) @
@ calculate location coefficients@
lo64=buse64./mbe64;
lor64=te64./mte64;
lcb64=lo64./lor64;@ LC of business oriented service, 1964@
lo69=buse69./mbe69;
lor69=te69./mte69;
```

```
lcb69=lo69./lor69;@ LC of business oriented service, 1969 @
lo79=buse79./mbe79;
lor79=te79./mte79;
lcb79=lo79./lor79;@ LC of business oriented service, 1979 @
lo89=buse89./mbe89;
lor89=te89./mte89;
lcb89=lo89./lor89;@ LC of business oriented service, 1989 @
pcblc=((lcb89-lcb69)./lcb69);@change of LC, 1969-89 @
lom69=man69./mman69;
lomr69=te69./mte69;
lcm69=lom69./lomr69; @ LC of manufacturing, 1969 @
lom89=man89./mman89;
lomr89=te89./mte89;
lcm89=lom89./lomr89; @ LC of manufacturing, 1989 @
pclcm=((lcm89-lcm69)./lcm69);
pceb=((buse89-buse69)./buse69);@change of B-O service emp.@
inertia=((lcb79-lcb64)./lcb64); @the existing inertia @
lmpop90=ln(mpop90);
lmpop70=ln(mpop70);
lmpopc=((lmpop90-lmpop70)./lmpop70);@ metro pop. change @
ainc69=pinc69.*3.379;@ expressed in constant 1989 values @
pcinc=((pinc89-ainc69)./ainc69); @ income change @
metblkc=((mblk90-mblk70)./mblk70);@ change of black pop. @
@calculate mean and s.d of location coefficients @
y64=meanc(lcb64);
y69=meanc(lcb69);
y79=meanc(lcb79);
y89=meanc(lcb89);
pcy=meanc(pcblc);
yooo=stdc(lcb64);
yoo=stdc(lcb69);
yo=stdc(lcb79);
yn=stdc(lcb89);
pcyy=stdc(pcblc);
/*print "lcb79 lcb89";
print lcb79~lcb89;*/
print "mean:";
print "lcb64 lcb69 lcb79 lcb89 pcblc";
print y64~y69~y79~y89~pcy;
print "standard deviation:";
print yooo~yoo~yo~yn~pcyy;
corpsls=mhq69;
dep=pcblc;
indep=pceb~inertia~pclcm~lmpopc~pcinc~corpsls~metblkc~
noe~mdw~w;
let ns=dep pceb inertia pclcm lmpopc pcinc corpsls
metblkc noe mdw w;
_vcov=1;
_rstat=1;
{b,e}=estimate(dep,indep,ns);
print " Heteroskedasticity Test (Koenkar-Basset Test) ";
one=ones(rows(dep),1);
s2=meanc(e^2);
```

```
e2=e^2;
ko=meanc((e2-s2)^2);
print "ko";
print ko; @ to calculate ESS/ko @
let ns=e2 pceb inertia pclcm lmpopc pcinc corpsls metblkc
noe mdw w;
{bb,ee}=estimate(e2,indep,ns);   @ to calculate ESS @
print "=== Weighted L-SQ Model ==="; @ ESTIMATION @
_vcov=1;
_rstat=1;
ee2=e2-ee;  @ fitted e2 @
_weight=(1/(ee2./s2));
indep=pceb~inertia~pclcm~lmpopc~pcinc~corpsls~metblkc~
noe~mdw~w;
let ns=dep pceb inertia pclcm lmpopc pcinc corpsls
metblkc noe mdw w;
{b,e}=estimate(dep,indep,ns);
print " Heteroskedasticity Re-Test (Koenkar-Basset Test) ";
one=ones(rows(dep),1);
s2=meanc(e^2);
e2=e^2;
ko=meanc((e2-s2)^2);
print "ko";
print ko; @ to calculate ESS/ko @
let ns=e2 pceb inertia pclcm lmpopc pcinc corpsls metblkc
noe mdw w;
{bb,ee}=estimate(e2,indep,ns);   @ to calculate ESS @
end;
```

```
use lsq;
output file=b:\di1g3 reset;
n=70;
load w[n,10]=b:\dib5.asc;
load x[n,10]=b:\dic5.asc;
load y[n,12]=b:\did5.asc;
load y1[n,10]=b:\die5.asc;
load z[n,10]=b:\dif5.asc;
load z1[n,10]=b:\dig.asc;
print "Model II of Decentr. (1969-89) of B-O Service";
format 8,6;
@ set data@
mpop90=w[2:n,5]; @ metropolitan population, 1990 @
te89=w[2:n,6];     @ total employment, 1989 @
te79=w[2:n,7];     @ total employment, 1979 @
te69=w[2:n,10]; @ total employment, 1969 @
buse89=x[2:n,2];@ employment of B-O service, 1989 @
buse79=x[2:n,3];@ employment of B-O service, 1979 @
mbe89=x[2:n,4];@ employment of B-O service(metro area '89)@
mbe79=x[2:n,5];@ employment of B-O service(metro area '79)@
mte89=x[2:n,6]; @ metropolitan total employment in 1989 @
mte79=x[2:n,7]; @ metro total employment in 1979 @
man79=x[2:n,8]; @ manufacturing employment, 1979@
man89=x[2:n,9]; @ manufacturing employment, 1989@
mblk90=x[2:n,10]; @ metropolitan black population in 1990 @
noe=y[2:n,2];   @ Northeast Region @
mdw=y[2:n,3];   @ Midwest Region @
w=y[2:n,4];     @ West Region @
s=y[2:n,5];     @ South Region @
mblk80=y[2:n,6]; @ metro black population in 1980 @
com89=y[2:n,8]; @ emp. of communication (SIC 48), 1989 @
com69=y[2:n,10];@ employment of communication, 1969 @
mblk70=y[2:n,11]; @ metro black population in 1970 @
mman79=y1[2:n,2];@ emp. of manufacturing(metro area '79) @
mman89=y1[2:n,3];@ emp. of manufacturing(metro area '89) @
man69=y1[2:n,4];@man69:manufacturing employment, 1969 @
mman69=y1[2:n,5];@ emp. of manufacturing(metro area '69)@
buse69=y1[2:n,10];@ emp. of B-O service, 1969 @
pcpc=z[2:n,2];  @percent change of metro population @
pinc79=z[2:n,3]; @per capita income, 1979 @
pinc89=z[2:n,4]; @per capita income, 1989 @
mte69=z[2:n,6]; @ metro total employment in 1969 @
mpop70=z[2:n,7]; @ metro population, 1970 @
pinc69=z[2:n,8]; @per capita income, 1969 @
mbe69=z[2:n,10];@employment of B-O service(metro area '69)@
mhqo=z1[2:n,5]; @location of 'Fortune 500' headquarters @
te64=z1[2:n,7]; @ total employment, 1964 @
buse64=z1[2:n,8];@ employment of B-O service, 1964 @
mte64=z1[2:n,9];@ metro total employment in 1964 @
mbe64=z1[2:n,10];@ emp. of B-O service(metro area '64)@
@ calculate location coefficients@
lo64=buse64./mbe64;
lor64=te64./mte64;
```

```
lcb64=lo64./lor64;@ LC of business oriented service, 1964@
lo69=buse69./mbe69;
lor69=te69./mte69;
lcb69=lo69./lor69;@ LC of business oriented service, 1969@
lo79=buse79./mbe79;
lor79=te79./mte79;
lcb79=lo79./lor79;@ LC of business oriented service, 1979@
lo89=buse89./mbe89;
lor89=te89./mte89;
lcb89=lo89./lor89;@ LC of business oriented service, 1989@
pcblc=((lcb89-lcb69)./lcb69);@change of LC, 1969-89@
lom69=man69./mman69;
lomr69=te69./mte69;
lcm69=lom69./lomr69;@ LC of manufacturing, 1969 @
lom79=man79./mman79;
lomr79=te79./mte79;
lcm79=lom79./lomr79;@ LC of manufacturing, 1979 @
lom89=man89./mman89;
lomr89=te89./mte89;
lcm89=lom89./lomr89;@ LC of manufacturing, 1989 @
pclcm=((lcm89-lcm69)./lcm69);
pceb=((buse89-buse69)./buse69);@change of B-O service emp.@
inertia=((lcb79-lcb64)./lcb64); @the existing inertia @
lmpop90=ln(mpop90);
lmpop70=ln(mpop70);
lmpopc=((lmpop90-lmpop70)./lmpop70);@ metro pop. change @
ainc69=pinc69.*3.379;@ expressed in constant 1989 values @
pcinc=((pinc89-ainc69)./ainc69);@ income change @
metblkc=((mblk90-mblk70)./mblk70);@ change of black pop. @
@calculate mean and s.d of location coefficients @
y64=meanc(lcb64);
y69=meanc(lcb69);
y79=meanc(lcb79);
y89=meanc(lcb89);
pcy=meanc(pcblc);
yooo=stdc(lcb64);
yoo=stdc(lcb69);
yo=stdc(lcb79);
yn=stdc(lcb89);
pcyy=stdc(pcblc);
print "mean:";
print "lcb64 lcb69 lcb79 lcb89 pcblc";
print y64~y69~y79~y89~pcy;
print "standard deviation:";
print yooo~yoo~yo~yn~pcyy;
methq=mhqo;
dep=pcblc;
indep=pceb~inertia~pclcm~lmpopc~pcinc~methq~metblkc~
noe~mdw~w;
let ns=dep pceb inertia pclcm lmpopc pcinc methq metblkc
noe mdw w;
_vcov=1;
_rstat=1;
```

```
{b,e}=estimate(dep,indep,ns);
print "Heteroskedasticity Test (Koenkar-Basset Test)";
one=ones(rows(dep),1);
s2=meanc(e^2);
e2=e^2;
ko=meanc((e2-s2)^2);
print "ko";
print ko; @ to calculate ESS/ko @
let ns=e2 pceb inertia pclcm lmpopc pcinc methq metblkc
noe mdw w;
{bb,ee}=estimate(e2,indep,ns);     @ to calculate ESS @
end;
```

APPENDIX C

DATA FOR REGRESSION MODELS

Case	Core County	MSAs
1	Albany	Albany-Schenectady-Troy, NY
2	Lehigh	Allentown-Bethlehem-Easton, PA-NJ
3	Outagamie	Appleton-Oshkosh-Neenah, WI
4	Baltimore	Baltimore, MD
5	East Baton Rouge	Baton Rouge, LA
6	Jefferson	Beaumont-Port Arthur, TX
7	Jefferson	Birmingham, AL
8	Middlesex	Boston, MA
9	Chittenden	Burlington, VT
10	Charleston	Charleston, SC
11	Mecklenburg	Charlotte-Gastonia-Rock Hill, NC-SC
12	Hamilton	Chattanooga, TN-GA
13	Cook	Chicago, IL
14	Cuyahoga	Cleveland, OH
15	Franklin	Columbus, OH
16	Dallas	Dallas, TX
17	Scott	Davenport-Rock Island-Moline, IA-IL
18	Montgomery	Dayton-Springfield, OH
19	Denver	Denver, CO
20	Polk	Des Moines, IA
21	Wayne	Detroit, MI
22	Vanderburgh	Evansville, IN-KY
23	Sebastian	Ft. Smith, AR-OK
24	Allen	Ft. Wayne, IN
25	Guilford	Greensboro-Winston-Salem-High Point, NC
26	Greenville	Greenville-Spartanburg, SC
27	Dauphin	Harrisburg-Lebanon-Carlisle, PA
28	Hartford	Hartford, CT
29	Catawba	Hickory-Morganton, NC
30	Cabell	Huntington-Ashland, WV-KY-OH
31	Marion	Indianapolis, IN
32	Hinds	Jackson, MS
33	Duval	Jacksonville, FL
34	Sullivan	Johnson City-Kingsport-Bristol, TN-VA
35	Jackson	Kansas City, MO-KS
36	Knox	Knoxville, TN
37	Ingham	Lansing-East Lansing, MI
38	Fayette	Lexington-Fayette, KY
39	Pulaski	Little Rock-North Little Rock, AR
40	Hillsborough	Manchester, NH
41	Shelby	Memphis, TN-AR-MS

Case	Core County	MSAs
		(continued)
42	Middlesex	Middlesex-Somerset-Hunterdon, NJ
43	Milwaukee	Milwaukee, WI
44	Hennepin	Minneapolis-St. Paul, MN-WI
45	Montgomery	Montgomery, AL
46	Davidson	Nashville, TN
47	Orleans	New Orleans, LA
48	Essex	Newark, NJ
49	Oklahoma	Oklahoma City, OK
50	Douglas	Omaha, NE-IA
51	Orange	Orlando, FL
52	Peoria	Peoria, IL
53	Philadelphia	Philadelphia, PA-NJ
54	Allegheny	Pittsburgh, PA
55	Multnomah	Portland, OR
56	Providence	Providence, RI
57	Wake	Raleigh-Durham, NC
58	Monroe	Rochester, NY
59	Sacramento	Sacramento, CA
60	Saginaw	Saginaw-Bay City-Midland, MI
61	Stearns	St. Cloud, MN
62	St. Louis	St. Louis, MO-IL
63	Salt Lake	Salt Lake City-Ogden, UT
64	San Francisco	San Francisco, CA
65	Luzerne	Scranton-Wilkes-Barre, PA
66	Jefferson	Steubenville-Weirton, OH-WV
67	Onondaga	Syracuse, NY
68	Pinellas	Tampa-St. Petersberg-Clearwater, FL
69	Lucas	Toledo, OH
70	Tulsa	Tulsa, OK
71	Belmont	Wheeling, WV-OH
72	New Castle	Wilmington, DE-NJ-MD

== Models of Decentralization of Consumer Oriented Services ==

case	lcon59	lcon69	lcon79	lcon89	mpop70	mpop90	pcpc
1	1.158	1.104	1.026	0.8992	8.109e+05	8.743e+05	4.600
2	1.208	1.224	1.111	1.023	5.941e+05	6.867e+05	8.100
3	1.097	1.069	1.065	1.068	2.769e+05	3.151e+05	8.200
4	1.049	0.924	0.732	0.6783	2.089e+06	2.382e+06	8.300
5	0.9797	0.9941	1.016	0.9999	3.756e+05	5.283e+05	6.900
6	0.9978	1.045	0.9821	0.9867	3.459e+05	3.612e+05	-3.200
7	0.9948	0.9886	1.002	0.9827	7.941e+05	9.078e+05	2.700
8	0.9791	0.9850	0.9478	0.8652	4.791e+06	2.871e+06	2.300
9	0.9517	0.9684	0.9881	0.9798	1.340e+05	1.771e+05	14.00
10	1.033	1.036	1.049	1.025	3.361e+05	5.069e+05	17.80
11	1.221	1.214	1.080	0.9719	8.403e+05	1.162e+06	19.60
12	1.034	1.023	1.020	1.018	3.494e+05	4.332e+05	1.600
13	0.9896	0.9822	0.9806	0.9802	6.096e+06	6.070e+06	0.200
14	0.9861	0.9829	0.9645	0.9500	2.064e+06	1.831e+06	-3.600
15	1.005	1.017	1.035	1.016	1.149e+06	1.377e+06	10.70
16	0.9730	0.9744	0.9688	0.9443	1.556e+06	2.553e+06	30.40
17	1.156	1.003	1.030	1.006	3.626e+05	3.509e+05	-8.800
18	0.9610	0.9571	0.9899	0.9697	9.727e+05	9.513e+05	1.000
19	0.9950	0.8888	0.8215	0.5100	1.104e+06	1.623e+06	13.60
20	0.9702	0.9741	0.9836	0.9867	3.396e+05	3.929e+05	6.900
21	0.9798	0.9339	0.9060	0.9546	4.550e+06	4.382e+06	-2.400
22	0.9482	1.021	1.021	1.046	2.545e+05	2.790e+05	1.000
23	0.9801	0.9226	0.9412	0.9540	1.283e+05	1.759e+05	8.000
24	0.9835	1.008	1.028	1.004	3.347e+05	3.638e+05	2.700
25	1.091	1.103	1.126	1.074	7.422e+05	9.421e+05	10.60
26	1.074	1.109	0.9664	0.9498	4.732e+05	6.409e+05	12.40
27	0.9646	0.9201	0.8958	0.8765	5.103e+05	5.880e+05	5.700
28	1.111	0.9611	0.9389	0.9355	1.409e+06	1.553e+06	7.300
29	1.024	1.082	1.075	1.059	1.707e+05	2.217e+05	9.400
30	1.017	1.038	1.048	1.141	3.068e+05	3.125e+05	-7.100
31	0.9686	0.9387	0.9427	0.9391	1.110e+06	1.250e+06	7.100
32	1.021	1.015	1.028	0.9641	2.886e+05	3.954e+05	9.200
33	1.005	1.006	0.9716	0.9257	6.123e+05	9.067e+05	25.50
34	0.8653	0.8709	0.9488	0.9866	3.729e+05	4.360e+05	0.600
35	0.9683	0.9290	0.9405	0.9634	1.371e+06	1.566e+06	9.300
36	1.156	1.068	1.021	1.045	4.765e+05	6.048e+05	6.900
37	0.9505	0.9493	0.9324	0.8979	3.784e+05	4.327e+05	3.100
38	1.009	1.039	1.072	1.029	2.667e+05	3.484e+05	9.700
39	1.009	1.009	1.015	0.9961	3.811e+05	5.131e+05	8.100
40	0.8651	0.8932	0.9142	0.9075	4.438e+05	7.019e+05	14.30
41	0.9840	0.9838	0.9892	0.9949	8.340e+05	9.817e+05	7.500
42	0.9846	0.9590	0.9951	1.019	8.519e+05	1.020e+06	15.10
43	0.9902	0.9852	0.9981	0.9910	1.404e+06	1.432e+06	2.500
44	1.044	1.059	0.9637	0.9210	1.982e+06	2.464e+06	15.30
45	1.016	0.9985	0.9966	0.9836	2.258e+05	2.925e+05	7.300
46	0.9632	0.9918	1.008	0.9270	6.991e+05	9.850e+05	15.80
47	1.027	0.9400	0.8636	0.8353	1.099e+06	1.239e+06	-1.400
48	1.021	0.9826	1.011	0.9832	1.934e+06	1.824e+06	-2.900
49	0.9166	0.9485	0.9259	0.9127	7.178e+05	9.588e+05	11.40

case	lcon59	lcon69	lcon79	lcon89	mpop70	mpop90	pcpc
			(continued)				
50	0.9620	0.9351	0.9374	0.9413	5.535e+05	6.183e+05	5.700
51	0.9877	0.9860	0.9490	0.9003	4.533e+05	1.073e+06	53.30
52	1.327	1.104	1.001	0.9204	3.420e+05	3.392e+05	7.300
53	0.9908	0.8946	0.8180	0.8500	4.818e+06	4.857e+06	3.000
54	0.9818	0.9775	0.9583	0.9496	2.347e+06	2.057e+06	-7.300
55	0.9629	0.9704	0.9593	0.8972	9.209e+05	1.240e+06	12.10
56	0.9289	0.8967	0.8284	0.8277	9.467e+05	6.549e+05	5.900
57	1.099	1.042	1.074	1.075	4.457e+05	7.355e+05	31.20
58	0.9310	0.9297	0.8774	0.9421	9.615e+05	1.002e+06	3.200
59	0.9620	1.008	1.002	0.9772	8.444e+05	1.481e+06	34.70
60	1.014	1.026	0.9948	1.062	4.009e+05	3.993e+05	-5.300
61	0.9625	1.011	1.030	1.059	1.346e+05	1.909e+05	16.90
62	1.209	1.237	1.129	1.039	2.429e+06	2.444e+06	2.800
63	0.9305	0.8986	0.9353	0.9268	6.839e+05	1.072e+06	17.80
64	0.9446	0.8812	0.7871	0.6789	1.478e+06	1.604e+06	7.700
65	1.035	0.9729	1.010	1.005	6.960e+05	7.342e+05	0.700
66	1.478	1.440	1.107	1.320	1.656e+05	1.425e+05	-13.00
67	0.9778	0.9620	0.9627	0.9620	6.365e+05	6.599e+05	2.600
68	1.197	1.112	1.067	1.043	1.106e+06	2.068e+06	28.20
69	0.9860	1.017	1.000	0.9969	6.072e+05	6.141e+05	-0.400
70	0.9557	0.9789	0.9872	0.9907	5.275e+05	7.090e+05	7.900
71	1.003	1.013	1.079	1.232	1.827e+05	1.593e+05	-14.20
72	1.006	1.023	0.9895	0.9782	4.995e+05	5.786e+05	10.60

== Models of Decentralization of Consumer Oriented Services ==

case	pinc69	pinc79	pinc89	cone59	cone69	cone79	cone89
1	3749.	7598.	1.636e+04	1.776e+04	2.413e+04	2.818e+04	3.687e+04
2	3507.	7873.	1.546e+04	1.261e+04	1.798e+04	2.632e+04	3.314e+04
3	2954.	7267.	1.389e+04	4967.	7686.	1.136e+04	1.332e+04
4	2886.	5877.	1.199e+04	7.915e+04	7.919e+04	5.454e+04	5.098e+04
5	2854.	7476.	1.313e+04	1.317e+04	1.884e+04	3.385e+04	3.906e+04
6	2928.	7601.	1.235e+04	1.406e+04	1.528e+04	2.364e+04	2.264e+04
7	2848.	7070.	1.328e+04	3.662e+04	4.109e+04	5.774e+04	6.774e+04
8	3747.	8439.	2.034e+04	6.161e+04	9.000e+04	1.175e+05	1.446e+05
9	3073.	6925.	1.610e+04	3944.	6017.	1.019e+04	1.645e+04
10	2557.	6358.	1.307e+04	1.062e+04	1.569e+04	2.455e+04	3.724e+04
11	3323.	7872.	1.691e+04	2.054e+04	3.098e+04	4.511e+04	6.968e+04
12	2863.	6886.	1.362e+04	1.497e+04	1.917e+04	2.578e+04	3.317e+04
13	3792.	8229.	1.570e+04	3.364e+05	4.304e+05	4.724e+05	4.780e+05
14	3727.	8099.	1.491e+04	9.889e+04	1.281e+05	1.400e+05	1.411e+05
15	3390.	7591.	1.491e+04	4.509e+04	6.748e+04	9.486e+04	1.285e+05
16	3694.	8667.	1.624e+04	6.985e+04	1.148e+05	1.669e+05	2.158e+05
17	3296.	8226.	1.363e+04	7819.	1.034e+04	1.540e+04	1.624e+04
18	3629.	7643.	1.450e+04	3.162e+04	4.541e+04	5.518e+04	6.416e+04
19	3557.	8555.	1.559e+04	4.118e+04	5.400e+04	6.621e+04	5.764e+04
20	3446.	8305.	1.537e+04	1.818e+04	2.463e+04	3.582e+04	4.507e+04
21	3505.	7608.	1.302e+04	1.520e+05	1.777e+05	1.655e+05	1.659e+05
22	2941.	7480.	1.343e+04	1.039e+04	1.390e+04	1.847e+04	2.337e+04
23	2636.	6834.	1.236e+04	4518.	5581.	8789.	1.179e+04
24	3355.	7766.	1.463e+04	1.520e+04	2.328e+04	3.134e+04	3.660e+04
25	3185.	7426.	1.537e+04	1.537e+04	2.267e+04	3.270e+04	4.680e+04
26	2759.	6746.	1.392e+04	1.155e+04	1.672e+04	2.633e+04	3.607e+04
27	3218.	7525.	1.489e+04	1.367e+04	1.706e+04	1.958e+04	2.415e+04
28	3854.	8342.	1.898e+04	4.177e+04	6.057e+04	7.391e+04	9.441e+04
29	2910.	6672.	1.376e+04	3671.	6295.	1.051e+04	1.467e+04
30	2773.	6785.	1.207e+04	7180.	7994.	1.042e+04	1.249e+04
31	3534.	7677.	1.461e+04	5.374e+04	6.395e+04	8.228e+04	1.034e+05
32	2659.	6728.	1.222e+04	1.185e+04	1.540e+04	2.437e+04	2.595e+04
33	2861.	6822.	1.386e+04	2.786e+04	4.083e+04	5.306e+04	7.272e+04
34	2705.	6497.	1.273e+04	5743.	8287.	1.147e+04	1.341e+04
35	3375.	7610.	1.371e+04	5.076e+04	6.408e+04	6.793e+04	7.249e+04
36	2750.	6895.	1.401e+04	1.536e+04	2.009e+04	2.857e+04	4.137e+04
37	3444.	7509.	1.374e+04	1.170e+04	1.879e+04	2.377e+04	2.911e+04
38	3154.	7395.	1.496e+04	8824.	1.442e+04	2.374e+04	3.152e+04
39	2811.	7134.	1.376e+04	1.547e+04	2.046e+04	3.130e+04	4.167e+04
40	3092.	7390.	1.740e+04	9465.	1.492e+04	2.521e+04	3.841e+04
41	2762.	6697.	1.333e+04	3.804e+04	5.016e+04	7.017e+04	8.741e+04
42	3524.	8357.	1.871e+04	1.672e+04	2.974e+04	4.612e+04	6.732e+04
43	3492.	7952.	1.338e+04	6.665e+04	8.346e+04	9.440e+04	9.726e+04
44	3852.	9403.	1.850e+04	6.126e+04	9.020e+04	1.195e+05	1.465e+05
45	2670.	6579.	1.281e+04	9704.	1.246e+04	1.777e+04	2.222e+04
46	3173.	7578.	1.519e+04	2.536e+04	3.664e+04	5.548e+04	7.247e+04
47	2723.	6463.	1.137e+04	4.401e+04	4.563e+04	5.048e+04	4.599e+04
48	3753.	7538.	1.757e+04	5.991e+04	6.335e+04	5.709e+04	6.168e+04
49	3288.	7987.	1.379e+04	3.137e+04	4.365e+04	6.289e+04	8.737e+04

case	pinc69	pinc79	pinc89	cone59	cone69	cone79	cone89
				(continued)			
50	3316.	7809.	1.464e+04	2.360e+04	3.291e+04	4.434e+04	5.170e+04
51	3038.	6984.	1.457e+04	1.525e+04	2.497e+04	4.605e+04	8.351e+04
52	3458.	8343.	1.392e+04	1.283e+04	1.627e+04	2.074e+04	1.940e+04
53	3041.	6053.	1.209e+04	1.403e+05	1.376e+05	1.080e+05	1.145e+05
54	3390.	7986.	1.512e+04	9.275e+04	1.125e+05	1.253e+05	1.437e+05
55	3547.	8129.	1.446e+04	3.541e+04	4.994e+04	6.494e+04	6.616e+04
56	3123.	6641.	1.387e+04	3.303e+04	3.914e+04	4.158e+04	5.110e+04
57	3007.	7708.	1.720e+04	1.060e+04	1.642e-04	2.890e+04	4.756e+04
58	3834.	8294.	1.616e+04	3.293e+04	4.877e-04	5.408e+04	7.069e+04
59	3414.	7950.	1.527e+04	2.346e+04	4.089e+04	6.895e+04	9.274e+04
60	3152.	7263.	1.236e+04	8023.	1.294e+04	1.901e+04	2.260e+04
61	2177.	5759.	1.162e+04	3027.	5955.	9893.	1.707e+04
62	4046.	9215.	1.863e+04	2.900e+04	6.025e+04	9.990e+04	1.213e+05
63	2972.	7013.	1.222e+04	2.236e+04	3.255e-04	5.827e+04	6.818e+04
64	4289.	9265.	1.970e+04	6.092e+04	7.059e+04	7.443e+04	9.576e+04
65	2674.	6008.	1.200e+04	1.541e+04	1.788e+04	2.200e+04	2.742e+04
66	2828.	7191.	1.100e+04	4704.	4939.	6622.	6103.
67	3443.	7286.	1.470e+04	2.450e+04	3.314e+04	3.887e+04	5.120e+04
68	3300.	7623.	1.571e+04	2.423e+04	3.582e+04	6.368e+04	9.258e+04
69	3491.	7588.	1.378e+04	2.721e+04	3.647e+04	4.249e+04	5.039e+04
70	3358.	8444.	1.474e+04	2.273e+04	3.054e+04	4.566e+04	5.318e+04
71	2641.	6647.	1.033e+04	2966.	3479.	5745.	5883.
72	3557.	8067.	1.744e+04	1.776e+04	2.655e+04	3.326e+04	4.529e+04

== Models of Decentralization of Consumer Oriented Services ==

case	mblk70	mblk80	mblk90	noe	mdw	w	s
1	2.479e+04	3.051e+04	4.111e+04	1.000	0.000	0.000	0.000
2	6506.	8948.	1.347e+04	1.000	0.000	0.000	0.000
3	206.0	463.0	932.0	0.000	1.000	0.000	0.000
4	4.945e+05	5.596e+05	6.161e+05	0.000	0.000	0.000	1.000
5	1.031e+05	1.376e+05	1.565e+05	0.000	0.000	0.000	1.000
6	7.171e+04	8.176e+04	8.467e+04	0.000	0.000	0.000	1.000
7	2.220e+05	2.402e+05	2.457e+05	0.000	0.000	0.000	1.000
8	1.469e+05	1.866e+05	2.570e+05	1.000	0.000	0.000	0.000
9	373.0	463.0	892.0	1.000	0.000	0.000	0.000
10	1.061e+05	1.336e+05	1.541e+05	0.000	0.000	0.000	1.000
11	1.629e+05	1.943e+05	2.317e+05	0.000	0.000	0.000	1.000
12	4.923e+04	5.859e+04	5.718e+04	0.000	0.000	0.000	1.000
13	1.185e+06	1.354e+06	1.333e+06	0.000	1.000	0.000	0.000
14	3.326e+05	3.455e+05	3.556e+05	0.000	1.000	0.000	0.000
15	1.105e+05	1.370e+05	1.646e+05	0.000	1.000	0.000	0.000
16	2.472e+05	3.137e+05	4.108e+05	0.000	0.000	0.000	1.000
17	1.215e+04	1.679e+04	1.912e+04	0.000	1.000	0.000	0.000
18	1.068e+05	1.186e+05	1.262e+05	0.000	1.000	0.000	0.000
19	4.952e+04	7.577e+04	9.580e+04	0.000	0.000	1.000	0.000
20	1.201e+04	1.399e+04	1.495e+04	0.000	1.000	0.000	0.000
21	7.627e+05	8.914e+05	9.435e+05	0.000	1.000	0.000	0.000
22	1.377e+04	1.555e+04	1.612e+04	0.000	1.000	0.000	0.000
23	5724.	6137.	6831.	0.000	0.000	0.000	1.000
24	1.933e+04	2.607e+04	3.038e+04	0.000	1.000	0.000	0.000
25	1.321e+05	1.618e+05	1.823e+05	0.000	0.000	0.000	1.000
26	8.185e+04	9.700e+04	1.113e+05	0.000	0.000	0.000	1.000
27	2.845e+04	3.389e+04	3.947e+04	1.000	0.000	0.000	0.000
28	6.765e+04	8.298e+04	1.096e+05	1.000	0.000	0.000	0.000
29	1.371e+04	1.655e+04	1.754e+04	0.000	0.000	0.000	1.000
30	7077.	7174.	6751.	0.000	0.000	0.000	1.000
31	1.373e+05	1.573e+05	1.723e+05	0.000	1.000	0.000	0.000
32	1.150e+05	1.493e+05	1.679e+05	0.000	0.000	0.000	1.000
33	1.323e+05	1.558e+05	1.813e+05	0.000	0.000	0.000	1.000
34	8678.	9050.	8925.	0.000	0.000	0.000	1.000
35	1.579e+05	1.795e+05	2.005e+05	0.000	1.000	0.000	0.000
36	2.896e+04	3.418e+04	3.640e+04	0.000	0.000	0.000	1.000
37	1.470e+04	2.330e+04	3.137e+04	0.000	1.000	0.000	0.000
38	2.993e+04	3.466e+04	3.721e+04	0.000	0.000	0.000	1.000
39	6.740e+04	9.071e+04	1.019e+05	0.000	0.000	0.000	1.000
40	2014.	3447.	3086.	1.000	0.000	0.000	0.000
41	3.106e+05	3.639e+05	3.990e+05	0.000	0.000	0.000	1.000
42	3.440e+04	4.731e+04	7.067e+04	1.000	0.000	0.000	0.000
43	1.065e+05	1.508e+05	1.972e+05	0.000	1.000	0.000	0.000
44	3.225e+04	4.933e+04	8.971e+04	0.000	1.000	0.000	0.000
45	7.714e+04	9.465e+04	1.052e+05	0.000	0.000	0.000	1.000
46	1.148e+05	1.370e+05	1.523e+05	0.000	0.000	0.000	1.000
47	3.426e+05	4.091e+05	4.305e+05	0.000	0.000	0.000	1.000
48	3.487e+05	4.087e+05	4.228e+05	1.000	0.000	0.000	0.000
49	5.974e+04	7.857e+04	1.011e+05	0.000	0.000	0.000	1.000

case	mblk70	mblk80	mblk90	noe	mdw	w	s
			(continued)				
50	3.684e+04	4.394e+04	5.143e+04	0.000	1.000	0.000	0.000
51	6.471e+04	9.043e+04	1.333e+05	0.000	0.000	0.000	1.000
52	1.498e+04	2.173e+04	2.514e+04	0.000	1.000	0.000	0.000
53	8.443e+05	8.835e+05	9.299e+05	1.000	0.000	0.000	0.000
54	1.650e+05	1.698e+05	1.684e+05	1.000	0.000	0.000	0.000
55	2.278e+04	3.218e+04	3.870e+04	0.000	0.000	1.000	0.000
56	2.534e+04	2.736e+04	3.886e+04	1.000	0.000	0.000	0.000
57	1.151e+05	1.468e+05	1.834e+05	0.000	0.000	0.000	1.000
58	5.895e+04	7.789e+04	9.382e+04	1.000	0.000	0.000	0.000
59	3.797e+04	6.154e+04	1.019e+05	0.000	0.000	1.000	0.000
60	2.774e+04	3.732e+04	3.881e+04	0.000	1.000	0.000	0.000
61	241.0	261.0	738.0	0.000	1.000	0.000	0.000
62	3.791e+05	4.072e-05	4.232e+05	0.000	1.000	0.000	0.000
63	6269.	8894.	1.046e+04	0.000	0.000	1.000	0.000
64	1.272e+05	1.274e+05	1.225e+05	0.000	0.000	1.000	0.000
65	3562.	4316.	7660.	1.000	0.000	0.000	0.000
66	6878.	6337.	5591.	0.000	1.000	0.000	0.000
67	2.340e+04	3.102e+04	3.910e+04	1.000	0.000	0.000	0.000
68	1.156e+05	1.481e+05	1.855e+05	0.000	0.000	0.000	1.000
69	5.513e+04	6.551e+04	6.972e+04	0.000	1.000	0.000	0.000
70	4.160e+04	5.130e+04	5.819e+04	0.000	0.000	0.000	1.000
71	3930.	3787.	3196.	0.000	1.000	0.000	0.000
72	6.090e+04	7.320e+04	8.564e+04	0.000	0.000	0.000	1.000

== Model I of Decentralization of Business Oriented Services ==

Case	Core County	MSAs
1	Albany	Albany-Schenectady-Troy, NY
2	Lehigh	Allentown-Bethlehem-Easton, PA-NJ
3	Outagamie	Appleton-Oshkosh-Neenah, WI
4	Fulton	Atlanta, GA
5	Baltimore	Baltimore, MD
6	Jefferson	Birmingham, AL
7	Middlesex	Boston, MA
8	Mecklenburg	Charlotte-Gastonia-Rock Hill, NC-SC
9	Cook	Chicago, IL
10	Hamilton	Cincinnati, OH-KY-IN
11	Cuyahoga	Cleveland, OH
12	Franklin	Columbus, OH
13	Dallas	Dallas, TX
14	Scott	Davenport-Rock Island-Moline, IA-IL
15	Montgomery	Dayton-Springfield, OH
16	Denver	Denver, CO
17	Wayne	Detroit, MI
18	Guilford	Greensboro-Winston-Salem-High Point, NC
19	Greenville	Greenville-Spartanburg, SC
20	Dauphin	Harrisburg-Lebanon-Carlisle, PA
21	Hartford	Hartford, CT
22	Harris	Houston, TX
23	Cabell	Huntington-Ashland, WV-KY-OH
24	Marion	Indianapolis, IN
25	Jackson	Kansas City, MO-KS
26	Shelby	Memphis, TN-AR-MS
27	Middlesex	Middlesex-Somerset-Hunterdon, NJ
28	Milwaukee	Milwaukee, WI
29	Hennepin	Minneapolis-St. Paul, MN-WI
30	Orleans	New Orleans, LA
31	Kings	New York, NY
32	Essex	Newark, NJ
33	Oklahoma	Oklahoma City, OK
34	Douglas	Omaha, NE-IA
35	Peoria	Peoria, IL
36	Philadelphia	Philadelphia, PA-NJ
37	Allegheny	Pittsburgh, PA
38	Multnomah	Portland, OR
39	Providence	Providence, RI
40	Henrico	Richmond-Petersburg, VA
41	Monroe	Rochester, NY

Case	Core County	MSAs
		(continued)
42	Saginaw	Saginaw-Bay City-Midland, MI
43	St. Louis	St. Louis, MO-IL
44	San Francisco	San Francisco, CA
45	Onondaga	Syracuse, NY
46	Pinellas	Tampa-St. Petersberg-Clearwater, FL
47	Lucas	Toledo, OH
48	New Castle	Wilmington, DE-NJ-MD

== Model I of Decentralization of Business Oriented Services ==

case	lcb64	lcb69	lcb79	lcb89	lcm69	lcm79	lcm89
1	1.09225	1.21322	1.24296	1.15750	0.636005	0.587459	0.686789
2	1.21330	1.30150	1.19104	1.16730	0.791271	0.871113	0.889042
3	1.07311	1.10023	1.13586	1.26336	0.817911	0.836165	0.802084
4	1.34103	1.38591	1.28629	1.27547	0.706649	0.767795	0.784719
5	1.29243	1.33959	1.13833	1.26947	0.854267	0.968708	0.908156
6	1.07953	1.08461	1.07466	1.07683	0.969249	0.943064	0.877543
7	0.81370	0.90693	1.08971	1.10677	1.06140	1.06386	1.12792
8	1.67008	1.71968	1.48823	1.31307	0.512729	0.530030	0.589894
9	0.96600	1.00944	1.01753	1.03342	1.00750	1.00547	1.00700
10	1.06566	1.08221	1.07239	1.08765	1.04520	1.04934	1.04119
11	1.03639	1.03567	1.05632	1.09242	0.982929	0.975111	0.956681
12	1.12776	1.14739	1.14372	1.07644	0.895752	0.831353	0.771605
13	1.02564	1.02821	1.04356	1.03440	0.985718	0.971618	0.942830
14	1.44592	1.41918	1.24873	1.29897	0.886914	0.894576	0.916660
15	1.01983	0.95654	1.05314	1.08475	1.01983	0.978674	0.960121
16	1.13926	0.74550	1.24648	1.17170	0.849232	0.853564	0.736990
17	1.15610	1.16355	1.01430	0.93144	0.961295	1.05353	1.03707
18	1.22854	1.30970	1.16605	1.08454	0.870233	0.830441	0.814458
19	1.07156	1.29841	0.90322	0.92314	0.885558	0.772525	0.816550
20	1.11652	1.16523	1.33781	1.24303	0.843641	0.938336	1.00389
21	1.12432	1.14298	1.15026	1.14364	0.963602	0.909160	0.893923
22	1.03137	1.02108	1.03280	1.02526	1.00834	0.982890	0.990070
23	1.37602	1.52002	1.20118	1.29872	0.885561	0.900301	0.765008
24	1.08567	1.03905	1.06045	1.08245	0.998473	1.00906	0.975998
25	1.20756	1.19041	1.22238	1.15402	0.925268	0.961713	0.986719
26	1.04581	0.99497	1.03094	1.03736	0.989668	0.958047	0.894856
27	0.82676	0.97104	0.997991	1.02997	1.03192	1.01724	1.05182
28	1.05702	1.08658	1.12577	1.11960	0.982998	0.979670	0.905242
29	1.15521	1.19785	1.19412	1.13308	0.836831	0.880330	0.844649
30	1.15948	1.12843	1.22006	1.05603	0.811426	0.762616	0.800791
31	0.32339	0.34930	0.377826	0.39174	1.48611	1.51301	1.38634
32	1.26153	1.25450	1.24296	1.01944	0.847483	0.841352	0.848061
33	1.04415	1.02786	1.05361	1.08597	1.04300	1.00476	1.04040
34	1.04931	1.06498	1.05553	1.11394	1.01116	0.992729	1.01193
35	1.44557	1.29683	1.24583	1.11592	0.821843	0.933659	0.997822
36	1.23103	1.32515	1.22104	1.12051	0.883275	0.846141	0.784700
37	1.16336	1.13818	1.12676	1.14632	0.958847	0.920108	0.877756
38	1.11686	1.15539	1.26989	1.23648	0.864405	0.769530	0.774261
39	1.11405	1.18647	1.08537	1.14475	0.995628	1.02164	1.04096
40	0.92977	0.95592	0.813636	1.26261	0.532888	0.720936	0.575749
41	1.11744	1.10007	1.10049	1.05875	1.02866	1.04377	1.00024
42	1.42311	1.30227	1.04524	0.97973	0.969891	1.05448	1.04099
43	0.63699	0.82363	0.950618	1.10481	1.03283	0.919980	0.782737
44	1.13499	1.21496	1.18407	1.23910	0.864631	0.860147	0.882855
45	1.05676	1.06384	1.08164	1.06418	0.995943	0.957567	0.927499
46	1.06618	0.91418	0.811712	0.80300	0.893866	0.983521	1.22300
47	1.03746	1.05445	1.07203	1.08978	0.944194	0.925668	0.860015
48	1.13819	1.09910	1.09716	1.10421	0.931985	0.954210	0.965926

== Model I of Decentralization of Business Oriented Services ==

case	mpop70	mpop90	pcpc	pinc69	pinc79	pinc89	mblk70
1	810929.	874304.	4.6	3749.	7598.00	16363.0	24794.0
2	594124.	686688.	8.1	3507.	7873.00	15458.0	6506.00
3	276891.	315121.	8.2	2954.	7267.00	13893.0	206.000
4	1.68650e+06	2.83351e+06	32.5	3459.	7621.00	18452.0	371329.
5	2.08909e+06	2.38217e+06	8.3	2886.	5877.00	11994.0	494498.
6	794083.	907810.	2.7	2848.	7070.00	13277.0	221972.
7	4.79098e+06	2.87067e+06	2.3	3747.	8439.00	20343.0	146935.
8	840347.	1.16209e+06	19.6	3323.	7872.00	16910.0	162943.
9	6.09581e+06	6.06997e+06	0.2	3792.	8229.00	15697.0	1.185e+06
10	1.38485e+06	1.45265e+06	3.7	3395.	7871.00	15354.0	152333.
11	2.06419e+06	1.83112e+06	-3.6	3727.	8099.00	14912.0	332614.
12	1.14943e+06	1.37742e+06	10.7	3390.	7591.00	14907.0	110544.
13	1.55595e+06	2.55336e+06	30.4	3694.	8667.00	16243.0	247181.
14	362638.	350861.	-8.8	3296.	8226.00	13625.0	12147.0
15	972662.	951270.	1.0	3629.	7643.00	14495.0	106823.
16	1.10405e+06	1.62298e+06	13.6	3557.	8555.00	15590.0	49524.0
17	4.54987e+06	4.38230e+06	-2.4	3505.	7608.00	13016.0	762655.
18	742159.	942091.	10.6	3185.	7426.00	15373.0	132080.
19	473226.	640861.	12.4	2759.	6746.00	13918.0	81848.0
20	510291.	587986.	5.7	3218.	7525.00	14890.0	28450.0
21	1.40943e+06	1.55273e+06	7.3	3854.	8342.00	18983.0	67648.0
22	1.89100e+06	3.30194e+06	20.7	3402.	9062.00	15202.0	379751.
23	306785.	312529.	-7.1	2773.	6785.00	12068.0	7077.00
24	1.10988e+06	1.24982e+06	7.1	3534.	7677.00	14614.0	137335.
25	1.37074e+06	1.56628e+06	9.3	3375.	7610.00	13712.0	157898.
26	834006.	981747.	7.5	2762.	6697.00	13330.0	310608.
27	851903.	1.01984e+06	15.1	3524.	8357.00	18714.0	34399.0
28	1.40369e+06	1.43215e+06	2.5	3492.	7952.00	13383.0	106532.
29	1.98172e+06	2.46412e+06	15.3	3852.	9403.00	18496.0	32248.0
30	1.09917e+06	1.23882e+06	-1.4	2723.	6463.00	11372.0	342585.
31	9.07557e+06	8.54685e+06	3.3	3072.	5753.00	12388.0	1.767e+06
32	1.93408e+06	1.82432e+06	-2.9	3753.	7538.00	17574.0	348653.
33	717825.	958839.	11.4	3288.	7987.00	13794.0	59742.0
34	553452.	618262.	5.7	3316.	7809.00	14644.0	36838.0
35	341979.	339172.	-7.3	3458.	8343.00	13924.0	14977.0
36	4.81791e+06	4.85688e+06	3.0	3041.	6053.00	12091.0	844300.
37	2.34749e+06	2.05671e+06	-7.3	3390.	7986.00	15115.0	164957.
38	920888.	1.23984e+06	12.1	3547.	8129.00	14462.0	22777.0
39	946725.	654854.	5.9	3123.	6641.00	13871.0	25338.0
40	676351.	865640.	13.7	3713.	8562.00	18019.0	185551.
41	961516.	1.00241e+06	3.2	3834.	8294.00	16162.0	58949.0
42	400851.	399320.	-5.3	3152.	7263.00	12355.0	27739.0
43	2.42866e+06	2.44410e+06	2.8	4046.	9215.00	18625.0	379100.
44	1.47795e+06	1.60368e+06	7.7	4289.	9265.00	19695.0	127205.
45	636507.	659864.	2.6	3443.	7286.00	14703.0	23398.0
46	1.10555e+06	2.06796e+06	28.2	3300.	7623.00	15712.0	115595.
47	607163.	614128.	-0.4	3491.	7588.00	13778.0	55130.0
48	499493.	578587.	10.6	3557.	8067.00	17442.0	60896.0

= Model I of Decentralization of Business Oriented Services =

case	mblk80	mblk90	buse64	noe	mdw	w	s
1	30505.0	41112.0	4493.00	1.00	0.00	0.00	0.00
2	8948.00	13466.0	1782.00	1.00	0.00	0.00	0.00
3	463.000	932.000	529.000	0.00	1.00	0.00	0.00
4	525507.	736153.	15990.0	0.00	0.00	0.00	1.00
5	559596.	616065.	16604.0	0.00	0.00	0.00	1.00
6	240204.	245726.	5461.00	0.00	0.00	0.00	1.00
7	186592.	256969.	12285.0	1.00	0.00	0.00	0.00
8	194296.	231654.	5212.00	0.00	0.00	0.00	1.00
9	1.354e+06	1.333e+06	94231.0	0.00	1.00	0.00	0.00
10	173333.	190473.	11257.0	0.00	1.00	0.00	0.00
11	345536.	355619.	24129.0	0.00	1.00	0.00	0.00
12	136956.	164602.	8440.00	0.00	1.00	0.00	0.00
13	313696.	410766.	17398.0	0.00	0.00	0.00	1.00
14	16789.0	19115.0	1546.00	0.00	1.00	0.00	0.00
15	118568.	126238.	5509.00	0.00	1.00	0.00	0.00
16	75774.0	95796.0	9925.00	0.00	0.00	1.00	0.00
17	891399.	943479.	34598.0	0.00	1.00	0.00	0.00
18	161778.	182284.	2393.00	0.00	0.00	0.00	1.00
19	97004.0	111334.	1414.00	0.00	0.00	0.00	1.00
20	33886.0	39472.0	1990.00	1.00	0.00	0.00	0.00
21	82975.0	109636.	9433.00	1.00	0.00	0.00	0.00
22	513797.	611243.	18656.0	0.00	0.00	0.00	1.00
23	7174.00	6751.00	796.000	0.00	0.00	0.00	1.00
24	157338.	172326.	7819.00	0.00	1.00	0.00	0.00
25	179477.	200508.	12757.0	0.00	1.00	0.00	0.00
26	363943.	399011.	7010.00	0.00	0.00	0.00	1.00
27	47305.0	70670.0	2948.00	1.00	0.00	0.00	0.00
28	150838.	197183.	13010.0	0.00	1.00	0.00	0.00
29	49327.0	89710.0	14974.0	0.00	1.00	0.00	0.00
30	409078.	430470.	9264.00	0.00	0.00	0.00	1.00
31	1.9109e+06	2.2500e+06	13599.0	1.00	0.00	0.00	0.00
32	408713.	422802.	19286.0	1.00	0.00	0.00	0.00
33	78573.0	101082.	5381.00	0.00	0.00	0.00	1.00
34	43935.0	51426.0	4615.00	0.00	1.00	0.00	0.00
35	21728.0	25142.0	1884.00	0.00	1.00	0.00	0.00
36	883477.	929907.	33023.0	1.00	0.00	0.00	0.00
37	169772.	168382.	19284.0	1.00	0.00	0.00	0.00
38	32184.0	38695.0	8987.00	0.00	0.00	1.00	0.00
39	27361.0	38861.0	6631.00	1.00	0.00	0.00	0.00
40	221474.	252340.	441.000	0.00	0.00	0.00	1.00
41	77891.0	93819.0	8870.00	1.00	0.00	0.00	0.00
42	37321.0	38810.0	1135.00	0.00	1.00	0.00	0.00
43	407213.	423182.	3879.00	0.00	1.00	0.00	0.00
44	127391.	122494.	33088.0	0.00	0.00	1.00	0.00
45	31016.0	39095.0	5589.00	1.00	0.00	0.00	0.00
46	148058.	185503.	3493.00	0.00	0.00	0.00	1.00
47	65505.0	69717.0	4312.00	0.00	1.00	0.00	0.00
48	73203.0	85641.0	4701.00	0.00	0.00	0.00	1.00

== Model I of Decentralization of Business Oriented Services ==

case	buse69	buse79	buse89	mhq69	mhq79	com79	com89
1	6251.	10321.	13806.	312.401	747.100	2500.00	2815.00
2	2675.	5594.	11176.	3149.17	8367.09	1463.00	1536.00
3	855.	1983.	3926.	834.714	2218.40	500.000	500.000
4	27088.	38003.	67892.	908.253	7730.73	10000.0	10638.0
5	23659.	26839.	37688.	405.525	3208.36	5625.00	4594.00
6	8702.	16649.	28723.	220.096	747.745	5000.00	7820.00
7	20663.	46119.	82706.	2743.84	12598.9	5000.00	6908.00
8	8744.	15855.	30162.	592.678	1865.26	5811.00	5476.00
9	128822.	201019.	256016.	29423.0	96170.4	34216.0	28073.0
10	16362.	27194.	44727.	3503.30	10667.2	6957.00	9356.00
11	34229.	46032.	68084.	10473.6	28722.5	12160.0	8683.00
12	14642.	27101.	47830.	270.926	785.189	6083.00	6951.00
13	29998.	67855.	126865.	6413.90	21166.6	13447.0	19640.0
14	2069.	3369.	5161.	1043.03	4933.10	500.000	598.000
15	7349.	13206.	21611.	2808.77	6944.26	2874.00	2302.00
16	15539.	33048.	41268.	268.534	3452.19	10000.0	12568.0
17	50050.	52216.	60532.	51449.1	138765.	10000.0	9250.00
18	3568.	7572.	17110.	3821.39	11520.2	2036.00	2012.00
19	3011.	5190.	13772.	299.591	579.199	1246.00	1553.00
20	3483.	5775.	8823.	798.841	3119.81	2634.00	1908.00
21	14716.	28539.	43019.	3151.51	14106.3	3287.00	4580.00
22	34880.	109815.	144114.	2626.91	34579.9	16505.0	13882.0
23	1233.	2083.	2620.	1151.50	6473.87	750.000	511.000
24	12502.	22053.	38438.	989.018	2758.39	7509.00	7061.00
25	18082.	25299.	32713.	670.467	4287.05	4593.00	9082.00
26	10562.	18266.	32089.	212.562	853.875	4320.00	3817.00
27	5403.	12676.	33288.	916.077	4686.06	5000.00	4447.00
28	19484.	32254.	46452.	3328.57	9735.20	5000.00	5092.00
29	26558.	48196.	71318.	6704.99	23916.9	7712.00	8010.00
30	13734.	23270.	22094.	927.951	3932.22	5447.00	3580.00
31	17552.	19396.	22256.	159699.	382392.	5000.00	5000.00
32	23755.	32658.	40085.	2438.74	13936.7	5000.00	5805.00
33	7520.	17792.	23812.	475.945	2683.47	5000.00	5273.00
34	8590.	14699.	34978.	720.717	644.830	5000.00	6096.00
35	2745.	5124.	6831.	2184.80	8025.49	1078.00	997.000
36	53082.	61330.	66741.	7569.15	23279.7	10000.0	10072.0
37	26139.	46469.	63076.	15995.7	73168.7	8775.00	7590.00
38	14501.	26517.	35931.	2032.13	10233.4	7138.00	5677.00
39	10034.	13584.	22669.	1682.17	3392.97	3325.00	3165.00
40	915.	3464.	9714.	1521.95	5940.35	1000.00	1452.00
41	13181.	19532.	30600.	3046.94	10319.6	3168.00	3617.00
42	1633.	2974.	3666.	1797.06	9865.54	2500.00	2178.00
43	9307.	23909.	45861.	10050.2	31400.2	2500.00	5328.00
44	46963.	73591.	93288.	7004.75	37667.9	18751.0	11532.0
45	8911.	13451.	18069.	1081.48	2049.08	2500.00	3299.00
46	5173.	12561.	29458.	623.559	1931.68	3346.00	3760.00
47	6160.	10817.	19322.	3611.23	11647.1	2375.00	1970.00
48	8001.	11605.	32454.	4665.24	15562.1	1000.00	1288.00

== Model II of Decentralization of Business Oriented Services ==

Case	Core County	MSAs
1	Albany	Albany-Schenectady-Troy, NY
2	Lehigh	Allentown-Bethlehem-Easton, PA-NJ
3	Outagamie	Appleton-Oshkosh-Neenah, WI
4	Fulton	Atlanta, GA
5	Richmond	Augusta, GA-SC
6	Travis	Austin, TX
7	Baltimore	Baltimore, MD
8	Jefferson	Beaumont-Port Arthur, TX
9	Jefferson	Birmingham, AL
10	Middlesex	Boston, MA
11	Mecklenburg	Charlotte-Gastonia-Rock Hill, NC-SC
12	Hamilton	Chattanooga, TN-GA
13	Cook	Chicago, IL
14	Hamilton	Cincinnati, OH-KY-IN
15	Cuyahoga	Cleveland, OH
16	Franklin	Columbus, OH
17	Dallas	Dallas, TX
18	Scott	Davenport-Rock Island-Moline, IA-IL
19	Montgomery	Dayton-Springfield, OH
20	Denver	Denver, CO
21	Polk	Des Moines, IA
22	Wayne	Detroit, MI
23	Vanderburgh	Evansville, IN-KY
24	Tarrant	Ft. Worth-Arlington, TX
25	Guilford	Greensboro-Winston-Salem-High Point, NC
26	Greenville	Greenville-Spartanburg, SC
27	Dauphin	Harrisburg-Lebanon-Carlisle, PA
28	Hartford	Hartford, CT
29	Harris	Houston, TX
30	Cabell	Huntington-Ashland, WV-KY-OH
31	Marion	Indianapolis, IN
32	Sullivan	Johnson City-Kingsport-Bristol, TN-VA
33	Jackson	Kansas City, MO-KS
34	Knox	Knoxville, TN
35	Ingham	Lansing-East Lansing, MI
36	Jefferson	Louisville, KY-IN
37	Hillsborough	Manchester, NH
38	Shelby	Memphis, TN-AR-MS
39	Middlesex	Middlesex-Somerset-Hunterdon, NJ
40	Milwaukee	Milwaukee, WI
41	Hennepin	Minneapolis-St. Paul, MN-WI

Case	Core County	MSAs
		(continued)
42	Davidson	Nashville, TN
43	Orleans	New Orleans, LA
44	Kings	New York, NY
45	Essex	Newark, NJ
46	Oklahoma	Oklahoma City, OK
47	Douglas	Omaha, NE-IA
48	Orange	Orlando, FL
49	Peoria	Peoria, IL
50	Philadelphia	Philadelphia, PA-NJ
51	Allegheny	Pittsburgh, PA
52	Multnomah	Portland, OR
53	Providence	Providence, RI
54	Wake	Raleigh-Durham, NC
55	Henrico	Richmond-Petersburg, VA
56	Monroe	Rochester, NY
57	Sacramento	Sacramento, CA
58	Saginaw	Saginaw-Bay City-Midland, MI
59	St. Louis	St. Louis, MO-IL
60	Salt Lake	Salt Lake City-Ogden, UT
61	San Francisco	San Francisco, CA
62	Luzerne	Scranton-Wilkes-Barre, PA
63	Jefferson	Steubenville-Weirton, OH-WV
64	Onondaga	Syracuse, NY
65	Pinellas	Tampa-St. Petersberg-Clearwater, FL
66	Lucas	Toledo, OH
67	Tulsa	Tulsa, OK
68	Belmont	Wheeling, WV-OH
69	New Castle	Wilmington, DE-NJ-MD

= Model II of Decentralization of Business Oriented Services =

case	lcb64	lcb69	lcb79	lcb89	lcm69	lcm79	lcm89	mpop70
1	1.0923	1.2132	1.2430	1.1575	0.63601	0.58746	0.68679	810929.
2	1.2133	1.3015	1.1910	1.1673	0.79127	0.87111	0.88904	594124.
3	1.0731	1.1002	1.1359	1.2634	0.81791	0.83617	0.80208	276891.
4	1.3410	1.3859	1.2863	1.2755	0.70665	0.76780	0.78472	1.68650e+06
5	1.5006	1.3034	1.3892	1.1274	0.69993	0.67113	0.62490	291063.
6	1.0886	1.1096	1.0818	1.0807	1.00032	0.99523	0.96546	360463.
7	1.2924	1.3396	1.1383	1.2695	0.85427	0.96871	0.90816	2.08909e+06
8	1.1138	1.0945	1.0279	1.0573	0.86882	0.94308	0.84524	345939.
9	1.0795	1.0846	1.0747	1.0768	0.96925	0.94306	0.87754	794083.
10	0.8137	0.9069	1.0897	1.1068	1.06140	1.06386	1.1279	4.79098e+06
11	1.6701	1.7197	1.4882	1.3131	0.51273	0.53003	0.58989	840347.
12	1.1010	1.1497	1.1337	1.0924	0.95611	0.90417	0.86808	349439.
13	0.9660	1.0094	1.0175	1.0334	1.00750	1.00550	1.00700	6.09581e+06
14	1.0657	1.0822	1.0724	1.0877	1.04520	1.04934	1.04119	1.38485e+06
15	1.0364	1.0357	1.0563	1.0924	0.98293	0.97511	0.95668	2.06419e+06
16	1.1278	1.1474	1.1437	1.0764	0.89575	0.83135	0.77161	1.14943e+06
17	1.0256	1.0282	1.0436	1.0344	0.98572	0.97162	0.94283	1.55595e+06
18	1.4459	1.4192	1.2487	1.2990	0.88691	0.89458	0.91666	362638.
19	1.0198	0.9565	1.0531	1.0848	1.01983	0.97867	0.96012	972662.
20	1.1393	0.7455	1.2465	1.1717	0.84923	0.85356	0.73699	1.10405e+06
21	1.0118	1.0071	1.0321	1.0267	1.00047	1.00238	1.00430	339618.
22	1.1561	1.1636	1.0143	0.9314	0.96130	1.05353	1.03707	4.54987e+06
23	1.1890	1.1811	1.0897	1.0767	0.96563	0.99406	0.91650	254515.
24	1.0263	1.0055	1.0125	1.0139	1.01251	1.00331	1.01426	795974.
25	1.2285	1.3097	1.1661	1.0845	0.87023	0.83044	0.81446	742159.
26	1.0716	1.2984	0.9032	0.9231	0.88556	0.77253	0.81655	473226.
27	1.1165	1.1652	1.3378	1.2430	0.84364	0.93834	1.00389	510291.
28	1.1243	1.1430	1.1503	1.1436	0.96360	0.90916	0.89392	1.40943e+06
29	1.0314	1.0211	1.0328	1.0253	1.00834	0.98289	0.99007	1.89100e+06
30	1.3760	1.5200	1.2012	1.2987	0.88556	0.90030	0.76501	306785.
31	1.0857	1.0391	1.0605	1.0825	0.99847	1.00906	0.97600	1.10988e+06
32	1.1502	1.2376	0.9419	1.0177	1.06358	0.97553	0.95953	372876.
33	1.2076	1.1904	1.2224	1.1540	0.92527	0.96171	0.98670	1.37074e+06
34	1.3269	1.3087	1.2205	1.2152	0.82302	0.82648	0.73102	476538.
35	1.1178	1.1254	1.1388	1.1791	1.02021	1.06100	1.07678	378423.
36	1.0780	1.1392	1.0796	1.0889	0.91683	0.99555	0.94314	906752.
37	1.0481	1.0044	1.0714	1.0715	1.10550	1.09689	1.17511	443817.
38	1.0458	0.9950	1.0309	1.0374	0.98967	0.95805	0.89486	834006.
39	0.8268	0.9710	0.9980	1.0300	1.03192	1.01724	1.05182	851903.
40	1.0570	1.0866	1.1258	1.1196	0.98300	0.97967	0.90524	1.40369e+06
41	1.1552	1.1979	1.1941	1.1331	0.83683	0.88033	0.84465	1.98172e+06
42	1.2113	1.2060	1.1500	1.1232	0.89379	0.78852	0.72371	699144.
43	1.1595	1.1284	1.2201	1.0560	0.81143	0.76262	0.80079	1.09917e+06
44	0.3234	0.3493	0.3778	0.3917	1.48611	1.51301	1.38634	9.07557e+06
45	1.2615	1.2545	1.2430	1.0194	0.84748	0.84135	0.84806	1.93408e+06
46	1.0442	1.0279	1.0536	1.0860	1.04300	1.00476	1.04040	717825.
47	1.0493	1.0650	1.0555	1.1139	1.01116	0.99273	1.01193	553452.
48	1.0492	1.0632	1.0924	1.1421	0.98830	0.96813	0.97906	453270.
49	1.4456	1.2968	1.2458	1.1159	0.82184	0.93366	0.99782	341979.

case	lcb64	lcb69	lcb79	lcb89	lcm69	lcm79	lcm89	mpop70
				(continued)				
50	1.2310	1.3252	1.2210	1.1205	0.88328	0.84614	0.78470	4.81791e+06
51	1.1634	1.1382	1.1268	1.1463	0.95885	0.92011	0.87776	2.34749e+06
52	1.1169	1.1554	1.2699	1.2365	0.86441	0.76953	0.77426	920888.
53	1.1141	1.1865	1.0854	1.1448	0.99563	1.02164	1.04096	946725.
54	1.1624	1.4952	1.2152	1.2229	0.98217	0.88457	0.75805	445661.
55	0.9298	0.9559	0.8136	1.2626	0.53289	0.72094	0.57575	676351.
56	1.1174	1.1001	1.1005	1.0588	1.02866	1.04377	1.00024	961516.
57	1.0372	1.0432	1.1242	1.1324	0.98530	0.92187	0.90658	844425.
58	1.4231	1.3023	1.0452	0.9797	0.96989	1.05448	1.04099	400851.
59	0.6370	0.8236	0.9506	1.1048	1.03283	0.91998	0.78274	2.42866e+06
60	1.0440	1.0343	1.0660	1.0291	0.99611	0.99875	0.93681	683913.
61	1.1350	1.2150	1.1841	1.2391	0.86463	0.86015	0.88286	1.47795e+06
62	0.9465	1.0372	1.0791	1.0748	1.00941	1.02047	0.94176	696026.
63	1.9439	2.0406	1.1935	1.2904	0.70452	0.45808	0.81947	165627.
64	1.0568	1.0638	1.0816	1.0642	0.99594	0.95757	0.92750	636507.
65	1.0662	0.9142	0.8117	0.8030	0.89387	0.98352	1.22300	1.10555e+06
66	1.0375	1.0545	1.0720	1.0898	0.94419	0.92567	0.86002	607163.
67	1.1266	1.0692	1.0429	1.0445	1.02208	0.99975	0.92342	527533.
68	0.8812	0.7506	0.6703	0.7308	1.02708	0.95753	1.04701	182712.
69	1.1382	1.0991	1.0972	1.1042	0.93199	0.95421	0.96593	499493.

= Model II of Decentralization of Business Oriented Services =

case	mpop90	pcpc	pinc69	pinc79	pinc89	buse64	buse69	buse79
1	874304.	4.6	3749.	7598.	16363.	4493.	6251.00	10321.0
2	686688.	8.1	3507.	7873.	15458.	1782.	2675.00	5594.00
3	315121.	8.2	2954.	7267.	13893.	529.	855.000	1983.00
4	2.83351e+06	32.5	3459.	7621.	18452.	15990.	27088.0	38003.0
5	396809.	14.7	2576.	5873.	11799.	997.	1570.00	2591.00
6	781572.	45.6	3014.	7540.	15123.	2477.	4651.00	11178.0
7	2.38217e+06	8.3	2886.	5877.	11994.	16604.	23659.0	26839.0
8	361226.	-3.2	2928.	7601.	12348.	1646.	2660.00	4569.00
9	907810.	2.7	2848.	7070.	13277.	5461.	8702.00	16649.0
10	2.87067e+06	2.3	3747.	8439.	20343.	12285.	20663.0	46119.0
11	1.16209e+06	19.6	3323.	7872.	16910.	5212.	8744.00	15855.0
12	433210.	1.6	2863.	6886.	13619.	2242.	3648.00	7636.00
13	6.06997e+06	0.2	3792.	8229.	15697.	94231.	128822.	201019.
14	1.45265e+06	3.7	3395.	7871.	15354.	11257.	16362.0	27194.0
15	1.83112e+06	-3.6	3727.	8099.	14912.	24129.	34229.0	46032.0
16	1.37742e+06	10.7	3390.	7591.	14907.	8440.	14642.0	27101.0
17	2.55336e+06	30.4	3694.	8667.	16243.	17398.	29998.0	67855.0
18	350861.	-8.8	3296.	8226.	13625.	1546.	2069.00	3369.00
19	951270.	1.0	3629.	7643.	14495.	5509.	7349.00	13206.0
20	1.62298e+06	13.6	3557.	8555.	15590.	9925.	15539.0	33048.0
21	392928.	6.90	3446.	8305.	15365.	3500.	4660.00	10383.0
22	4.38230e+06	-2.4	3505.	7608.	13016.	34598.	50050.0	52216.0
23	278990.	1.0	2941.	7480.	13434.	1447.	1853.00	3656.00
24	1.33205e+06	36.9	3336.	7965.	15178.	5469.	7941.00	16622.0
25	942091.	10.6	3185.	7426.	15373.	2393.	3568.00	7572.00
26	640861.	12.4	2759.	6746.	13918.	1414.	3011.00	5190.00
27	587986.	5.70	3218.	7525.	14890.	1990.	3483.00	5775.00
28	1.55273e+06	7.30	3854.	8342.	18983.	9433.	14716.0	28539.0
29	3.30194e+06	20.7	3402.	9062.	15202.	18656.	34880.0	109815.
30	312529.	-7.1	2773.	6785.	12068.	796.	1233.00	2083.00
31	1.24982e+06	7.1	3534.	7677.	14614.	7819.	12502.0	22053.0
32	436047.	0.6	2705.	6497.	12725.	513.	843.000	1336.00
33	1.56628e+06	9.3	3375.	7610.	13712.	12757.	18082.0	25299.0
34	604816.	6.9	2750.	6895.	14007.	1676.	2657.00	6718.00
35	432674.	3.1	3444.	7509.	13740.	1642.	3144.00	5557.00
36	952662.	-0.4	3200.	7324.	14067.	6367.	10367.0	19662.0
37	701923.	14.3	3092.	7390.	17404.	1868.	2332.00	5479.00
38	981747.	7.5	2762.	6697.	13330.	7010.	10562.0	18266.0
39	1.01984e+06	15.1	3524.	8357.	18714.	2948.	5403.00	12676.0
40	1.43215e+06	2.5	3492.	7952.	13383.	13010.	19484.0	32254.0
41	2.46412e+06	15.3	3852.	9403.	18496.	14974.	26558.0	48196.0
42	985026.	15.8	3173.	7578.	15195.	4338.	7629.00	15556.0
43	1.23882e+06	-1.4	2723.	6463.	11372.	9264.	13734.0	23270.0
44	8.54685e+06	3.30	3072.	5753.	12388.	13599.	17552.0	19396.0
45	1.82432e+06	-2.9	3753.	7538.	17574.	19286.	23755.0	32658.0
46	958839.	11.4	3288.	7987.	13794.	5381.	7520.00	17792.0
47	618262.	5.7	3316.	7809.	14644.	4615.	8590.00	14699.0
48	1.07275e+06	53.3	3038.	6984.	14570.	2946.	4576.00	13509.0
49	339172.	-7.3	3458.	8343.	13924.	1884.	2745.00	5124.00

case	mpop90	pcpc	pinc69	pinc79	pinc89	buse64	buse69	buse79
				(continued)				
50	4.85688e+06	3.0	3041.	6053.	12091.	33023.	53082.0	61330.0
51	2.05671e+06	-7.3	3390.	7986.	15115.	19284.	26139.0	46469.0
52	1.23984e+06	12.1	3547.	8129.	14462.	8987.	14501.0	26517.0
53	654854.	5.9	3123.	6641.	13871.	6631.	10034.0	13584.0
54	735480.	31.2	3007.	7708.	17195.	1694.	3350.00	9370.00
55	865640.	13.7	3713.	8562.	18019.	441.	915.000	3464.00
56	1.00241e+06	3.2	3834.	8294.	16162.	8870.	13181.0	19532.0
57	1.48110e+06	34.7	3414.	7950.	15265.	4437.	6442.00	15713.0
58	399320.	-5.3	3152.	7263.	12355.	1135.	1633.00	2974.00
59	2.44410e+06	2.8	4046.	9215.	18625.	3879.	9307.00	23909.0
60	1.07223e+06	17.8	2972.	7013.	12222.	5649.	7547.00	15097.0
61	1.60368e+06	7.7	4289.	9265.	19695.	33088.	46963.0	73591.0
62	734175.	0.7	2674.	6008.	12002.	1739.	2451.00	4331.00
63	142523.	-13.	2828.	7191.	11001.	406.	479.000	862.000
64	659864.	2.6	3443.	7286.	14703.	5589.	8911.00	13451.0
65	2.06796e+06	28.2	3300.	7623.	15712.	3493.	5173.00	12561.0
66	614128.	-0.4	3491.	7588.	13778.	4312.	6160.00	10817.0
67	708954.	7.9	3358.	8444.	14742.	4378.	7055.00	15177.0
68	159301.	-14.2	2641.	6647.	10329.	239.	265.000	432.000
69	578587.	10.6	3557.	8067.	17442.	4701.	8001.00	11605.0

= Model II of Decentralization of Business Oriented Services =

case	buse89	mhqo	mblk70	mblk80	mblk90	noe	mdw	w	s
1	13806.	1.	24794.	30505.	41112.	1.	0.	0.	0.
2	11176.	1.	6506.	8948.	13466.	1.	0.	0.	0.
3	3926.	1.	206.	463.	932.	0.	1.	0.	0.
4	67892.	1.	371329.	525507.	736153.	0.	0.	0.	1.
5	5333.	0.	81334.	106713.	123482.	0.	0.	0.	1.
6	26909.	0.	37625.	50256.	72254.	0.	0.	0.	1.
7	37688.	1.	494498.	559596.	616065.	0.	0.	0.	1.
8	6863.	0.	71710.	81762.	84665.	0.	0.	0.	1.
9	28723.	1.	221972.	240204.	245726.	0.	0.	0.	1.
10	82706.	1.	146935.	186592.	256969.	1.	0.	0.	0.
11	30162.	1.	162943.	194296.	231654.	0.	0.	0.	1.
12	9946.	0.	49227.	58592.	57183.	0.	0.	0.	1.
13	256016.	1.	1.185e+06	1.354e+06	1.333e+06	0.	1.	0.	0.
14	44727.	1.	152333.	173333.	190473.	0.	1.	0.	0.
15	68084.	1.	332614.	345536.	355619.	0.	1.	0.	0.
16	47830.	1.	110544.	136956.	164602.	0.	1.	0.	0.
17	126865.	1.	247181.	313696.	410766.	0.	0.	0.	1.
18	5161.	1.	12147.	16789.	19115.	0.	1.	0.	0.
19	21611.	1.	106823.	118568.	126238.	0.	1.	0.	0.
20	41268.	1.	49524.	75774.	95796.	0.	0.	1.	0.
21	17132.	0.	12005.	13990.	14952.	0.	1.	0.	0.
22	60532.	1.	762655.	891399.	943479.	0.	1.	0.	0.
23	5831.	0.	13765.	15551.	16115.	0.	1.	0.	0.
24	29753.	0.	82903.	102912.	143850.	0.	0.	0.	1.
25	17110.	1.	132080.	161778.	182284.	0.	0.	0.	1.
26	13772.	1.	81848.	97004.	111334.	0.	0.	0.	1.
27	8823.	1.	28450.	33886.	39472.	1.	0.	0.	0.
28	43019.	1.	67648.	82975.	109636.	1.	0.	0.	0.
29	144114.	1.	379751.	513797.	611243.	0.	0.	0.	1.
30	2620.	1.	7077.	7174.	6751.	0.	0.	0.	1.
31	38438.	1.	137335.	157338.	172326.	0.	1.	0.	0.
32	2557.	0.	8678.	9050.	8925.	0.	0.	0.	1.
33	32713.	1.	157898.	179477.	200508.	0.	1.	0.	0.
34	12067.	0.	28961.	34178.	36400.	0.	0.	0.	1.
35	8217.	0.	14699.	23298.	31365.	0.	1.	0.	0.
36	30348.	1.	105141.	120934.	124761.	0.	0.	0.	1.
37	12935.	0.	2014.	3447.	3086.	1.	0.	0.	0.
38	32089.	1.	310608.	363943.	399011.	0.	0.	0.	1.
39	33288.	1.	34399.	47305.	70670.	1.	0.	0.	0.
40	46452.	1.	106532.	150838.	197183.	0.	1.	0.	0.
41	71318.	1.	32248.	49327.	89710.	0.	1.	0.	0.
42	28090.	1.	114750.	137042.	152349.	0.	0.	0.	1.
43	22094.	1.	342585.	409078.	430470.	0.	0.	0.	1.
44	22256.	1.	1.767e+06	1.911e+06	2.250e+06	1.	0.	0.	0.
45	40085.	1.	348653.	408713.	422802.	1.	0.	0.	0.
46	23812.	1.	59742.	78573.	101082.	0.	0.	0.	1.
47	34978.	1.	36838.	43935.	51426.	0.	1.	0.	0.
48	36770.	0.	64711.	90425.	133308.	0.	0.	0.	1.
49	6831.	1.	14977.	21728.	25142.	0.	1.	0.	0.

case	buse89	mhqo	mblk70	mblk80	mblk90	noe	mdw	w	s
				(continued)					
50	66741.	1.	844300.	883477.	929907.	1.	0.	0.	0.
51	63076.	1.	164957.	169772.	168382.	1.	0.	0.	0.
52	35931.	1.	22777.	32184.	38695.	0.	0.	1.	0.
53	22669.	1.	25338.	27361.	38861.	1.	0.	0.	0.
54	22744.	0.	115143.	146777.	183447.	0.	0.	0.	1.
55	9714.	1.	185551.	221474.	252340.	0.	0.	0.	1.
56	30600.	1.	58949.	77891.	93819.	1.	0.	0.	0.
57	33222.	0.	37971.	61539.	101940.	0.	0.	1.	0.
58	3666.	1.	27739.	37321.	38810.	0.	1.	0.	0.
59	45861.	1.	379100.	407213.	423182.	0.	1.	0.	0.
60	29591.	0.	6269.	8894.	10464.	0.	0.	1.	0.
61	93288.	1.	127205.	127391.	122494.	0.	0.	1.	0.
62	6730.	0.	3562.	4316.	7660.	1.	0.	0.	0.
63	915.	0.	6878.	6337.	5591.	0.	1.	0.	0.
64	18069.	1.	23398.	31016.	39095.	1.	0.	0.	0.
65	29458.	1.	115595.	148058.	185503.	0.	0.	0.	1.
66	19322.	1.	55130.	65505.	69717.	0.	1.	0.	0.
67	19650.	0.	41602.	51300.	58186.	0.	0.	0.	1.
68	701.	0.	3930.	3787.	3196.	0.	1.	0.	0.
69	32454.	1.	60896.	73203.	85641.	0.	0.	0.	1.

APPENDIX D

GAUSS ECONOMETRIC OUTPUT

DEFINITION OF VARIABLES IN SERVICE DECENTRALIZATION ESTIMATION

Symbol Econ. Program	Text	Description
Dependent Variables		
PCCLC	LCC	Change in the location coefficient of consumer oriented services in a core county in the LCC models
PCBLC	LCB	Change in the location coefficient of business oriented services in a core county in the LCB models
Structural Change Variables		
PCPCON	POPUC	Change in metropolitan population in the LCC models
PCTCP	POPUC	Change in metropolitan population in the LCB (1969-79) models
MPOPC	POPUC	Change in metropolitan population in the LCB (1979-89, 1969-89) models
PCECON	COSEMPC	Change in consumer oriented service employment in the LCC models
PCEB	BUSEMPC	Change in business oriented service employment in the LCB models
Relocation Cost Variables		
INERLC	INERTIA	Inertia of the existing decentralization of consumer oriented service in the LCC models
INERTIA	INERTIA	Inertia of the existing decentralization of business oriented service in the LCB models
PCCOM	COMEMPC	Change in employment of communications (SIC 4800) in the LCB models
Manufacturing Decentralization Variable		
PCLCM	MANUFC	Change in the location coefficient of manufacturing (SIC 2000-3999) in the LCB models

Corporate Influence Variables

METHQ	HQUARTER	Dummy variable equals one if core county's metropolitan area has 'Fortune' 500 corporate headquarter in the LCB models
CORPSLS	CPSALES	Sales (in million dollars) for 'Fortune' 500 industrial corporations in core county's metropolitan area in the LCB models

Service Demand Variables

PCCINC	PERINCC	Change in real per capita income in the LCC models
PCINC	PERINCC	Change in real per capita income in the LCB models

Racial Composition Variables

PCBLK	BLACKC	Change in metropolitan black population in the LCC and LCB (1969-79) models
METBLKC	BLACKC	Change in metropolitan black population in the LCB (1979-89, 1969-89) models

Regional Location Variables

NOE	NORTHEAST	Regional dummy
MDW	MIDWEST	Regional dummy
W	WEST	Regional dummy

TABLE 8.1

WLS RESULTS USING THE CHANGES OF DECENTRALIZATION OF CONSUMER ORIENTED AND BUSIENSS ORIENTED SERVICES OF THE CORE COUNTIES

Variable	Con.O. Serv. 1979-89	Bus.O. Serv. II 1969-79	Con.O. Serv. 1969-89	Bus.O. Serv. I 1969-89
constant	-0.0413***	0.0142	0.0805*	-0.0584
	(-4.9307)	(0.3460)	(1.7449)	(-1.0608)
popuc		-0.2344**		
		(-2.5714)		
popuc>>	1.6071**		-2.3160*	0.5904
	(2.5380)		(-1.7200)	(0.5203)
cosempc			0.0268	
			(1.0280)	
cosempc>>	3.0876***			
	(5.2154)			
busempc		0.2200***		0.0058
		(4.1087)		(0.3703)
inertia	0.4361	-0.5535***	1.0667***	0.0971
	(1.3566)	(-3.9062)	(5.4604)	(0.7653)
manufc		0.6046***		-0.3716*
		(3.5324)		(-1.7411)
perincc				0.0788
				(0.3187)
perincc>>	-5.9705***	-8.9815***	-2.1156	
	(-8.6215)	(-7.0508)	(-1.3185)	
blackc			-0.0454*	-0.0509
			(-1.9113)	(-0.9389)

TABLE 8.1
(continued)

WLS RESULTS USING THE CHANGES OF DECENTRALIZATION OF CONSUMER ORIENTED AND BUSIENSS ORIENTED SERVICES OF THE CORE COUNTIES

blackc>>	-0.7110***	0.6168		
	(-2.6407)	(0.8983)		
cpsales				1.1817e-07
				(0.2405)
hquarter		-0.0238		
		(-1.3328)		
Northeast	0.1169***	0.0098	0.0302	0.0515
	(3.9975)	(0.3530)	(0.7144)	(1.0979)
Midwest	0.0887***	-0.0919**	-0.0157	0.0472**
	(6.3512)	(-2.4703)	(-0.4946)	(2.0736)
West	-0.0137	0.0700	0.0183	0.2030
	(-0.0423)	(0.3677)	(0.0740)	(0.1794)
R^2	0.9607	0.9962	0.7123	0.7592
AdjR^2	0.9561	0.9955	0.6712	0.6913
B-P statistic		7222.91	7862.66	
White statistic		64.82	57.78	
K-B statistic	16503.38			7595.08
Stand. Error	0.1849	0.2037	0.1529	0.2598
No. of Cases	86	69	72	50

Statistics not in parentheses are estimated coefficients.
*** Significant at .01 (t-statistics in parentheses)
** Significant at .05
* Significant at or below .10
>> Logged variables

Model of Decentralization (1969-79) of Consumer Oriented Services

* Location Coefficient:

mean:

lcon59	lcon69	lcon79	pcclc
1.021011	1.004657	0.9828011	-0.01957881

standard deviation:

0.09905550 0.09045941 0.07592998 0.05561930

LSQ/GAUSS Version 3.1: Applied Data Associates. (1994/04/10/01:03:07)

Ordinary Least Squares Estimation

Dependent Variable = DEP
Estimation Range = 1 72
Number of Observations = 72
Mean of Dependent Variable = -0.019579
Standard Error of Dependent Variable = 0.055619

R-Square = 0.18206 R-Square Adjusted = 0.078190
Standard Error of the Estimate = 0.053401
Log-Likelihood = 113.60

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.039987	8	0.0049983	1.7528	0.10367
Residual	0.17965	63	0.0028516		
Total	0.21964	71	0.0030935		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 63 DF	Prob >|t|
LPCPCON	0.98618	0.92721	1.0636	0.29157
PCECON	0.050174	0.042978	1.1674	0.24744
LPCCINC	0.14952	1.1981	0.12480	0.90108
LPCBLK	0.025080	0.34750	0.072172	0.94269
INERLC	0.23276	0.15154	1.5360	0.12955
NOE	0.028483	0.023416	1.2164	0.22838
MDW	0.020572	0.018223	1.1289	0.26322
W	-0.0050886	0.027290	-0.18647	0.85268
CONSTANT	-0.057928	0.025246	-2.2945	0.025105

Variance-Covariance Matrix of Coefficients

	LPCPCON	PCECON	LPCCINC	LPCBLK	INERLC
LPCPCON	0.85971				
PCECON	-0.017081	0.0018471			
LPCCINC	0.029293	-0.026160	1.4355		
LPCBLK	-0.068042	-0.0024422	-0.005762	0.1208	
INERLC	0.023093	-0.0025969	0.01252	0.003777	0.022964
NOE	0.010249	-0.00015945	0.01061	-0.002420	0.00037911
MDW	0.0077269	-3.075E-05	0.003115	-0.002001	1.6871E-05
W	0.00037648	-5.413E-05	0.006962	-0.001938	0.00040178
CONSTANT	-0.0035326	-1.344E-06	-0.02111	0.000296	0.00069260

	NOE	MDW	W	CONSTANT
NOE	0.0005483			
MDW	0.0002560	0.0003321		
W	0.0001915	0.0001424	0.000745	
CONSTANT	-0.0003718	-0.0002325	-0.000205	0.000637

Correlation Matrix of Coefficients

Model of Decentralization (1969-79) of Consumer Oriented Services
(continued)

LPCPCON	1.0000				
PCECON	-0.42864	1.0000			
LPCCINC	0.026368	-0.50804	1.0000		
LPCBLK	-0.21118	-0.16352	-0.013840	1.0000	
INERLC	0.16435	-0.39874	0.068967	0.071728	1.0000
NOE	0.47205	-0.15844	0.37812	-0.29743	0.10684
MDW	0.45731	-0.039268	0.14269	-0.31602	0.006109
W	0.014879	-0.046153	0.21294	-0.20439	0.097155
CONSTANT	-0.15091	-0.0012383	-0.69803	0.033688	0.18103
	LPCPCON	PCECON	LPCCINC	LPCBLK	INERLC

NOE	1.0000			
MDW	0.59998	1.0000		
W	0.29965	0.28640	1.0000	
CONSTANT	-0.62890	-0.50545	-0.29749	1.0000
	NOE	MDW	W	CONSTANT

R-Square Between Observed and Predicted = 0.18206
Sum of Absolute Residuals = 2.5981
Sum of Residuals = 1.41553E-15
Standard Error of Residuals = 0.050302
Skewness of Residuals = -1.3252
Kurtosis of Residuals = 6.1667
First-Order Rho = -0.14685
Durbin-Watson Statistic = 2.2840
Standardized Von-Neumann Ratio Statistic = 1.2219
Durbin-H Statistic = NA

=== Heteroskedasticity Test (Koenkar-Basset Test) ===
ko
3.3257e-05

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 72
Number of Observations = 72
Mean of Dependent Variable = 0.0024952
Standard Error of Dependent Variable = 0.0058073

R-Square = 0.091606 R-Square Adjusted = -0.023746
Standard Error of the Estimate = 0.0058759
Log-Likelihood = 272.50

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.000219	8	2.7418E-05	0.79414	0.60975
Residual	0.0021751	63	3.4526E-05		
Total	0.0023945	71	3.3725E-05		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 63 DF	Prob >|t|
LPCPCON	-0.031551	0.10202	-0.30925	0.75815

Model of Decentralization (1969-79) of Consumer Oriented Services
(continued)

PCECON	0.00056127	0.0047290	0.11869	0.90590
LPCCINC	0.12207	0.13183	0.92593	0.35802
LPCBLK	-0.069732	0.038237	-1.8237	0.072945
INERLC	-0.011210	0.016674	-0.67230	0.50385
NOE	0.00057081	0.0025766	0.22154	0.82539
MDW	0.0018707	0.0020051	0.93299	0.35439
W	1.7178E-05	0.0030028	0.0057206	0.99545
CONSTANT	0.00081225	0.0027779	0.29239	0.77095

Variance-Covariance Matrix of Coefficients

LPCPCON	0.01041				
PCECON	-0.0002068	2.236E-05			
LPCCINC	0.0003547	-0.000317	0.01738		
LPCBLK	-0.0008238	-2.957E-05	-6.977E-05	0.001462	
INERLC	0.0002796	-3.144E-05	0.000152	4.573E-05	0.0002780
NOE	0.0001241	-1.931E-06	0.000128	-2.930E-05	4.590E-06
MDW	9.355E-05	-3.724E-07	3.772E-05	-2.423E-05	2.043E-07
W	4.558E-06	-6.554E-07	8.430E-05	-2.347E-05	4.865E-06
CONSTANT	-4.277E-05	-1.627E-08	-0.0002556	3.578E-06	8.386E-06
	LPCPCON	PCECON	LPCCINC	LPCBLK	INERLC

NOE	6.639E-06				
MDW	3.10E-06	4.021E-06			
W	2.318E-06	1.724E-06	9.017E-06		
CONSTANT	-4.501E-06	-2.815E-06	-2.482E-06	7.717E-06	
	NOE	MDW	W	CONSTANT	

Correlation Matrix of Coefficients

LPCPCON	1.0000				
PCECON	-0.42864	1.0000			
LPCCINC	0.026368	-0.50804	1.0000		
LPCBLK	-0.21118	-0.16352	-0.013840	1.0000	
INERLC	0.16435	-0.39874	0.068967	0.071728	1.0000
NOE	0.47205	-0.15844	0.37812	-0.29743	0.10684
MDW	0.45731	-0.039268	0.14269	-0.31602	0.0061094
W	0.014879	-0.046153	0.21294	-0.20439	0.097155
CONSTANT	-0.15091	-0.001238	-0.69803	0.033688	0.18103
	LPCPCON	PCECON	LPCCINC	LPCBLK	INERLC

NOE	1.0000			
MDW	0.59998	1.0000		
W	0.29965	0.28640	1.0000	
CONSTANT	-0.62890	-0.50545	-0.29749	1.0000
	NOE	MDW	W	CONSTANT

R-Square Between Observed and Predicted = 0.091606
Sum of Absolute Residuals = 0.22386
Sum of Residuals = -2.33320E-16
Standard Error of Residuals = 0.0055349
Skewness of Residuals = 4.1913
Kurtosis of Residuals = 25.681
First-Order Rho = 0.062599

Model of Decentralization (1969-79) of Consumer Oriented Services
(continued)

Durbin-Watson Statistic = 1.8737
Standardized Von-Neumann Ratio Statistic = -0.54350
Durbin-H Statistic = NA

Model of Decentralization (1979-89) of Consumer Oriented Services

* Location Coefficient:

mean:

lcon69	lcon79	lcon89	pcclc
1.009	0.9867	0.9771	-0.005960

standard deviation:

0.1066	0.1015	0.1060	0.1018

LSQ/GAUSS Version 3.1: Applied Data Associates. (1994/04/10/01:19:27)

Ordinary Least Squares Estimation

Dependent Variable = DEP
Estimation Range = 1 86
Number of Observations = 86
Mean of Dependent Variable = -0.0059601
Standard Error of Dependent Variable = 0.10179

R-Square = 0.67691 R-Square Adjusted = 0.64334
Standard Error of the Estimate = 0.060789
Log-Likelihood = 123.55

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.59614	8	0.074517	20.165	4.5746E-16
Residual	0.28454	77	0.003695		
Total	0.88067	85	0.010361		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 77 DF	Prob >|t|
LPCPCON	-4.7920	1.2891	-3.7173	0.00037996
INERLC	-0.14374	0.12036	-1.1942	0.23606
LPCECON	4.8696	0.40312	12.080	1.8725E-19
LPCCINC	-3.5833	0.97335	-3.6814	0.0004284
LPCBLK	-0.61661	0.28775	-2.1428	0.035285
NOE	0.028190	0.023672	1.1908	0.23738
MDW	0.021322	0.019422	1.0978	0.27570
W	0.012087	0.030191	0.40034	0.69001
CONSTANT	-0.039979	0.016348	-2.4456	0.016746

Variance-Covariance Matrix of Coefficients

	LPCPCON	INERLC	LPCECON	LPCCINC	LPCBLK
LPCPCON	1.6618				
INERLC	-0.016418	0.01449			
LPCECON	-0.10194	0.001969	0.16250		
LPCCINC	-0.44327	0.008384	-0.13133	0.9474	
LPCBLK	-0.14819	-0.001463	-0.01676	0.0131	0.08280
NOE	0.015117	-0.0002570	0.001885	-0.01185	-0.00232
MDW	0.010251	-0.0001335	0.0007473	0.001768	-0.00215
W	0.0060244	0.0002282	0.0026538	0.003130	-0.000651
CONSTANT	-0.004766	0.0003415	-0.0015669	-0.005914	0.000669

	NOE	MDW	W	CONSTANT
NOE	0.00056037			
MDW	0.00017329	0.0003772		
W	5.4448E-05	0.0001107	0.0009115	
CONSTANT	-9.1100E-05	-0.0002116	-0.0001431	0.000267

Correlation Matrix of Coefficients

Model of Decentralization (1979-89) of Consumer Oriented Services

(continued)

LPCPCON	1.0000				
INERLC	-0.10581	1.0000			
LPCECON	-0.19617	0.040572	1.0000		
LPCCINC	-0.35327	0.071560	-0.33471	1.0000	
LPCBLK	-0.39949	-0.042243	-0.14447	0.04689	1.0000
NOE	0.49538	-0.090197	0.19757	-0.51436	-0.34065
MDW	0.40943	-0.057112	0.095449	0.093506	-0.38549
W	-0.15479	0.062793	0.21805	0.10650	-0.0749
CONSTANT	-0.22614	0.17353	-0.23778	-0.37168	0.14219
	LPCPCON	INERLC	LPCECON	LPCCINC	LPCBLK

NOE	1.0000			
MDW	0.37693	1.0000		
W	0.076185	0.18885	1.0000	
CONSTANT	-0.23541	-0.66629	-0.29000	1.0000
	NOE	MDW	W	CONSTANT

R-Square Between Observed and Predicted = 0.67691
Sum of Absolute Residuals = 3.7999
Sum of Residuals = 1.24900E-16
Standard Error of Residuals = 0.057858
Skewness of Residuals = -0.50720
Kurtosis of Residuals = 4.5685
First-Order Rho = -0.075953
Durbin-Watson Statistic = 2.0932
Standardized Von-Neumann Ratio Statistic = 0.43712
Durbin-H Statistic = NA

=== Heteroskedasticity Test (Koenkar-Basset Test) ===
kc
4.0247e-05

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 86
Number of Observations = 86
Mean of Dependent Variable = 0.0033086
Standard Error of Dependent Variable = 0.0063813

R-Square = 0.32580 R-Square Adjusted = 0.25575
Standard Error of the Estimate = 0.0055051
Log-Likelihood = 330.10

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.001128	8	0.00014096	4.6512	0.000115
Residual	0.0023336	77	3.0306E-05		
Total	0.0034612	85	4.0720E-05		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 77 DF	Prob >|t|
LPCPCON	-0.072119	0.11674	-0.61776	0.53856

Model of Decentralization (1979-89) of Consumer Oriented Services

(continued)

INERLC	-0.042800	0.010900	-3.9265	0.00018638
LPCECON	0.045409	0.036506	1.2438	0.21733
LPCCINC	0.00057180	0.088148	0.0064869	0.99484
LPCBLK	-0.0083266	0.026059	-0.31953	0.75019
NOE	0.0010342	0.0021438	0.48243	0.63087
MDW	0.00057391	0.0017589	0.32630	0.74508
W	0.011746	0.0027341	4.2962	5.0209E-05
CONSTANT	0.00094478	0.0014804	0.63817	0.52525

Variance-Covariance Matrix of Coefficients

LPCPCON	0.01363				
INERLC	-0.0001347	0.000119			
LPCECON	-0.0008360	1.615E-05	0.00133		
LPCCINC	-0.003635	6.876E-05	-0.001077	0.007770	
LPCBLK	-0.001215	-1.200E-05	-0.0001374	0.000108	0.000679
NOE	0.000124	-2.108E-06	1.546E-05	-9.720E-05	-1.903E-05
MDW	8.407E-05	-1.095E-06	6.129E-06	1.450E-05	-1.767E-05
W	-4.941E-05	1.871E-06	2.176E-05	2.567E-05	-5.336E-06
CONSTANT	-3.908E-05	2.800E-06	-1.285E-05	-4.850E-05	5.485E-06
	LPCPCON	INERLC	LPCECON	LPCCINC	LPCBLK

NOE	4.596E-06			
MDW	1.421E-06	3.094E-06		
W	4.465E-07	9.081E-07	7.475E-06	
CONSTANT	-7.471E-07	-1.735E-06	-1.174E-06	2.192E-06
	NOE	MDW	W	CONSTANT

Correlation Matrix of Coefficients

LPCPCON	1.0000				
INERLC	-0.10581	1.0000			
LPCECON	-0.19617	0.040572	1.0000		
LPCCINC	-0.35327	0.071560	-0.33471	1.0000	
LPCBLK	-0.39949	-0.042243	-0.14447	0.046893	1.0000
NOE	0.49538	-0.090197	0.19757	-0.51436	-0.34065
MDW	0.40943	-0.057112	0.095449	0.093506	-0.38549
W	-0.15479	0.062793	0.21805	0.10650	-0.074898
CONSTANT	-0.22614	0.17353	-0.23778	-0.37168	0.14219
	LPCPCON	INERLC	LPCECON	LPCCINC	LPCBLK

NOE	1.0000			
MDW	0.37693	1.0000		
W	0.076185	0.18885	1.0000	
CONSTANT	-0.23541	-0.66629	-0.29000	1.0000
	NOE	MDW	W	CONSTANT

R-Square Between Observed and Predicted = 0.32580
Sum of Absolute Residuals = 0.25300
Sum of Residuals = 9.80119E-17
Standard Error of Residuals = 0.0052396
Skewness of Residuals = 3.1983
Kurtosis of Residuals = 22.689
First-Order Rho = 0.096978
Durbin-Watson Statistic = 1.7534

Model of Decentralization (1979-89) of Consumer Oriented Services
(continued)

Standardized Von-Neumann Ratio Statistic = -1.1571
Durbin-H Statistic = NA

=== Weighted L-SQ Model ===

Weighted Least Squares Estimation

Dependent Variable = DEP
Estimation Range = 1 86
Number of Observations = 86
Mean of Dependent Variable = -0.070083
Standard Error of Dependent Variable = 0.88730

WARNING: No Constant Term. @ Since the whole model was weighted, there is no constant term; the original constant became 1/weight. @

R-Square, AOV may not be reliable! @ In the Weighted Least Squares, the R-Square Between Observed and Predicted is interpreted instead of the adjusted R-Square. @

R-Square = 0.96065 R-Square Adjusted = 0.95605
Standard Error of the Estimate = 0.18493
Log-Likelihood = 27.873

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	64.287	9	7.1430	208.86	2.6041E-50
Residual	2.6334	77	0.034200		
Total	66.921	86	0.77815		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 77 DF	Prob >|t|
LPCPCON	1.6071	0.63320	2.5380	0.013169
INERLC	0.43610	0.32145	1.3566	0.17886
LPCECON	3.0876	0.59201	5.2154	1.5013E-06
LPCCINC	-5.9705	0.69251	-8.6215	6.3892E-13
LPCBLK	-0.71096	0.26923	-2.6407	0.010013
NOE	0.11691	0.029247	3.9975	0.00014564
MDW	0.088730	0.013971	6.3512	1.3670E-08
W	-0.013683	0.32360	-0.042283	0.96638
WEIGHT	-0.041278	0.0083717	-4.9307	4.6046E-06

Variance-Covariance Matrix of Coefficients

LPCPCON	0.4009				
INERLC	0.1084	0.1033			
LPCECON	-0.2702	-0.1160	0.3505		
LPCCINC	0.1407	0.06796	-0.2909	0.4796	
LPCBLK	-0.03876	0.03853	-0.03647	0.01142	0.07248
NOE	0.003342	-0.001919	0.002473	-0.00578	-0.00285
MDW	0.002623	-0.001501	-0.002414	0.00471	-0.00072
W	0.002591	0.002033	-0.00117	0.000256	0.000353
WEIGHT	-0.003129	-0.001962	0.001981	-0.00175	-0.000635
	LPCPCON	INERLC	LPCECON	LPCCINC	LPCBLK

Model of Decentralization (1979-89) of Consumer Oriented Services
(continued)

NOE	0.000855			
MDW	2.801E-05	0.000195		
W	-6.851E-06	-2.885E-05	0.1047	
WEIGHT	1.995E-05	-1.852E-05	-5.463E-05	7.009E-05
	NOE	MDW	W	WEIGHT

Correlation Matrix of Coefficients

LPCPCON	1.0000				
INERLC	0.53234	1.0000			
LPCECON	-0.72083	-0.60963	1.0000		
LPCCINC	0.32077	0.30531	-0.70962	1.0000	
LPCBLK	-0.22734	0.44518	-0.22883	0.061245	1.0000
NOE	0.18046	-0.20406	0.14285	-0.28536	-0.36173
MDW	0.29646	-0.33431	-0.29181	0.48680	-0.19180
W	0.01264	0.01955	-0.006105	0.001142	0.004046
WEIGHT	-0.59031	-0.72904	0.39978	-0.30181	-0.28192
	LPCPCON	INERLC	LPCECON	LPCCINC	LPCBLK

NOE	1.0000			
MDW	0.068553	1.0000		
W	-0.00072389	-0.0063805	1.0000	
WEIGHT	0.081471	-0.15831	-0.020164	1.0000
	NOE	MDW	W	WEIGHT

R-Square Between Observed and Predicted = 0.96065
Sum of Absolute Residuals = 8.4745
Sum of Residuals = -1.18655E-12
Standard Error of Residuals = 0.17601
Skewness of Residuals = 2.7176
Kurtosis of Residuals = 21.500
First-Order Rho = 0.010625
Durbin-Watson Statistic = 1.9736
Standardized Von-Neumann Ratio Statistic = -0.12404
Durbin-H Statistic = NA

=== Heteroskedasticity Re-Test (Koenkar-Basset Test) ===
ko
0.019699

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 86
Number of Observations = 86
Mean of Dependent Variable = -0.36886
Standard Error of Dependent Variable = 4.2645

WARNING: No Constant Term.
R-Square, AOV may not be reliable!

R-Square = 0.21031 R-Square Adjusted = 0.11801
Standard Error of the Estimate = 3.9817

Model of Decentralization (1979-89) of Consumer Oriented Services

(continued)

Log-Likelihood = -236.10

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	325.10	9	36.123	2.2785	0.02535
Residual	1220.7	77	15.854		
Total	1545.8	86	17.975		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 77 DF	Prob >|t|
LPCPCON	0.045721	13.633	0.0033537	0.99733
INERLC	8.9997	6.9210	1.3004	0.19736
LPCECON	11.347	12.746	0.89020	0.37613
LPCCINC	14.148	14.910	0.94892	0.34563
LPCBLK	-2.7940	5.7966	-0.48201	0.63117
NOE	-0.32429	0.62970	-0.51499	0.60803
MDW	-0.073357	0.30079	-0.24388	0.80797
W	0.38885	6.9671	0.055812	0.95564
WEIGHT	-0.42975	0.18025	-2.3843	0.019575

Variance-Covariance Matrix of Coefficients

LPCPCON	185.86				
INERLC	50.229	47.900			
LPCECON	-125.26	-53.780	162.46		
LPCCINC	65.201	31.505	-134.86	222.31	
LPCBLK	-17.965	17.860	-16.907	5.2932	33.600
NOE	1.5492	-0.88933	1.1466	-2.6792	-1.3204
MDW	1.2157	-0.69596	-1.1188	2.1832	-0.33442
W	1.2009	0.94250	-0.54213	0.11865	0.16342
WEIGHT	-1.4506	-0.90946	0.91848	-0.81111	-0.29455
	LPCPCON	INERLC	LPCECON	LPCCINC	LPCBLK

NOE	0.39653			
MDW	0.012985	0.090477		
W	-0.0031759	-0.013372	48.541	
WEIGHT	0.0092471	-0.0085832	-0.025322	0.032489
	NOE	MDW	W	WEIGHT

Correlation Matrix of Coefficients

LPCPCON	1.0000				
INERLC	0.53234	1.0000			
LPCECON	-0.72083	-0.60963	1.0000		
LPCCINC	0.32077	0.30531	-0.70962	1.0000	
LPCBLK	-0.22734	0.44518	-0.22883	0.061245	1.0000
NOE	0.18046	-0.20406	0.14285	-0.28536	-0.36173
MDW	0.29646	-0.33431	-0.29181	0.48680	-0.19180
W	0.01264	0.01955	-0.006105	0.001142	0.004046
WEIGHT	-0.59031	-0.72904	0.39978	-0.30181	-0.28192
	LPCPCON	INERLC	LPCECON	LPCCINC	LPCBLK

NOE	1.0000			
MDW	0.068553	1.0000		
W	-0.00072389	-0.0063805	1.0000	
WEIGHT	0.081471	-0.15831	-0.020164	1.0000
	NOE	MDW	W	WEIGHT

Model of Decentralization (1979-89) of Consumer Oriented Services
(continued)

R-Square Between Observed and Predicted = 0.21031
Sum of Absolute Residuals = 104.77
Sum of Residuals = 5.78121E-12
Standard Error of Residuals = 3.7897
Skewness of Residuals = -6.1065
Kurtosis of Residuals = 51.621
First-Order Rho = -0.025775
Durbin-Watson Statistic = 2.0514
Standardized Von-Neumann Ratio Statistic = 0.24092
Durbin-H Statistic = NA

Model I of Decentralization (1969-79) of Business Oriented Services

* Location Coefficient

mean:

lcb64	lcb69	lcb79	pcblc
1.11247	1.12755	1.10503	-0.00582096

standard deviation:

0.202637	0.205427	0.160992	0.135899

LSQ/GAUSS Version 3.1: Applied Data Associates. (1994/04/10/02:10:19)

Ordinary Least Squares Estimation

Dependent Variable = DEP
Estimation Range = 1 50
Number of Observations = 50
Mean of Dependent Variable = -0.0058210
Standard Error of Dependent Variable = 0.13590

R-Square = 0.55136 R-Square Adjusted = 0.43633
Standard Error of the Estimate = 0.10203
Log-Likelihood = 49.389

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.49896	10	0.049896	4.7930	0.00017225
Residual	0.40600	39	0.010410		
Total	0.90496	49	0.018469		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 39 DF	Prob >|t|
PCEB	0.10566	0.039510	2.6741	0.010888
INERTIA	-0.77886	0.19706	-3.9523	0.00031572
PCLCM	-0.58354	0.20842	-2.7998	0.0079123
PCTCP	-0.22825	0.15108	-1.5107	0.13892
LPCINC	-0.46589	2.9045	-0.16040	0.87339
CORPSLS	8.6360E-07	6.9912E-07	1.2353	0.22412
LPCBLK	0.25955	0.77066	0.33678	0.73809
NOE	0.073694	0.054608	1.3495	0.18496
MDW	0.038582	0.044762	0.86193	0.39400
W	0.22083	0.070517	3.1316	0.0032908
CONSTANT	-0.10827	0.059053	-1.8335	0.074367

Variance-Covariance Matrix of Coefficients

	PCEB	INERTIA	PCLCM	PCTCP	LPCINC
PCEB	0.0015611				
INERTIA	-0.0019966	0.038834			
PCLCM	-0.0028125	0.014335	0.043441		
PCTCP	-0.0013843	0.010497	0.0056403	0.022826	
LPCINC	-0.045821	0.048161	0.14400	-0.034891	8.4363
CORPSLS	2.514E-09	-1.243E-08	-9.902E-09	-7.632E-09	5.899E-07
LPCBLK	-0.0024130	0.0041121	-0.017439	-0.016599	-0.59274
NOE	-0.0002442	0.0012061	0.0023163	0.0043082	0.057851
MDW	3.4292E-05	0.0016863	0.0013855	0.0033841	0.018697
W	-0.00023028	0.0045268	0.0041367	0.0014203	0.040631
CONSTANT	-0.0003221	-0.0018067	-0.0018408	-0.0020356	-0.11056

	CORPSLS	LPCBLK	NOE
CORPSLS	4.888E-13		
LPCBLK	7.041E-09	0.59392	
NOE	-1.242E-09	-0.012742	0.002982

Model I of Decentralization (1969-79) of Business Oriented Services

(continued)

MDW	-1.360E-09	-0.01221	0.001619	0.002004	
W	7.117E-11	-0.008969	0.001216	0.001094	0.004973
CONSTANT	-1.348E-08	0.008383	-0.002167	-0.001501	-0.001468
	CORPSLS	LPCBLK	NOE	MDW	W
CONSTANT	0.003487				
	CONSTANT				

Correlation Matrix of Coefficients

PCEB	1.0000				
INERTIA	-0.25644	1.0000			
PCLCM	-0.34153	0.34901	1.0000		
PCTCP	-0.23191	0.35257	0.17912	1.0000	
LPCINC	-0.39928	0.084143	0.23786	-0.079510	1.0000
CORPSLS	0.09101	-0.090238	-0.067955	-0.072257	0.29049
LPCBLK	-0.07925	0.027077	-0.10857	-0.14256	-0.26480
NOE	-0.11318	0.11208	0.20351	0.52218	0.36473
MDW	0.019390	0.19117	0.14850	0.50039	0.14381
W	-0.082650	0.32576	0.28146	0.13332	0.19837
CONSTANT	-0.13803	-0.15525	-0.14956	-0.22816	-0.64457
	PCEB	INERTIA	PCLCM	PCTCP	LPCINC
CORPSLS	1.0000				
LPCBLK	0.013068	1.0000			
NOE	-0.032537	-0.30278	1.0000		
MDW	-0.043469	-0.35392	0.66217	1.0000	
W	0.0014435	-0.16503	0.31573	0.34672	1.0000
CONSTANT	-0.32650	0.18421	-0.67194	-0.56782	-0.35241
	CORPSLS	LPCBLK	NOE	MDW	W
CONSTANT	1.0000				
	CONSTANT				

R-Square Between Observed and Predicted = 0.55136
Sum of Absolute Residuals = 3.3967
Sum of Residuals = -2.49800E-16
Standard Error of Residuals = 0.091026
Skewness of Residuals = 0.53109
Kurtosis of Residuals = 3.7932
First-Order Rho = -0.17764
Durbin-Watson Statistic = 2.3420
Standardized Von-Neumann Ratio Statistic = 1.2337
Durbin-H Statistic = NA

=== Heteroskedasticity Test (Breusch-Pagan Test) ===
s2
0.0081200

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 50

Model I of Decentralization (1969-79) of Business Oriented Services
(continued)

Number of Observations = 50
Mean of Dependent Variable = 0.0081200
Standard Error of Dependent Variable = 0.014087

R-Square = 0.26010 R-Square Adjusted = 0.070377
Standard Error of the Estimate = 0.013582
Log-Likelihood = 150.21

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.0025292	10	0.00025292	1.3710	0.22961
Residual	0.0071948	39	0.00018448		
Total	0.0097240	49	0.00019845		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 39 DF	Prob >|t|
PCEB	-0.00076076	0.0052597	-0.14464	0.88574
INERTIA	0.0080865	0.026233	0.30825	0.75953
PCLCM	0.035642	0.027746	1.2846	0.20651
PCTCP	0.013480	0.020112	0.67021	0.50667
LPCINC	0.59786	0.38665	1.5462	0.13012
CORPSLS	-1.9912E-08	9.3067E-08	-0.21396	0.83170
LPCBLK	-0.11919	0.10259	-1.1618	0.25239
NOE	0.013122	0.0072695	1.8051	0.078777
MDW	0.0083466	0.0059588	1.4007	0.16921
W	0.030698	0.0093873	3.2701	0.0022515
CONSTANT	-0.0075183	0.0078612	-0.95639	0.34477

Variance-Covariance Matrix of Coefficients

	PCEB	INERTIA	PCLCM	PCTCP	LPCINC
PCEB	2.766E-05				
INERTIA	-3.538E-05	0.0006882			
PCLCM	-4.984E-05	0.0002540	0.0007698		
PCTCP	-2.453E-05	0.0001860	9.995E-05	0.0004045	
LPCINC	-0.000812	0.0008535	0.002552	-0.0006183	0.1495
CORPSLS	4.455E-11	-2.203E-10	-1.755E-10	-1.353E-10	0.045E-08
LPCBLK	-4.276E-05	7.287E-05	-0.0003090	-0.0002942	-0.010504
NOE	-4.328E-06	2.137E-05	4.105E-05	7.635E-05	0.001025
MDW	6.077E-07	2.988E-05	2.455E-05	5.997E-05	0.000331
W	-4.081E-06	8.022E-05	7.331E-05	2.517E-05	0.000720
CONSTANT	-5.707E-06	-3.202E-05	-3.262E-05	-3.607E-05	-0.001959

	CORPSLS	LPCBLK	NOE	MDW	W
CORPSLS	8.662E-15				
LPCBLK	1.248E-10	0.01053			
NOE	-2.201E-11	-0.000226	5.285E-05		
MDW	-2.411E-11	-0.000216	2.868E-05	3.551E-05	
W	1.261E-12	-0.000159	2.155E-05	1.939E-05	8.812E-05
CONSTANT	-2.389E-10	-0.000149	-3.84E-05	-2.66E-05	-2.601E-05

	CONSTANT
CONSTANT	6.18E-05

Correlation Matrix of Coefficients

PCEB	1.0000

Model I of Decentralization (1969-79) of Business Oriented Services

(continued)

INERTIA	-0.25644	1.0000			
PCLCM	-0.34153	0.34901	1.0000		
PCTCP	-0.23191	0.35257	0.17912	1.0000	
LPCINC	-0.39928	0.084143	0.23786	-0.079510	1.0000
CORPSLS	0.091012	-0.090238	-0.067955	-0.072257	0.29049
LPCBLK	-0.079246	0.027077	-0.10857	-0.14256	-0.26480
NOE	-0.11318	0.11208	0.20351	0.52218	0.36473
MDW	0.019390	0.19117	0.14850	0.50039	0.14381
W	-0.082650	0.32576	0.28146	0.13332	0.19837
CONSTANT	-0.13803	-0.15525	-0.14956	-0.22816	-0.64457
	PCEB	INERTIA	PCLCM	PCTCP	LPCINC

CORPSLS	1.0000				
LPCBLK	0.013068	1.0000			
NOE	-0.032537	-0.30278	1.0000		
MDW	-0.043469	-0.35392	0.66217	1.0000	
W	0.0014435	-0.16503	0.31573	0.34672	1.0000
CONSTANT	-0.32650	0.18421	-0.67194	-0.56782	-0.35241
	CORPSLS	LPCBLK	NOE	MDW	W

CONSTANT	1.0000
	CONSTANT

R-Square Between Observed and Predicted = 0.26010
Sum of Absolute Residuals = 0.39776
Sum of Residuals = 4.81386E-16
Standard Error of Residuals = 0.012117
Skewness of Residuals = 1.8687
Kurtosis of Residuals = 6.4767
First-Order Rho = 0.23436
Durbin-Watson Statistic = 1.5304
Standardized Von-Neumann Ratio Statistic = -1.6942
Durbin-H Statistic = NA

=== Heteroskedasticity Test (White Test) ===

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 50
Number of Observations = 50
Mean of Dependent Variable = 0.0081200
Standard Error of Dependent Variable = 0.014087

R-Square = 0.64285 R-Square Adjusted = 0.32690
Standard Error of the Estimate = 0.011557
Log-Likelihood = 168.42

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.0062511	23	0.00027178	2.0347	0.040945
Residual	0.0034730	26	0.00013358		
Total	0.0097240	49	0.00019845		

Model I of Decentralization (1969-79) of Business Oriented Services

(continued)

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 26 DF	Prob >|t|
PCEB	0.014505	0.024245	0.59828	0.55483
INERTIA	-0.13896	0.097547	-1.4245	0.16619
PCLCM	0.080621	0.067012	1.2031	0.23978
PCTCP	-0.018774	0.095363	-0.19687	0.84546
LPCINC	0.84389	1.4826	0.56919	0.57411
CORPSLS	6.6031E-07	1.6203E-06	0.40753	0.68695
LPCBLK	-0.17729	0.48065	-0.36886	0.71522
NOE	0.014209	0.0086655	1.6397	0.11312
MDW	0.0087078	0.0070778	1.2303	0.22960
W	0.017266	0.0097460	1.7716	0.088189
PCEB^2	-0.016350	0.013406	-1.2196	0.23356
INERTIA^	0.35229	0.11949	2.9484	0.0066689
PCLCM^2	0.46494	0.40055	1.1607	0.25629
PCTCP^2	0.063919	0.078839	0.81075	0.42487
LPCINC^2	-19.024	48.966	-0.38852	0.70080
CORPSLS^	-1.633E-12	1.2504E-11	-0.13061	0.89709
LPCBLK^2	1.3485	2.6207	0.51456	0.61121
PCEB.*IN	0.15322	0.092730	1.6523	0.11051
INERTIA.	0.13906	0.46419	0.29958	0.76688
PCLCM.*P	-0.078859	0.46910	-0.16811	0.86780
PCTCP.*L	3.5247	5.4498	0.64675	0.52346
LPCINC.*	3.4902E-07	8.5039E-05	0.004104	0.99676
CORPSLS.	-6.6082E-05	6.7118E-05	-0.98456	0.33391
CONSTANT	-0.012726	0.012105	-1.0512	0.30282

Variance-Covariance Matrix of Coefficients

	PCEB	INERTIA	PCLCM	PCTCP	LPCINC
PCEB	0.0005878				
INERTIA	-0.0003284	0.009516			
PCLCM	-1.551E-06	5.548E-06	0.004491		
PCTCP	-0.0008449	-0.0001438	0.003521	0.009094	
LPCINC	-0.01739	0.0319	-0.01861	-0.03244	2.198
CORPSLS	5.791E-09	-2.977E-08	1.700E-08	1.227E-08	-4.612E-08
LPCBLK	0.0006683	0.01009	-0.007621	-0.01984	-0.01458
NOE	-4.003E-05	-0.0001641	0.0001568	0.000407	0.001980
MDW	-2.951E-06	-2.451E-05	0.0001063	0.000293	-0.0009325
W	-2.785E-07	-0.0001412	1.212E-05	3.306E-05	-0.0008013
PCEB^2	-0.0002992	0.0004138	0.0001618	0.000631	0.008064
INERTIA^	3.012E-05	0.001697	-0.0002933	0.000704	-0.01109
PCLCM^2	0.006258	-0.01471	-0.01233	-0.0189	-0.1483
PCTCP^2	-8.008E-05	-0.002851	0.001610	0.00489	-0.03907
LPCINC^2	0.3733	-1.1428	0.6892	1.982	-67.495
CORPSLS^	-3.015E-14	2.951E-13	-1.131E-13	-1.751E-13	-1.082E-14
LPCBLK^2	-0.002012	-0.06583	0.0358	0.0889	0.2000
PCEB.*IN	0.0004800	-0.008611	-0.0002144	-0.00061	-0.03327
INERTIA.	0.003861	-0.006273	-0.01073	-0.00813	-0.1357
PCLCM.*P	0.002386	0.0005283	-0.02604	-0.0348	0.09673
PCTCP.*L	0.05246	-0.03791	-0.1829	-0.502	2.030
LPCINC.*	7.075E-08	2.145E-06	-7.374E-07	-1.821E-06	-1.519E-05
CORPSLS.	-2.128E-07	-8.492E-07	-6.933E-07	8.986E-07	1.109E-05
CONSTANT	-0.000128	-0.0001487	6.910E-05	0.00034	-0.006150

Model I of Decentralization (1969-79) of Business Oriented Services

(continued)

CORPSLS	2.625E-12				
LPCBLK	2.082E-07	0.2310			
NOE	-1.183E-11	-0.002614	7.509E-05		
MDW	-2.448E-10	-0.001437	4.269E-05	5.010E-05	
W	-2.599E-09	-0.00132	2.649E-05	1.862E-05	9.499E-05
PCEB^2	-3.547E-09	-0.0006481	1.889E-05	-3.511E-07	-3.703E-06
INERTIA	-8.781E-09	-0.003003	-1.099E-05	0.0001263	-0.0004541
PCLCM^2	8.369E-08	0.01895	-0.0002268	0.0002159	9.339E-05
PCTCP^2	2.594E-08	-0.01242	0.0002797	0.0002932	5.624E-05
LPCINC^2	1.017E-05	-2.355	0.009564	0.06241	0.05698
CORPSLS	-1.923E-17	-2.583E-13	-1.264E-14	-1.905E-15	1.119E-14
LPCBLK^2	-1.078E-06	-1.219	0.01364	0.007168	0.006423
PCEB.*IN	3.110E-08	-0.005302	0.0001181	5.452E-05	0.0001673
INERTIA.	8.480E-08	0.02882	-0.0002614	0.0007934	-0.0005622
PCLCM.*P	-1.025E-07	0.07164	-0.001547	-0.001120	0.0004769
PCTCP.*L	-5.065E-07	0.9179	-0.01657	-0.01148	-0.0004923
LPCINC.*	-1.127E-10	6.850E-06	-1.811E-07	-5.437E-08	1.661E-08
CORPSLS.	-3.715E-11	-2.272E-05	1.900E-07	3.657E-08	1.567E-07
CONSTANT	-9.055E-09	-0.001314	-1.821E-05	-1.620E-05	4.076E-07
	CORPSLS	LPCBLK	NOE	MDW	W

PCEB^2	0.0001797				
INERTIA^	-8.776E-05	0.01428			
PCLCM^2	-0.004599	0.004777	0.1604		
PCTCP^2	-2.250E-05	0.0009547	0.003404	0.006216	
LPCINC^2	-0.1667	0.2723	3.217	1.7898	2397.7
CORPSLS^	1.916E-14	4.915E-14	-5.199E-13	-2.355E-13	-9.165E-11
LPCBLK^2	0.00142	0.01911	-0.02242	0.06593	5.0932
PCEB.*IN	-0.00054	-0.0008628	0.01767	0.002797	1.0546
INERTIA.	-0.00303	0.02967	0.1024	0.00793	3.1866
PCLCM.*P	-0.002364	-0.002739	0.08804	-0.01859	-5.0309
PCTCP.*L	-0.04077	-0.01993	1.226	-0.2480	-122.36
LPCINC.*	-1.922E-08	3.454E-07	-3.716E-07	-1.730E-06	-0.000288
CORPSLS.	1.232E-07	2.383E-07	-1.576E-06	2.032E-07	-3.201E-05
CONSTANT	7.089E-05	2.397E-05	-0.001846	7.301E-05	0.1841
	PCEB^2	INERTIA^	PCLCM^2	PCTCP^2	LPCINC^2

CORPSLS^	1.564E-22				
LPCBLK^2	1.773E-12	6.8681			
PCEB.*IN	-2.682E-13	0.042274	0.008599		
INERTIA.	-3.874E-13	-0.10979	0.01319	0.2155	
PCLCM.*P	8.441E-13	-0.34038	0.003348	0.05959	0.2201
PCTCP.*L	8.312E-12	-3.6821	0.09164	0.6676	1.870
LPCINC.*	1.009E-15	-3.037E-05	-1.729E-06	4.995E-07	7.136E-06
CORPSLS.	3.110E-17	0.0001111	2.232E-07	-4.652E-06	1.688E-06
CONSTANT	5.826E-14	0.006423	4.268E-05	-0.001347	0.0009877
	CORPSLS^	LPCBLK^2	PCEB.*IN	INERTIA.	PCLCM.*P

PCTCP.*L	29.701			
LPCINC.*	8.999E-05	7.232E-09		
CORPSLS.	-5.086E-05	-1.222E-09	4.505E-09	
CONSTANT	-0.02347	3.079E-07	1.915E-07	0.0001465
	PCTCP.*L	LPCINC.*	CORPSLS.	CONSTANT

Model I of Decentralization (1969-79) of Business Oriented Services

(continued)

Correlation Matrix of Coefficients

PCEB	1.0000				
INERTIA	-0.13886	1.0000			
PCLCM	-0.0009544	0.0008488	1.0000		
PCTCP	-0.36544	-0.015461	0.55092	1.0000	
LPCINC	-0.48375	0.22056	-0.18728	-0.22941	1.0000
CORPSLS	0.14742	-0.18833	0.15654	0.079426	-0.019198
LPCBLK	0.057351	0.21529	-0.23660	-0.43284	-0.020461
NOE	-0.19052	-0.19410	0.26995	0.49281	0.15413
MDW	-0.017196	-0.035505	0.22412	0.43445	-0.088861
W	-0.0011787	-0.14854	0.018554	0.035575	-0.055455
PCEB^2	-0.92044	0.31642	0.18011	0.49329	0.40573
INERTIA^	0.010396	0.14561	-0.036627	0.061763	-0.062627
PCLCM^2	0.64440	-0.37646	-0.45929	-0.49352	-0.24968
PCTCP^2	-0.041893	-0.37067	0.30479	0.65089	-0.33427
LPCINC^2	0.31447	-0.23926	0.21004	0.42433	-0.92971
CORPSLS^	-0.099435	0.24192	-0.13500	-0.14684	-0.000584
LPCBLK^2	-0.031663	-0.25752	0.20383	0.35567	0.051473
PCEB.*IN	0.21352	-0.95195	-0.034497	-0.068925	-0.24199
INERTIA.	0.34303	-0.13853	-0.34499	-0.18366	-0.19716
PCLCM.*P	0.20983	0.011545	-0.82830	-0.77807	0.13909
PCTCP.*L	0.39706	-0.071308	-0.50069	-0.96602	0.25125
LPCINC.*	0.034313	0.25862	-0.12940	-0.22452	-0.12047
CORPSLS.	-0.13076	-0.12970	-0.15413	0.14039	0.11146
CONSTANT	-0.43461	-0.12596	0.085176	0.29451	-0.34269

	PCEB	INERTIA	PCLCM	PCTCP	LPCINC
CORPSLS	1.0000				
LPCBLK	0.26739	1.0000			
NOE	-0.0008428	-0.62764	1.0000		
MDW	-0.021344	-0.42254	0.69611	1.0000	
W	-0.16460	-0.28169	0.31370	0.26998	1.0000
PCEB^2	-0.16330	-0.10058	0.16263	-0.003700	-0.02834
INERTIA^	-0.045357	-0.052294	-0.010614	0.14937	-0.38998
PCLCM^2	0.12894	0.098427	-0.065353	0.076162	0.023922
PCTCP^2	0.20305	-0.32767	0.40943	0.52547	0.073197
LPCINC^2	0.12820	-0.10006	0.022540	0.18007	0.11940
CORPSLS^	-0.94927	-0.042982	-0.11666	-0.021528	0.091792
LPCBLK^2	-0.25375	-0.96748	0.60068	0.38641	0.25145
PCEB.*IN	0.20697	-0.11895	0.14696	0.083065	0.18508
INERTIA.	0.11275	0.12915	-0.064993	0.24149	-0.12426
PCLCM.*P	-0.13486	0.31774	-0.38064	-0.33732	0.10431
PCTCP.*L	-0.057355	0.35043	-0.35083	-0.29758	-0.00927
LPCINC.*	-0.81824	0.16759	-0.24575	-0.090330	0.02004
CORPSLS.	-0.34163	-0.70425	0.32661	0.076977	0.23955
CONSTANT	-0.46164	-0.22575	-0.17356	-0.18903	0.003455

	CORPSLS	LPCBLK	NOE	MDW	W
PCEB^2	1.0000				
INERTIA^	-0.054789	1.0000			
PCLCM^2	-0.85641	0.099812	1.0000		
PCTCP^2	-0.021288	0.10135	0.10781	1.0000	
LPCINC^2	-0.25397	0.046548	0.16401	0.46363	1.0000

Model I of Decentralization (1969-79) of Business Oriented Services

(continued)

CORPSLS^	0.11429	0.032896	-0.10379	-0.23889	-0.14968
LPCBLK^2	0.040409	0.061038	-0.021357	0.31908	0.039689
PCEB.*IN	-0.42953	-0.077867	0.47584	0.38261	0.23226
INERTIA.	-0.48654	0.53492	0.55077	0.21667	0.14019
PCLCM.*P	-0.37592	-0.048868	0.46855	-0.50273	-0.21902
PCTCP.*L	-0.55796	-0.030607	0.56160	-0.57726	-0.45853
LPCINC.*	-0.016860	0.033988	-0.010908	-0.25797	-0.069084
CORPSLS.	0.13696	0.029710	-0.058624	0.038405	-0.009740
CONSTANT	0.43682	0.016572	-0.38065	0.076498	0.31061
	PCEB^2	INERTIA^	PCLCM^2	PCTCP^2	LPCINC^2
CORPSLS^	1.0000				
LPCBLK^2	0.054102	1.0000			
PCEB.*IN	-0.23133	0.17395	1.0000		
INERTIA.	-0.066738	-0.090247	0.30653	1.0000	
PCLCM.*P	0.14390	-0.27687	0.076954	0.27368	1.0000
PCTCP.*L	0.12198	-0.25781	0.18134	0.26389	0.73162
LPCINC.*	0.94866	-0.13628	-0.21929	0.012654	0.17888
CORPSLS.	0.03705	0.63183	0.035867	-0.14931	0.053595
CONSTANT	0.3849	0.20245	0.038024	-0.23978	-0.17393
	CORPSLS^	LPCBLK^2	PCEB.*IN	INERTIA.	PCLCM.*P
PCTCP.*L	1.0000				
LPCINC.*	0.19418	1.0000			
CORPSLS.	-0.13905	-0.21401	1.0000		
CONSTANT	-0.35581	0.29914	0.23570	1.0000	
	PCTCP.*L	LPCINC.*	CORPSLS.	CONSTANT	

R-Square Between Observed and Predicted = 0.64285
Sum of Absolute Residuals = 0.26947
Sum of Residuals = 1.68758E-14
Standard Error of Residuals = 0.0084188
Skewness of Residuals = 1.3836
Kurtosis of Residuals = 8.1363
First-Order Rho = 0.035052
Durbin-Watson Statistic = 1.9260
Standardized Von-Neumann Ratio Statistic = -0.26679
Durbin-H Statistic = NA

Model II of Decentralization (1969-79) of Business Oriented Services

* Location Coefficient

mean:

lcb64	lcb69	lcb79	pcblc
1.12302	1.13678	1.09963	-0.0167568

standard deviation:

0.210743	0.221277	0.154727	0.132721

LSQ/GAUSS Version 3.1: Applied Data Associates. (1994/04/10/00:01:12)

Ordinary Least Squares Estimation

Dependent Variable = DEP
Estimation Range = 1 69
Number of Observations = 69
Mean of Dependent Variable = -0.016757
Standard Error of Dependent Variable = 0.13272

R-Square = 0.43305 R-Square Adjusted = 0.33530
Standard Error of the Estimate = 0.10821
Log-Likelihood = 61.521

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.51871	10	0.051871	4.4302	0.000123
Residual	0.67910	58	0.011709		
Total	1.1978	68	0.017615		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 58 DF	Prob >|t|
PCEB	0.086692	0.037630	2.3038	0.024837
INERTIA	-0.64958	0.17056	-3.8086	0.0003397
PCLCM	-0.16829	0.18068	-0.93139	0.35551
PCTCP	-0.10019	0.13323	-0.75203	0.45507
LPCINC	-3.4880	2.4170	-1.4431	0.15437
METHQ	0.037102	0.034234	1.0838	0.28294
LPCBLK	0.96794	0.73635	1.3145	0.19385
NOE	0.065275	0.049240	1.3257	0.19015
MDW	0.0069457	0.040157	0.17296	0.86328
W	0.16619	0.057518	2.8894	0.0054197
CONSTANT	-0.088463	0.065801	-1.3444	0.18406

Variance-Covariance Matrix of Coefficients

PCEB	0.001416				
INERTIA	-0.001973	0.02909			
PCLCM	-0.001839	0.009924	0.03265		
PCTCP	-0.001728	0.006525	0.003673	0.01775	
LPCINC	-0.03719	0.069999	0.1221	0.02497	5.8418
METHQ	1.209E-05	6.662E-05	-0.0008848	0.001211	0.02244
LPCBLK	-0.002808	-0.002472	-0.02676	-0.02973	-0.2810
NOE	-0.0001937	0.0005765	0.001605	0.003297	0.04988
MDW	-2.039E-05	0.00135	0.001334	0.002859	0.0154
W	-0.0001415	0.002354	0.002549	0.000693	0.0344
CONSTANT	-0.000285	-0.001300	-0.0006982	-0.00278	-0.1020
	PCEB	INERTIA	PCLCM	PCTCP	LPCINC

METHQ	0.001172		
LPCBLK	-0.002157	0.54221	
NOE	0.000243	-0.012865	0.002425

Model II of Decentralization (1969-79) of Business Oriented Services

(continued)

MDW	0.0001339	-0.01076	0.001221	0.001613	
W	0.0001102	-0.01039	0.0008681	0.000756	0.003308
CONSTANT	-0.001426	0.007773	-0.001947	-0.001279	-0.00112
	METHQ	LPCBLK	NOE	MDW	W
CONSTANT	0.00433				
	CONSTANT				

Correlation Matrix of Coefficients

PCEB	1.0000				
INERTIA	-0.30735	1.0000			
PCLCM	-0.27047	0.32204	1.0000		
PCTCP	-0.34459	0.28715	0.15256	1.0000	
LPCINC	-0.40894	0.16981	0.27956	0.077541	1.0000
METHQ	-0.0093845	0.011410	-0.14304	0.26553	0.2712
LPCBLK	-0.10132	-0.019679	-0.20112	-0.30305	-0.15791
NOE	-0.10452	0.068642	0.18039	0.50256	0.41916
MDW	-0.013492	0.19708	0.18377	0.53446	0.15870
W	-0.065390	0.23996	0.24522	0.09047	0.24746
CONSTANT	-0.11495	-0.11587	-0.058725	-0.3169	-0.64141
	PCEB	INERTIA	PCLCM	PCTCP	LPCINC
METHQ	1.0000				
LPCBLK	-0.085574	1.0000			
NOE	0.14413	-0.35482	1.0000		
MDW	0.097391	-0.36385	0.61759	1.0000	
W	0.055956	-0.24541	0.30650	0.32728	1.0000
CONSTANT	-0.63317	0.16042	-0.60091	-0.48402	-0.2948
	METHQ	LPCBLK	NOE	MDW	W
CONSTANT	1.0000				
	CONSTANT				

R-Square Between Observed and Predicted = 0.43305
Sum of Absolute Residuals = 5.1587
Sum of Residuals = 3.37230E-15
Standard Error of Residuals = 0.099934
Skewness of Residuals = -0.0046003
Kurtosis of Residuals = 4.8911
First-Order Rho = -0.085389
Durbin-Watson Statistic = 2.1687
Standardized Von-Neumann Ratio Statistic = 0.71076
Durbin-H Statistic = NA

=== Heteroskedasticity Test (Breusch-Pagan Test) ===
s2
0.0098420

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 69

Model II of Decentralization (1969-79) of Business Oriented Services
(continued)

Number of Observations = 69
Mean of Dependent Variable = 0.0098420
Standard Error of Dependent Variable = 0.019917

R-Square = 0.23636 R-Square Adjusted = 0.10470
Standard Error of the Estimate = 0.018846
Log-Likelihood = 182.12

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.0063759	10	0.00063759	1.7952	0.081821
Residual	0.020600	58	0.00035517		
Total	0.026976	68	0.00039670		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 58 DF	Prob >|t|
PCEB	0.017300	0.0065539	2.6397	0.01064
INERTIA	-0.042375	0.029705	-1.4265	0.15908
PCLCM	-0.044993	0.031469	-1.4297	0.15815
PCTCP	-0.024426	0.023204	-1.0527	0.29686
LPCINC	0.21333	0.42096	0.50678	0.61423
METHQ	0.0051186	0.0059624	0.85849	0.39416
LPCBLK	-0.20572	0.12825	-1.6041	0.11412
NOE	0.0061393	0.0085759	0.71588	0.47694
MDW	0.0089083	0.0069941	1.2737	0.20785
W	0.019642	0.010018	1.9607	0.054719
CONSTANT	-0.011454	0.011460	-0.99940	0.32175

Variance-Covariance Matrix of Coefficients

	PCEB	INERTIA	PCLCM	PCTCP	LPCINC
PCEB	4.295E-05				
INERTIA	-5.984E-05	0.0008824			
PCLCM	-5.578E-05	0.0003010	0.000990		
PCTCP	-5.240E-05	0.0001979	0.000111	0.0005384	
LPCINC	-0.001128	0.002123	0.003703	0.0007574	0.1772
METHQ	-3.667E-07	2.021E-06	-2.684E-05	3.674E-05	0.000681
LPCBLK	-8.516E-05	-7.497E-05	-0.0008117	-0.0009018	-0.008525
NOE	-5.875E-06	1.749E-05	4.868E-05	0.0001000	0.001513
MDW	-6.185E-07	4.095E-05	4.045E-05	8.674E-05	0.000467
W	-4.293E-06	7.141E-05	7.731E-05	2.103E-05	0.001044
CONSTANT	-8.634E-06	-3.945E-05	-2.118E-05	-8.428E-05	-0.003094

	METHQ	LPCBLK	NOE	MDW	W
METHQ	3.555E-05				
LPCBLK	-6.544E-05	0.01645			
NOE	7.3698E-06	-0.0003903	7.355E-05		
MDW	4.061E-06	-0.0003264	3.704E-05	4.892E-05	
W	3.342E-06	-0.0003153	2.633E-05	2.293E-05	0.000100
CONSTANT	-4.327E-05	0.0002358	-5.906E-05	-3.88E-05	-3.385E-05

	CONSTANT
CONSTANT	0.00013134

Correlation Matrix of Coefficients

	PCEB
PCEB	1.0000

Model II of Decentralization (1969-79) of Business Oriented Services

(continued)

INERTIA	-0.30735	1.0000			
PCLCM	-0.27047	0.32204	1.0000		
PCTCP	-0.34459	0.28715	0.15256	1.0000	
LPCINC	-0.40894	0.16981	0.27956	0.077541	1.0000
METHQ	-0.0093845	0.011410	-0.14304	0.26553	0.27120
LPCBLK	-0.10132	-0.019679	-0.30112	-0.30305	-0.15791
NOE	-0.10452	0.068642	0.18039	0.50256	0.41916
MDW	-0.013492	0.19708	0.18377	0.53446	0.15870
W	-0.065390	0.23996	0.24522	0.090470	0.24746
CONSTANT	-0.11495	-0.11587	-0.058725	-0.31692	-0.64141
	PCEB	INERTIA	PCLCM	PCTCP	LPCINC

METHQ	1.0000				
LPCBLK	-0.085574	1.0000			
NOE	0.14413	-0.35482	1.0000		
MDW	0.097391	-0.36385	0.61759	1.0000	
W	0.055956	-0.24541	0.30650	0.32728	1.0000
CONSTANT	-0.63317	0.16042	-0.60091	-0.48402	-0.29481
	METHQ	LPCBLK	NOE	MDW	W

CONSTANT	1.0000
	CONSTANT

R-Square Between Observed and Predicted = 0.23636
Sum of Absolute Residuals = 0.81054
Sum of Residuals = -1.11543E-15
Standard Error of Residuals = 0.017405
Skewness of Residuals = 1.9244
Kurtosis of Residuals = 7.3368
First-Order Rho = 0.046648
Durbin-Watson Statistic = 1.9053
Standardized Von-Neumann Ratio Statistic = -0.39921
Durbin-H Statistic = NA

=== Heteroskedasticity Test (White Test) ===

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 69
Number of Observations = 69
Mean of Dependent Variable = 0.0098420
Standard Error of Dependent Variable = 0.019917

R-Square = 0.79058 R-Square Adjusted = 0.69701
Standard Error of the Estimate = 0.010963
Log-Likelihood = 226.75

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.021326	21	0.0010155	8.4492	8.0278E-10
Residual	0.0056491	47	0.00012019		
Total	0.026976	68	0.00039670		

Model II of Decentralization (1969-79) of Business Oriented Services

(continued)

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 47 DF	Prob >|t|
PCEB	0.023276	0.016477	1.4126	0.16436
INERTIA	0.012126	0.057693	0.21018	0.83443
PCLCM	-0.029864	0.039657	-0.75306	0.45517
PCTCP	-0.044925	0.041232	-1.0896	0.28146
LPCINC	0.59397	0.82426	0.72062	0.47472
METHQ	0.00089695	0.0040028	0.22408	0.82367
LPCBLK	-0.23798	0.41962	-0.56713	0.57332
NOE	0.0049370	0.0057739	0.85507	0.39685
MDW	0.0058918	0.0045444	1.2965	0.20114
W	0.0092320	0.0065464	1.4103	0.16505
PCEB^2	-0.011370	0.0070880	-1.6041	0.11539
INERTIA^	0.54468	0.099347	5.4826	1.618E-06
PCLCM^2	0.62530	0.12700	4.9235	1.089E-05
PCTCP^2	0.037441	0.037762	0.99151	0.32651
LPCINC^2	-23.114	25.010	-0.92420	0.36010
LPCBLK^2	1.1283	2.0443	0.55196	0.58359
PCEB.*IN	-0.040203	0.049102	-0.81877	0.41705
INERTIA.	-0.042229	0.33606	-0.12566	0.90054
PCLCM.*P	0.41355	0.24763	1.6701	0.10156
PCTCP.*L	2.0447	2.3645	0.86476	0.39156
LPCINC.*	2.3384	22.372	0.10452	0.91720
CONSTANT	-0.012165	0.0096625	-1.2590	0.21424

Variance-Covariance Matrix of Coefficients

PCEB	0.0002715				
INERTIA	-6.528E-05	0.003328			
PCLCM	0.0003574	-0.0002702	0.001573		
PCTCP	6.575E-06	4.394E-05	0.0003028	0.001700	
LPCINC	-0.006478	0.006977	-0.006353	-0.01416	0.67940
METHQ	9.365E-06	-4.625E-05	2.178E-05	3.327E-05	-0.000491
LPCBLK	-0.00153	0.002539	-0.001957	-0.006003	0.059421
NOE	1.436E-06	-4.533E-05	7.318E-05	7.584E-05	0.0008508
MDW	1.091E-05	3.327E-05	5.682E-05	4.304E-05	-9.313E-06
W	-2.863E-06	-5.047E-05	3.875E-05	1.879E-06	0.000229
PCEB^2	-0.0001104	6.675E-05	-0.000161	6.430E-06	0.0025103
INERTIA^	7.725E-05	0.002428	-0.0001237	0.0001654	0.0003026
PCLCM^2	0.001178	-0.001282	0.002161	-6.091E-05	-0.027085
PCTCP^2	4.946E-05	-0.0002612	0.0003528	0.0006825	-0.0093569
LPCINC^2	0.11058	-0.1180	0.22177	0.5277	-17.790
LPCBLK^2	0.007291	-0.01411	0.04244	-0.003866	0.34603
PCEB.*IN	7.751E-05	-0.002606	0.0001766	-3.380E-05	-0.0066691
INERTIA.	0.0007983	0.003408	-0.002895	0.0004525	-0.036211
PCLCM.*P	-0.001488	0.000917	-0.00141	-0.003794	0.042376
PCTCP.*L	0.002994	-0.009758	-0.004197	-0.08868	0.86728
LPCINC.*	0.005567	-0.02491	-0.02156	0.2403	-4.3250
CONSTANT	-6.106E-05	-6.895E-05	-0.00014	2.966E-05	-0.001931
	PCEB	INERTIA	PCLCM	PCTCP	LPCINC
METHQ	1.602E-05				
LPCBLK	0.0002720	0.17608			
NOE	3.044E-06	-0.000742	3.334E-05		
MDW	2.998E-06	-0.0002638	1.536E-05	2.065E-05	

Model II of Decentralization (1969-79) of Business Oriented Services

(continued)

W	3.841E-06	3.865E-06	1.187E-05	8.164E-06	4.286E-05
PCEB^2	-4.883E-06	0.0006915	-1.518E-06	-4.972E-06	7.693E-07
INERTIA^	-3.453E-05	0.001071	-5.981E-05	5.933E-05	-0.0002062
PCLCM^2	6.683E-05	-0.01375	6.542E-05	8.6599E-05	-9.111E-05
PCTCP^2	3.888E-05	-0.0018998	1.131E-05	3.1699E-05	7.625E-06
LPCINC^2	0.03166	1.3134	-0.01162	0.006409	0.01466
LPCBLK^2	0.001396	0.08973	0.003725	0.002305	0.003459
PCEB.*IN	4.879E-05	-0.001835	2.962E-05	-1.167E-05	6.167E-05
INERTIA.	0.0001384	-0.0065995	-0.0002520	0.0002512	-0.0003218
PCLCM.*P	-0.0001804	0.01587	-0.0004252	-0.0003271	7.7459E-05
PCTCP.*L	-0.0009056	0.2556	-0.001208	-0.0001264	0.0007775
LPCINC.*	-0.02175	-7.646	0.00237	-0.008565	-0.02532
CONSTANT	-2.120E-05	-0.001421	-1.992E-05	-1.909E-05	-1.256E-05
	METHQ	LPCBLK	NOE	MDW	W

PCEB^2	5.024E-05				
INERTIA^	-5.845E-05	0.0098699			
PCLCM^2	-0.0006341	0.0021051	0.01613		
PCTCP^2	-4.528E-05	0.0002354	0.001084	0.001426	
LPCINC^2	-0.03932	-0.068462	0.1477	0.3693	625.49
LPCBLK^2	-0.002975	-0.010268	-4.764E-06	0.002908	-2.7661
PCEB.*IN	-8.434E-05	-0.0015895	0.001509	0.000338	0.12426
INERTIA.	-0.0005180	0.019639	0.01214	0.00163	0.48047
PCLCM.*P	0.0005890	-0.0005841	-0.01263	-0.002542	-1.4113
PCTCP.*L	-0.002534	-0.0025570	0.04207	-0.04414	-33.218
LPCINC.*	-0.00631	0.032004	0.5683	0.04945	-50.206
CONSTANT	2.507E-05	-7.573E-05	-0.0002519	-1.972E-05	0.00424
	PCEB^2	INERTIA^	PCLCM^2	PCTCP^2	LPCINC^2

LPCBLK^2	4.179				
PCEB.*IN	0.008866	0.002411			
INERTIA.	-0.1219	0.0009883	0.11294		
PCLCM.*P	-0.175	0.0004705	0.011626	0.061319	
PCTCP.*L	1.0883	0.01306	0.030048	0.16436	5.5907
LPCINC.*	-29.402	0.02789	1.0293	0.60853	-16.068
CONSTANT	-0.007568	3.003E-05	-0.0003056	0.0006035	-0.004845
	LPCBLK^2	PCEB.*IN	INERTIA.	PCLCM.*P	PCTCP.*L

LPCINC.*	500.52				
CONSTANT	0.11291	9.336E-05			
	LPCINC.*	CONSTANT			

Correlation Matrix of Coefficients

PCEB	1.0000				
INERTIA	-0.068673	1.0000			
PCLCM	0.54694	-0.11810	1.0000		
PCTCP	0.0096773	0.018471	0.18515	1.0000	
LPCINC	-0.47698	0.14672	-0.19436	-0.41668	1.0000
METHQ	0.14199	-0.20029	0.13719	0.20159	-0.14872
LPCBLK	-0.22122	0.10489	-0.11757	-0.34693	0.17180
NOE	0.015093	-0.13607	0.31960	0.31857	0.17877
MDW	0.14572	0.12689	0.31530	0.22972	-0.002486
W	-0.026543	-0.13363	0.14928	0.006961	0.042438

Model II of Decentralization (1969-79) of Business Oriented Services

(continued)

PCEB^2	-0.94531	0.16323	-0.57272	0.022002	0.42968
INERTIA^	0.047194	0.42352	-0.031409	0.040384	0.003695
PCLCM^2	0.56268	-0.17496	0.42909	-0.011632	-0.25874
PCTCP^2	0.079488	-0.11988	0.23557	0.43837	-0.30062
LPCINC^2	0.26834	-0.081798	0.22360	0.51176	-0.86299
LPCBLK^2	0.21645	-0.11963	0.52345	-0.045868	0.20536
PCEB.*IN	0.095801	-0.91983	0.090715	-0.016696	-0.16478
INERTIA.	0.14417	0.17575	-0.21724	0.032658	-0.13073
PCLCM.*P	-0.36479	0.064187	-0.75452	-0.37160	0.20761
PCTCP.*L	0.076843	-0.071530	-0.044761	-0.90958	0.44501
LPCINC.*	0.015102	-0.019298	-0.24301	0.26053	-0.23454
CONSTANT	-0.38354	-0.12368	-0.36521	0.074434	-0.24248
	PCEB	INERTIA	PCLCM	PCTCP	LPCINC
METHQ	1.0000				
LPCBLK	0.16195	1.0000			
NOE	0.13169	-0.30613	1.0000		
MDW	0.16481	-0.13832	0.58543	1.0000	
W	0.14659	0.0014071	0.31398	0.27442	1.0000
PCEB^2	-0.17211	0.23251	-0.037091	-0.15436	0.016580
INERTIA^	-0.086836	0.025701	-0.10427	0.13141	-0.31706
PCLCM^2	0.13147	-0.25805	0.089215	0.15005	-0.10958
PCTCP^2	0.25721	-0.11990	0.051882	0.18472	0.030844
LPCINC^2	0.31622	0.12515	-0.080440	0.056391	0.089549
LPCBLK^2	0.17054	0.10461	0.31557	0.24815	0.25848
PCEB.*IN	0.24824	-0.089035	0.10449	-0.052275	0.19185
INERTIA.	0.10291	-0.046799	-0.12988	0.16450	-0.14628
PCLCM.*P	-0.18201	0.15274	-0.29744	-0.29063	0.047783
PCTCP.*L	-0.095688	0.25765	-0.088458	-0.011765	0.050228
LPCINC.*	-0.24290	-0.81445	0.018344	-0.084246	-0.17288
CONSTANT	-0.54816	-0.35046	-0.35700	-0.43472	-0.19853
	METHQ	LPCBLK	NOE	MDW	W
PCEB^2	1.0000				
INERTIA^	-0.083009	1.0000			
PCLCM^2	-0.70445	0.16684	1.0000		
PCTCP^2	-0.16917	0.062739	0.22608	1.0000	
LPCINC^2	-0.22181	-0.027554	0.046506	0.39107	1.0000
LPCBLK^2	-0.20535	-0.050558	-1.8350E-05	0.037668	-0.054102
PCEB.*IN	-0.24232	-0.32584	0.24203	0.18227	0.10119
INERTIA.	-0.21747	0.58822	0.28435	0.12844	0.057166
PCLCM.*P	0.33559	-0.023743	-0.40174	-0.27185	-0.22789
PCTCP.*L	-0.15120	-0.010885	0.14010	-0.49440	-0.56173
LPCINC.*	-0.039792	0.014399	0.20002	0.058538	-0.089730
CONSTANT	0.36606	-0.078892	-0.20527	-0.054038	0.017546
	PCEB^2	INERTIA^	PCLCM^2	PCTCP^2	LPCINC^2
LPCBLK^2	1.0000				
PCEB.*IN	0.088327	1.0000			
INERTIA.	-0.17740	0.059891	1.0000		
PCLCM.*P	-0.34567	0.038692	0.13971	1.0000	
PCTCP.*L	0.22516	0.11250	0.037815	0.28071	1.0000
LPCINC.*	-0.64289	0.025392	0.13690	0.10984	-0.30374

Model II of Decentralization (1969-79) of Business Oriented Services

(continued)

CONSTANT	-0.38313	0.063303	-0.094124	0.25224	-0.21204
	LPCBLK^2	PCEB.*IN	INERTIA.	PCLCM.*P	PCTCP.*L
LPCINC.*	1.0000				
CONSTANT	0.52233	1.0000			
	LPCINC.*	CONSTANT			

R-Square Between Observed and Predicted = 0.79058
Sum of Absolute Residuals = 0.42636
Sum of Residuals = -1.06729E-14
Standard Error of Residuals = 0.0091146
Skewness of Residuals = 1.1671
Kurtosis of Residuals = 6.8638
First-Order Rho = 0.15522
Durbin-Watson Statistic = 1.6691
Standardized Von-Neumann Ratio Statistic = -1.3945
Durbin-H Statistic = NA

=== Weighted L-SQ Model ===

Weighted Least Squares Estimation

Dependent Variable = DEP
Estimation Range = 1 69
Number of Observations = 69
Mean of Dependent Variable = -0.36599
Standard Error of Dependent Variable = 3.0521

WARNING: No Constant Term. @ Since the whole model was weighted, there is no constant term; the original constant became 1/weight. @

R-Square, AOV may not be reliable! @ In the Weighted Least Squares, the R-Square Between Observed and Predicted is interpreted instead of the adjusted R-Square. @

R-Square = 0.99620 R-Square Adjusted = 0.99548
Standard Error of the Estimate = 0.20371
Log-Likelihood = 17.868

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	631.03	11	57.366	1382.4	6.9669E-66
Residual	2.4069	58	0.041498		
Total	633.43	69	9.1802		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 58 DF	Prob >|t|
PCEB	0.22004	0.053555	4.1087	0.00012655
INERTIA	-0.55345	0.14168	-3.9062	0.00024737
PCLCM	0.60457	0.17115	3.5324	0.00081521
PCTCP	-0.23438	0.091151	-2.5714	0.012715
LPCINC	-8.9815	1.2738	-7.0508	2.4085E-09
METHQ	-0.023760	0.017827	-1.3328	0.18781
LPCBLK	0.61677	0.68658	0.89832	0.37273

Model II of Decentralization (1969-79) of Business Oriented Services

(continued)

NOE	0.0097711	0.027683	0.35297	0.72539
MDW	-0.091899	0.037201	-2.4703	0.016462
W	0.069961	0.19025	0.36774	0.71441
WEIGHT	0.014234	0.041144	0.34595	0.73063

Variance-Covariance Matrix of Coefficients

PCEB	0.002868				
INERTIA	-0.004502	0.02008			
PCLCM	-0.005800	0.02241	0.02929		
PCTCP	-0.004498	0.006641	0.01006	0.008308	
LPCINC	0.01309	-0.1333	-0.1329	-0.01088	1.6226
METHQ	0.0005237	-0.00176	-0.001338	-0.00056	0.01525
LPCBLK	-0.02567	0.07564	0.08341	0.03047	-0.48536
NOE	0.0003958	-0.00288	-0.002772	-0.0002285	0.0315
MDW	0.00116	-0.00408	-0.004793	-0.001533	0.03367
W	-6.504E-05	-0.000357	0.0002106	0.000265	0.01032
WEIGHT	-0.001404	0.004427	0.004479	0.001802	-0.04377
	PCEB	INERTIA	PCLCM	PCTCP	LPCINC

METHQ	0.0003178				
LPCBLK	-0.007999	0.47139			
NOE	0.0003485	-0.013474	0.0007663		
MDW	0.0003946	-0.020196	0.0007559	0.001384	
W	8.054E-05	-0.0033534	0.0002284	0.0001941	0.036194
WEIGHT	-0.0006343	0.019874	-0.0009057	-0.001193	-0.000243
	METHQ	LPCBLK	NOE	MDW	W

WEIGHT	0.0016929
	WEIGHT

Correlation Matrix of Coefficients

PCEB	1.0000				
INERTIA	-0.59335	1.0000			
PCLCM	-0.63278	0.92416	1.0000		
PCTCP	-0.92139	0.51418	0.64463	1.0000	
LPCINC	0.19192	-0.73830	-0.60960	-0.093742	1.0000
METHQ	0.54851	-0.69666	-0.43844	-0.34465	0.67164
LPCBLK	-0.69801	0.77753	0.70985	0.48681	-0.55497
NOE	0.26699	-0.73418	-0.58498	-0.090567	0.89328
MDW	0.58208	-0.77468	-0.75284	-0.45211	0.71058
W	-0.0063834	-0.013246	-0.0064674	0.015279	0.042568
WEIGHT	-0.63734	0.75948	0.63601	0.48056	-0.83517
	PCEB	INERTIA	PCLCM	PCTCP	LPCINC

METHQ	1.0000				
LPCBLK	-0.65355	1.0000			
NOE	0.70608	-0.70893	1.0000		
MDW	0.59499	-0.79070	0.73399	1.0000	
W	0.023746	-0.025674	0.043373	0.027431	1.0000
WEIGHT	-0.86472	0.70353	-0.79520	-0.77947	-0.031031
	METHQ	LPCBLK	NOE	MDW	W

WEIGHT	1.0000
	WEIGHT

Model II of Decentralization (1969-79) of Business Oriented Services
(continued)

R-Square Between Observed and Predicted = 0.99620
Sum of Absolute Residuals = 8.7594
Sum of Residuals = 6.02740E-13
Standard Error of Residuals = 0.18814
Skewness of Residuals = 0.071900
Kurtosis of Residuals = 4.3345
First-Order Rho = 0.12677
Durbin-Watson Statistic = 1.7243
Standardized Von-Neumann Ratio Statistic = -1.1621
Durbin-H Statistic = NA

=== Heteroskedasticity Re-Test (Breusch-Pagan Test) ===
s2
0.034882

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 69
Number of Observations = 69
Mean of Dependent Variable = 0.12283
Standard Error of Dependent Variable = 0.61030

WARNING: No Constant Term.
R-Square, AOV may not be reliable!

R-Square = 0.69396 R-Square Adjusted = 0.63592
Standard Error of the Estimate = 0.36557
Log-Likelihood = -22.481

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	17.577	11	1.5979	11.956	2.7544E-11
Residual	7.7512	58	0.13364		
Total	25.328	69	0.36707		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 58 DF	Prob >|t|
PCEB	-0.044421	0.096108	-0.46220	0.64567
INERTIA	-0.17779	0.25426	-0.69923	0.48720
PCLCM	-0.42904	0.30714	-1.3969	0.16777
PCTCP	-0.024708	0.16358	-0.15105	0.88046
LPCINC	-6.2044	2.2860	-2.7141	0.0087360
METHQ	-0.095631	0.031992	-2.9893	0.0040970
LPCBLK	-0.10581	1.2321	-0.085880	0.93186
NOE	0.037394	0.049678	0.75272	0.45466
MDW	-0.075883	0.066760	-1.1366	0.26036
W	-0.082358	0.34141	-0.24123	0.81023
WEIGHT	0.27221	0.073836	3.6867	0.00050199

Variance-Covariance Matrix of Coefficients

PCEB	0.009237	
INERTIA	-0.0145	0.064650

Model II of Decentralization (1969-79) of Business Oriented Services

(continued)

PCLCM	-0.01868	0.072171	0.094333		
PCTCP	-0.01449	0.021386	0.032386	0.02676	
LPCINC	0.04216	-0.42913	-0.42800	-0.03505	5.2256
METHQ	0.001687	-0.0056668	-0.0043080	-0.001804	0.04912
LPCBLK	-0.08266	0.24358	0.26863	0.09811	-1.5631
NOE	0.001275	-0.0092737	-0.0089256	-0.000736	0.10144
MDW	0.003735	-0.013150	-0.015437	-0.004937	0.10844
W	-0.0002095	-0.0011498	-0.00067817	0.000853	0.03322
WEIGHT	-0.004523	0.014258	0.014423	0.005804	-0.14097
	PCEB	INERTIA	PCLCM	PCTCP	LPCINC

METHQ	0.001024				
LPCBLK	-0.02576	1.5181			
NOE	0.001122	-0.043393	0.002468		
MDW	0.001271	-0.065040	0.002434	0.004457	
W	0.0002594	-0.010800	0.0007356	0.000625	0.11656
WEIGHT	-0.002043	0.064003	-0.002917	-0.003842	-0.00078
	METHQ	LPCBLK	NOE	MDW	W

WEIGHT	0.005452
	WEIGHT

Correlation Matrix of Coefficients

PCEB	1.0000				
INERTIA	-0.59335	1.0000			
PCLCM	-0.63278	0.92416	1.0000		
PCTCP	-0.92139	0.51418	0.64463	1.0000	
LPCINC	0.19192	-0.73830	-0.60960	-0.093742	1.0000
METHQ	0.54851	-0.69666	-0.43844	-0.34465	0.67164
LPCBLK	-0.69801	0.77753	0.70985	0.48681	-0.55497
NOE	0.26699	-0.73418	-0.58498	-0.090567	0.89328
MDW	0.58208	-0.77468	-0.75284	-0.45211	0.71058
W	-0.006383	-0.01325	-0.006467	0.01528	0.04257
WEIGHT	-0.63734	0.75948	0.63601	0.48056	-0.83517
	PCEB	INERTIA	PCLCM	PCTCP	LPCINC

METHQ	1.0000				
LPCBLK	-0.65355	1.0000			
NOE	0.70608	-0.70893	1.0000		
MDW	0.59499	-0.79070	0.73399	1.0000	
W	0.023746	-0.025674	0.043373	0.027431	1.0000
WEIGHT	-0.86472	0.70353	-0.79520	-0.77947	-0.03103
	METHQ	LPCBLK	NOE	MDW	W

WEIGHT	1.0000
	WEIGHT

R-Square Between Observed and Predicted = 0.69396
Sum of Absolute Residuals = 11.909
Sum of Residuals = -2.37421E-13
Standard Error of Residuals = 0.33762
Skewness of Residuals = -1.8463

Model II of Decentralization (1969-79) of Business Oriented Services
(continued)

Kurtosis of Residuals = 15.839
First-Order Rho = -0.088721
Durbin-Watson Statistic = 2.1484
Standardized Von-Neumann Ratio Statistic = 0.62543
Durbin-H Statistic = NA

=== Heteroskedasticity Re-Test (White Test) ===

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 69
Number of Observations = 69
Mean of Dependent Variable = 0.12283
Standard Error of Dependent Variable = 0.61030

WARNING: No Constant Term.
R-Square, AOV may not be reliable!

R-Square = 0.93940 R-Square Adjusted = 0.91104
Standard Error of the Estimate = 0.18071
Log-Likelihood = 33.390

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	23.793	22	1.0815	33.119	1.4801E-21
Residual	1.5348	47	0.032655		
Total	25.328	69	0.36707		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 47 DF	Prob >|t|
PCEB	-0.025876	0.14998	-0.17254	0.86376
INERTIA	0.079526	0.47767	0.16649	0.86849
PCLCM	-0.38636	0.44827	-0.86190	0.39312
PCTCP	0.92588	0.48587	1.9056	0.062827
LPCINC	12.075	5.5380	2.1803	0.034276
METHQ	-0.071064	0.024614	-2.8871	0.0058582
LPCBLK	-7.0926	3.1576	-2.2462	0.029431
NOE	0.094028	0.043438	2.1647	0.035525
MDW	-0.080811	0.039788	-2.0311	0.047927
W	-0.075210	0.17018	-0.44193	0.66056
PCEB^2	-0.032718	0.077416	-0.42262	0.67450
INERTIA^	-4.5336	1.2549	-3.6129	0.00073475
PCLCM^2	5.3562	2.3857	2.2451	0.029505
PCTCP^2	-0.96436	0.64162	-1.5030	0.13953
LPCINC^2	-513.59	137.25	-3.7419	0.00049655
LPCBLK^2	45.038	21.223	2.1222	0.039124
PCEB.*IN	0.14389	0.52447	0.27435	0.78502
INERTIA.	0.90560	3.4296	0.26406	0.79289
PCLCM.*P	1.1219	2.5602	0.43822	0.66324
PCTCP.*L	-6.8181	25.044	-0.27225	0.78662
LPCINC.*	38.238	180.16	0.21224	0.83283
WEIGHT	0.17084	0.058078	2.9416	0.0050551

Model II of Decentralization (1969-79) of Business Oriented Services

(continued)

Variance-Covariance Matrix of Coefficients

PCEB	0.02249				
INERTIA	-0.03498	0.22817			
PCLCM	0.03606	-0.061625	0.20095		
PCTCP	0.01541	-0.055644	0.050777	0.23607	
LPCINC	-0.4249	0.73668	-0.67097	-1.8880	30.670
METHQ	-0.0001941	-0.000737	-0.0027121	0.0016875	0.012777
LPCBLK	-0.3455	0.60813	-0.65212	-0.67292	9.3549
NOE	0.002274	-0.015045	0.0064825	0.0015597	0.036911
MDW	0.00267	-0.0079777	-0.0010011	0.0030658	-0.019181
W	-0.0003395	-0.005558	0.0011091	-0.0040533	0.073681
PCEB^2	-0.01021	0.018717	-0.014139	-0.015007	0.25941
INERTIA^	-0.08833	0.25397	-0.068599	-0.22033	3.9334
PCLCM^2	0.03144	-0.094528	-0.40305	-0.096962	-2.2804
PCTCP^2	0.01643	-0.019545	-0.037830	0.11313	-0.98065
LPCINC^2	1.6599	-9.5584	-5.8945	47.990	-546.40
LPCBLK^2	0.84549	-4.4316	5.6746	-0.46818	30.634
PCEB.*IN	0.02002	-0.20647	0.0081368	0.13287	-1.4829
INERTIA.	-0.27621	0.93576	-1.0125	-0.011975	1.3514
PCLCM.*P	-0.22079	0.37408	-0.87570	-0.32322	5.7624
PCTCP.*L	-0.72105	1.0980	0.030517	-10.324	90.302
LPCINC.*	7.6288	5.1491	-9.9769	30.319	-583.97
WEIGHT	-0.000156	0.00124	0.0042049	0.010979	-0.19068
	PCEB	INERTIA	PCLCM	PCTCP	LPCINC

METHQ	0.0006059				
LPCBLK	0.0237	9.9705			
NOE	0.0004324	-0.025626	0.001887		
MDW	0.0003495	-0.056801	0.0009611	0.001583	
W	0.0001171	0.014461	0.0007948	0.0002459	0.02896
PCEB^2	9.184E-05	0.16036	-0.000959	-0.001091	0.0002036
INERTIA^	0.001685	1.5608	-0.005444	-0.006790	0.005596
PCLCM^2	-0.009593	0.19680	-0.02701	-0.02099	-0.01439
PCTCP^2	0.001401	-0.14882	-0.001947	-2.927E-06	-0.003393
LPCINC^2	1.4561	-5.1780	-0.1924	0.5926	-1.165
LPCBLK^2	0.056439	-4.0220	0.6484	0.08688	0.3295
PCEB.*IN	0.001185	-0.48938	0.008795	0.004844	0.002452
INERTIA.	0.03410	5.7587	-0.07398	-0.03138	-0.03171
PCLCM.*P	-0.005116	2.8979	-0.03854	-0.009535	0.002739
PCTCP.*L	-0.0781	27.381	0.13295	-0.1102	0.2959
LPCINC.*	-1.5865	-365.53	-3.5652	1.0827	-2.7506
WEIGHT	-0.001007	-0.071419	-0.001378	-0.00087	-0.00074
	METHQ	LPCBLK	NOE	MDW	W

PCEB^2	0.005993				
INERTIA^	0.04995	1.5747			
PCLCM^2	-0.04258	-1.0071	5.6916		
PCTCP^2	-0.01773	-0.12938	0.39826	0.41167	
LPCINC^2	-2.7639	-54.971	6.0072	42.958	18839.
LPCBLK^2	-0.2170	4.9397	-18.234	-1.3754	-661.23
PCEB.*IN	-0.01878	-0.35629	0.32183	0.081531	34.893
INERTIA.	0.09559	1.3402	2.2088	0.38302	167.24
PCLCM.*P	0.0843	1.1485	1.8155	-0.17516	-91.667

Model II of Decentralization (1969-79) of Business Oriented Services

(continued)

PCTCP.*L	0.7121	11.039	-4.8089	-12.057	-2623.8
LPCINC.*	-5.221	-92.595	129.75	17.421	4333.2
WEIGHT	-0.00041	-0.018716	0.021089	0.002485	1.4635
	PCEB^2	INERTIA^	PCLCM^2	PCTCP^2	LPCINC^2
LPCBLK^2	450.40				
PCEB.*IN	0.60190	0.27507			
INERTIA.	-40.021	-0.34330	11.762		
PCLCM.*P	-21.187	-0.16506	3.2032	6.5545	
PCTCP.*L	129.60	-5.3974	-13.780	13.239	627.18
LPCINC.*	-2712.8	17.936	37.854	34.494	-1942.0
WEIGHT	-0.43567	0.006423	-0.02388	0.000828	-0.51603
	LPCBLK^2	PCEB.*IN	INERTIA.	PCLCM.*P	PCTCP.*L
LPCINC.*	32458.				
WEIGHT	6.3591	0.003373			
	LPCINC.*	WEIGHT			

Correlation Matrix of Coefficients

PCEB	1.0000				
INERTIA	-0.48830	1.0000			
PCLCM	0.53639	-0.28780	1.0000		
PCTCP	0.21147	-0.23976	0.23314	1.0000	
LPCINC	-0.51158	0.27848	-0.27028	-0.70166	1.0000
METHQ	-0.052578	-0.062695	-0.24580	0.14111	0.093733
LPCBLK	-0.72957	0.40319	-0.46071	-0.43862	0.53496
NOE	0.34910	-0.72511	0.33292	0.073900	0.15344
MDW	0.44739	-0.41977	-0.056130	0.15859	-0.087050
W	-0.013301	-0.068372	0.014538	-0.049020	0.078178
PCEB^2	-0.87908	0.50615	-0.40742	-0.39897	0.60508
INERTIA^2	-0.46933	0.42370	-0.12195	-0.36138	0.56600
PCLCM^2	0.087874	-0.082950	-0.37688	-0.083649	-0.17260
PCTCP^2	0.17071	-0.063774	-0.13153	0.36291	-0.27598
LPCINC^2	0.080638	-0.14579	-0.095804	0.71963	-0.71884
LPCBLK^2	0.26564	-0.43716	0.59648	-0.045404	0.26065
PCEB.*IN	0.25452	-0.82416	0.034609	0.52141	-0.51053
INERTIA.	-0.53700	0.57122	-0.65858	-0.007187	0.071154
PCLCM.*P	-0.57503	0.30589	-0.76304	-0.25984	0.40642
PCTCP.*L	-0.19198	0.091788	0.0027183	-0.84843	0.65109
LPCINC.*	0.28234	0.059834	-0.12354	0.34636	-0.58530
WEIGHT	-0.017886	0.044727	0.16151	0.38907	-0.59284
	PCEB	INERTIA	PCLCM	PCTCP	LPCINC
METHQ	1.0000				
LPCBLK	0.30488	1.0000			
NOE	0.40439	-0.18683	1.0000		
MDW	0.35684	-0.45212	0.55608	1.0000	
W	0.027949	0.026910	0.10752	0.036310	1.0000
PCEB^2	0.048199	0.65602	-0.28518	-0.35419	0.01545
INERTIA	0.054554	0.39391	-0.099873	-0.13600	0.02620
PCLCM^2	-0.16336	0.026125	-0.2606	-0.22113	-0.03545
PCTCP^2	0.088692	-0.073455	-0.06987	-0.000115	-0.03107

Model II of Decentralization (1969-79) of Business Oriented Services

(continued)

LPCINC^2	0.43100	-0.011948	-0.032264	0.10852	-0.04989
LPCBLK^2	0.10804	-0.060018	0.70337	0.10288	0.09122
PCEB.*IN	0.091782	-0.29551	0.38607	0.23214	0.02747
INERTIA.	0.40400	0.53177	-0.49657	-0.22993	-0.05432
PCLCM.*P	-0.081178	0.35847	-0.34654	-0.093606	0.006287
PCTCP.*L	-0.12670	0.34625	0.12221	-0.11059	0.06943
LPCINC.*	-0.35777	-0.64255	-0.45557	0.15104	-0.08971
WEIGHT	-0.70416	-0.38944	-0.54619	-0.37576	-0.07489
	METHQ	LPCBLK	NOE	MDW	W
PCEB^2	1.0000				
INERTIA^	0.51418	1.0000			
PCLCM^2	-0.23056	-0.33639	1.0000		
PCTCP^2	-0.35689	-0.16070	0.26018	1.0000	
LPCINC^2	-0.26011	-0.31916	0.018345	0.48781	1.0000
LPCBLK^2	-0.13209	0.18548	-0.36014	-0.10101	-0.22700
PCEB.*IN	-0.46253	-0.54135	0.25720	0.24228	0.48471
INERTIA.	0.36004	0.31142	0.26996	0.17406	0.35529
PCLCM.*P	0.42531	0.35750	0.29724	-0.10663	-0.26087
PCTCP.*L	0.36728	0.35127	-0.080487	-0.75036	-0.76331
LPCINC.*	-0.37435	-0.40958	0.30188	0.15071	0.17524
WEIGHT	-0.09122	-0.25680	0.15220	0.06668	0.18360
	PCEB^2	INERTIA^	PCLCM^2	PCTCP^2	LPCINC^2
LPCBLK^2	1.0000				
PCEB.*IN	0.05408	1.0000			
INERTIA.	-0.54985	-0.19086	1.0000		
PCLCM.*P	-0.38994	-0.12293	0.36481	1.0000	
PCTCP.*L	0.24383	-0.41093	-0.16045	0.20649	1.0000
LPCINC.*	-0.70952	0.18983	0.061265	0.074786	-0.43041
WEIGHT	-0.35347	0.21087	-0.11989	-0.0055695	-0.35478
	LPCBLK^2	PCEB.*IN	INERTIA.	PCLCM.*P	PCTCP.*L
LPCINC.*	1.0000				
WEIGHT	0.60775	1.0000			
	LPCINC.*	WEIGHT			

R-Square Between Observed and Predicted = 0.93940
Sum of Absolute Residuals = 7.7161
Sum of Residuals = 1.66712E-12
Standard Error of Residuals = 0.15023
Skewness of Residuals = -0.30970
Kurtosis of Residuals = 3.4337
First-Order Rho = 0.076583
Durbin-Watson Statistic = 1.8212
Standardized Von-Neumann Ratio Statistic = -0.75333
Durbin-H Statistic = NA

Model I of Decentralization (1979-89) of Business Oriented Services

* Location Coefficient

mean:

lcb69	lcb79	lcb89	pcblc
1.12127	1.10213	1.09808	0.00264957

standard deviation:

0.202169	0.158224	0.142002	0.0994947

LSQ/GAUSS Version 3.1: Applied Data Associates. (1994/04/10/02:23:59)

Ordinary Least Squares Estimation

Dependent Variable = DEP
Estimation Range = 1 52
Number of Observations = 52
Mean of Dependent Variable = 0.0026496
Standard Error of Dependent Variable = 0.099495

R-Square = 0.50596 R-Square Adjusted = 0.37010
Standard Error of the Estimate = 0.078965
Log-Likelihood = 65.051

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.25544	11	0.023222	3.7241	0.0010559
Residual	0.24942	40	0.0062355		
Total	0.50486	51	0.0098992		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 40 DF	Prob >|t|
PCEB	0.11327	0.033217	3.4100	0.0014959
INERTIA	-0.13755	0.10652	-1.2913	0.20403
PCLCM	-0.65990	0.16682	-3.9557	0.00030375
PCCOM	0.021435	0.042466	0.50474	0.61651
LMPOPC	-1.8730	3.1362	-0.59724	0.55371
LPCINC	0.15632	1.6190	0.096553	0.92356
CORPSLS	1.6777E-07	2.147E-07	0.78151	0.43910
METBLKC	0.038483	0.066890	0.57532	0.56830
NOE	-0.015001	0.041641	-0.36024	0.72056
MDW	-0.010460	0.034986	-0.29897	0.76651
W	0.052665	0.060558	0.86967	0.38967
CONSTANT	-0.081274	0.032627	-2.4910	0.016987

Variance-Covariance Matrix of Coefficients

PCEB	0.00110					
INERTIA	0.0006555	0.011348				
PCLCM	0.0004114	0.0029516	0.027830			
PCCOM	-0.0001838	-0.0009815	0.001681	0.0018		
LMPOPC	-0.03031	-0.059699	-0.14767	-0.0211	9.8355	
LPCINC	-0.01957	0.0066695	-0.013835	-0.005227	-1.2725	2.6211
CORPSLS	1.793E-09	7.809E-10	7.875E-09	9.03E-10	-7.203E-08	-1.2E-08
METBLKC	-8.069E-06	-0.0002602	0.0006367	0.000188	-0.10392	0.00015
NOE	0.000122	-0.0012574	-0.001727	-9.137E-05	0.072663	-0.00015
MDW	-0.000144	-0.00078384	-0.001056	-0.0002467	0.060103	-0.00015
W	0.0002512	-0.0033293	5.8370E-06	0.0005285	-0.00150	-0.00015
CONSTANT	-0.000324	0.00070699	0.001326	0.0002015	-0.025495	0.00015
	PCEB	INERTIA	PCLCM	PCCOM	LMPOPC	LPCINC

Model I of Decentralization (1979-89) of Business Oriented Services

(continued)

CORPSLS	-4.21E-08	4.6086E-14			
METBLKC	0.01327	1.5857E-09	0.004474		
NOE	-0.03267	-1.4850E-09	-0.001029	0.00173	
MDW	0.004664	-1.1632E-09	-0.0008396	0.000771	0.00122
W	-0.005523	4.1423E-10	0.0001199	0.0006999	0.000511
CONSTANT	-0.01258	-7.6043E-10	-4.760E-05	-0.000497	-0.000700
	LPCINC	CORPSLS	METBLKC	NOE	MDW

W	0.003667	
CONSTANT	-0.000726	0.001065
	W	CONSTANT

Correlation Matrix of Coefficients

PCEB	1.0000				
INERTIA	0.18525	1.0000			
PCLCM	0.074243	0.16609	1.0000		
PCCOM	-0.13029	-0.21697	0.23734	1.0000	
LMPOPC	-0.29099	-0.17870	-0.28225	-0.15859	1.0000
LPCINC	-0.36395	0.038673	-0.051227	-0.076022	-0.25062
CORPSLS	0.25147	0.034148	0.21990	0.099051	-0.10698
METBLKC	-0.003631	-0.036515	0.057056	0.066174	-0.49538
NOE	0.088213	-0.28347	-0.24866	-0.051671	0.55641
MDW	-0.12391	-0.21032	-0.18087	-0.16606	0.54778
W	0.12487	-0.51610	0.0005778	0.20552	-0.007915
CONSTANT	-0.29905	0.20342	0.24361	0.14540	-0.24916
	PCEB	INERTIA	PCLCM	PCCOM	LMPOPC

LPCINC	1.0000				
CORPSLS	-0.12112	1.0000			
METBLKC	0.12250	0.11042	1.0000		
NOE	-0.48466	-0.16611	-0.36959	1.0000	
MDW	0.082349	-0.15487	-0.35877	0.52952	1.0000
W	-0.056336	0.031863	0.029592	0.27756	0.24113
CONSTANT	-0.23810	-0.10857	-0.021813	-0.36587	-0.61329
	LPCINC	CORPSLS	METBLKC	NOE	MDW

W	1.0000	
CONSTANT	-0.36759	1.0000
	W	CONSTANT

R-Square Between Observed and Predicted = 0.50596
Sum of Absolute Residuals = 2.6605
Sum of Residuals = -1.09635E-15
Standard Error of Residuals = 0.069933
Skewness of Residuals = 0.84870
Kurtosis of Residuals = 5.8289
First-Order Rho = -0.037553
Durbin-Watson Statistic = 1.9875
Standardized Von-Neumann Ratio Statistic = -0.045866
Durbin-H Statistic = NA

=== Heteroskedasticity Test (Koenkar-Basset Test) ===
ko
0.00011641

Model I of Decentralization (1979-89) of Business Oriented Services
(continued)

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 52
Number of Observations = 52
Mean of Dependent Variable = 0.0047966
Standard Error of Dependent Variable = 0.010895

R-Square = 0.34914 R-Square Adjusted = 0.17015
Standard Error of the Estimate = 0.0099245
Log-Likelihood = 172.90

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.0021135	11	0.00019213	1.9507	0.061186
Residual	0.0039399	40	9.8496E-05		
Total	0.0060533	51	0.00011869		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 40 DF	Prob >|t|
PCEB	0.0090778	0.0041748	2.1744	0.035646
INERTIA	-0.017021	0.013388	-1.2713	0.21096
PCLCM	-0.045054	0.020967	-2.1488	0.037754
PCCOM	0.0029106	0.0053373	0.54533	0.58855
LMPOPC	-0.21945	0.39416	-0.55675	0.58080
LPCINC	0.12629	0.20348	0.62064	0.53835
CORPSLS	6.0116E-10	2.6981E-08	0.022281	0.98233
METBLKC	9.4776E-05	0.0084069	0.011274	0.99106
NOE	-0.0037674	0.0052335	-0.71985	0.47580
MDW	-0.0050420	0.0043971	-1.1467	0.25834
W	0.0035713	0.0076110	0.46922	0.64146
CONSTANT	-0.00031218	0.0041006	-0.076132	0.93969

Variance-Covariance Matrix of Coefficients

	PCEB	INERTIA	PCLCM	PCCOM	LMPOPC
PCEB	1.743E-05				
INERTIA	1.035E-05	0.000179			
PCLCM	6.499E-06	4.662E-05	0.00044		
PCCOM	-2.903E-06	-1.550E-05	2.656E-05	2.849E-05	
LMPOPC	-0.000479	-0.000943	-0.0023	-0.000334	0.1554
LPCINC	-0.000309	0.000105	-0.000219	-8.256E-05	-0.02010
CORPSLS	2.833E-11	1.234E-11	1.244E-10	1.426E-11	-1.138E-09
METBLKC	-1.275E-07	-4.110E-06	1.006E-05	2.969E-06	-0.001642
NOE	1.927E-06	-1.986E-05	-2.729E-05	-1.443E-06	0.00115
MDW	-2.275E-06	-1.238E-05	-1.668E-05	-3.897E-06	0.0009494
W	3.968E-06	-5.259E-05	9.220E-08	8.349E-06	-2.375E-05
CONSTANT	-5.119E-06	1.117E-05	2.094E-05	3.18E-06	-0.0004027

	LPCINC	CORPSLS	METBLKC	NOE	MDW	W
LPCINC	0.0414					
CORPSLS	-6.649E-10	7.280E-16				
METBLKC	0.00021	2.505E-11	7.068E-05			
NOE	-0.000516	-2.346E-11	-1.626E-05	2.739E-05		
MDW	7.368E-05	-1.837E-11	-1.326E-05	1.219E-05	1.934E-05	
W	-8.725E-05	6.543E-12	1.893E-06	1.106E-05	8.07E-06	

Model I of Decentralization (1979-89) of Business Oriented Services

(continued)

CONSTANT	-0.000199	-1.201E-11	-7.519E-07	-7.852E-06	-1.106E-05
	LPCINC	CORPSLS	METBLKC	NOE	MDW
W	5.793E-05				
CONSTANT	-1.147E-05	1.682E-05			
	W	CONSTANT			

Correlation Matrix of Coefficients

PCEB	1.0000				
INERTIA	0.18525	1.0000			
PCLCM	0.074243	0.16609	1.0000		
PCCOM	-0.13029	-0.21697	0.23734	1.0000	
LMPOPC	-0.29099	-0.17870	-0.28225	-0.15859	1.0000
LPCINC	-0.36395	0.038673	-0.051227	-0.076022	-0.25062
CORPSLS	0.25147	0.034148	0.21990	0.099051	-0.10698
METBLKC	-0.0036314	-0.036515	0.057056	0.066174	-0.49538
NOE	0.088213	-0.28347	-0.24866	-0.051671	0.55641
MDW	-0.12391	-0.21032	-0.18087	-0.16606	0.54778
W	0.12487	-0.51610	0.000578	0.20552	-0.007915
CONSTANT	-0.29905	0.20342	0.24361	0.14540	-0.24916
	PCEB	INERTIA	PCLCM	PCCOM	LMPOPC
LPCINC	1.0000				
CORPSLS	-0.12112	1.0000			
METBLKC	0.12250	0.11042	1.0000		
NOE	-0.48466	-0.16611	-0.36959	1.0000	
MDW	0.082349	-0.15487	-0.35877	0.52952	1.0000
W	-0.056336	0.031863	0.029592	0.27756	0.24113
CONSTANT	-0.23810	-0.10857	-0.021813	-0.36587	-0.61329
	LPCINC	CORPSLS	METBLKC	NOE	MDW
W	1.0000				
CONSTANT	-0.36759	1.0000			
	W	CONSTANT			

R-Square Between Observed and Predicted = 0.34914
Sum of Absolute Residuals = 0.29851
Sum of Residuals = -6.15827E-17
Standard Error of Residuals = 0.0087893
Skewness of Residuals = 2.5805
Kurtosis of Residuals = 14.056
First-Order Rho = -0.056258
Durbin-Watson Statistic = 2.0523
Standardized Von-Neumann Ratio Statistic = 0.19229
Durbin-H Statistic = NA

Model II of Decentralization (1979-89) of Business Oriented Services

* Location Coefficient

mean:

lcb69	lcb79	lcb89	pcblc
1.13599	1.09607	1.09730	0.00761951

standard deviation:

0.214985	0.152466	0.132304	0.0939900

LSQ/GAUSS Version 3.1: Applied Data Associates. (1994/04/10/00:34:09)

Ordinary Least Squares Estimation

Dependent Variable = DEP
Estimation Range = 1 74
Number of Observations = 74
Mean of Dependent Variable = 0.0076195
Standard Error of Dependent Variable = 0.093990

R-Square = 0.28145 R-Square Adjusted = 0.15397
Standard Error of the Estimate = 0.086452
Log-Likelihood = 82.709

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.18151	11	0.016501	2.2077	0.025043
Residual	0.46338	62	0.0074739		
Total	0.64489	73	0.0088341		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 62 DF	Prob >|t|
PCEB	0.091725	0.030851	2.9732	0.0041935
INERTIA	-0.16774	0.10418	-1.6101	0.11246
PCLCM	-0.078634	0.098691	-0.79678	0.42862
PCCOM	0.070523	0.039089	1.8042	0.076063
LMPOPC	-4.7409	2.2083	-2.1469	0.035723
LPCINC	-0.097237	1.5122	-0.064301	0.94894
METHQ	0.013194	0.024348	0.54190	0.58983
METBLKC	0.020425	0.058925	0.34662	0.73005
NOE	-0.039021	0.039062	-0.99896	0.32170
MDW	-0.016754	0.031794	-0.52696	0.60010
W	0.038237	0.048362	0.79064	0.43217
CONSTANT	-0.044149	0.033438	-1.3203	0.19158

Variance-Covariance Matrix of Coefficients

PCEB	0.000952					
INERTIA	0.000665	0.01085				
PCLCM	8.758E-05	0.00358	0.00974			
PCCOM	-0.00013	-0.000555	0.00076	0.001528		
LMPOPC	-0.0191	-0.0495	-0.02787	-0.01173	4.8765	
LPCINC	-0.0169	0.00323	0.01538	-0.00454	-0.90701	
METHQ	0.000144	-0.000425	8.814E-05	7.585E-05	0.00145	
METBLKC	-0.000234	-0.000312	0.000275	-1.306E-05	-0.06260	
NOE	0.000134	-0.00108	-0.000942	-7.013E-06	0.04638	
MDW	-7.906E-05	-0.000671	-0.000665	-0.0002176	0.03279	
W	8.513E-05	-0.00220	-0.000602	0.000128	-0.00195	
CONSTANT	-0.0004	0.000981	0.000281	9.411E-05	-0.00929	
	PCEB	INERTIA	PCLCM	PCCOM	LMPOPC	

LPCINC	2.2868

Model II of Decentralization (1979-89) of Business Oriented Services

(continued)

METHQ	-0.006817	0.0005928			
METBLKC	0.01135	8.119E-05	0.003472		
NOE	-0.02743	-6.022E-05	-0.001038	0.001526	
MDW	0.008317	-0.0001073	-0.0005714	0.000546	0.00101
W	0.007704	8.664E-05	-0.000154	0.000395	0.00041
CONSTANT	-0.008065	-0.0004275	2.053E-05	-0.000278	-0.00050
	LPCINC	METHQ	METBLKC	NOE	MDW

W	0.002339	
CONSTANT	-0.0006146	0.001118
	W	CONSTANT

Correlation Matrix of Coefficients

PCEB	1.0000				
INERTIA	0.20703	1.0000			
PCLCM	0.028765	0.34817	1.0000		
PCCOM	-0.10528	-0.13617	0.19781	1.0000	
LMPOPC	-0.28072	-0.21499	-0.12788	-0.13586	1.0000
LPCINC	-0.36256	0.020497	0.10307	-0.076843	-0.27161
METHQ	0.19115	-0.16755	0.036680	0.079694	0.026964
METBLKC	-0.12846	-0.050822	0.047287	-0.005668	-0.48110
NOE	0.11106	-0.26621	-0.24443	-0.004593	0.53772
MDW	-0.080599	-0.20262	-0.21206	-0.17508	0.46700
W	0.057056	-0.43709	-0.12605	0.067727	-0.018221
CONSTANT	-0.38635	0.28147	0.085251	0.072005	-0.12574
	PCEB	INERTIA	PCLCM	PCCOM	LMPOPC

LPCINC	1.0000				
METHQ	-0.18514	1.0000			
METBLKC	0.12736	0.056588	1.0000		
NOE	-0.46430	-0.063317	-0.45091	1.0000	
MDW	0.17299	-0.13855	-0.30499	0.43970	1.0000
W	0.10534	0.073582	-0.054044	0.20907	0.26919
CONSTANT	-0.15949	-0.52511	0.010419	-0.21310	-0.46938
	LPCINC	METHQ	METBLKC	NOE	MDW

W	1.0000	
CONSTANT	-0.38007	1.0000
	W	CONSTANT

R-Square Between Observed and Predicted = 0.28145
Sum of Absolute Residuals = 3.9973
Sum of Residuals = 1.94289E-16
Standard Error of Residuals = 0.079673
Skewness of Residuals = 1.3235
Kurtosis of Residuals = 9.2592
First-Order Rho = -0.15370
Durbin-Watson Statistic = 2.2719
Standardized Von-Neumann Ratio Statistic = 1.1854
Durbin-H Statistic = NA

=== Heteroskedasticity Test (Koenkar-Basset Test) ===
ko
0.00033388

Model II of Decentralization (1979-89) of Business Oriented Services

(continued)

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 74
Number of Observations = 74
Mean of Dependent Variable = 0.0062620
Standard Error of Dependent Variable = 0.018397

R-Square = 0.21442 R-Square Adjusted = 0.075043
Standard Error of the Estimate = 0.017693
Log-Likelihood = 200.10

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.0052976	11	0.00048160	1.5384	0.14079
Residual	0.019409	62	0.00031305		
Total	0.024707	73	0.00033845		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 62 DF	Prob >|t|
PCEB	0.014181	0.0063140	2.2459	0.028281
INERTIA	-0.028717	0.021322	-1.3468	0.18293
PCLCM	-0.015901	0.020198	-0.78728	0.43412
PCCOM	0.0094761	0.0080000	1.1845	0.24073
LMPOPC	-0.62021	0.45195	-1.3723	0.17491
LPCINC	0.078294	0.30949	0.25298	0.80112
METHQ	0.0072844	0.0049830	1.4619	0.14883
METBLKC	-0.0032043	0.012060	-0.26570	0.79135
NOE	-0.0075035	0.0079944	-0.93859	0.35159
MDW	-0.0072949	0.0065069	-1.1211	0.26656
W	0.0043491	0.0098977	0.43941	0.66189
CONSTANT	-0.0042264	0.0068434	-0.61759	0.53911

Variance-Covariance Matrix of Coefficients

	PCEB	INERTIA	PCLCM	PCCOM	LMPOPC
PCEB	3.987E-05				
INERTIA	2.787E-05	0.000455			
PCLCM	3.668E-06	0.00015	0.0004		
PCCOM	-5.318E-06	-2.323E-05	3.196E-05	6.3999E-05	
LMPOPC	-0.0008	-0.00207	-0.00117	-0.00049	0.2043
LPCINC	-0.000709	0.000135	0.00064	-0.00019	-0.03799
METHQ	6.014E-06	-1.780E-05	3.692E-06	3.177E-06	6.072E-05
METBLKC	-9.781E-06	-1.307E-05	1.152E-05	-5.468E-07	-0.00262
NOE	5.606E-06	-4.538E-05	-3.947E-05	-2.938E-07	0.00194
MDW	-3.311E-06	-2.81E-05	-2.787E-05	-9.114E-06	0.00137
W	3.566E-06	-9.224E-05	-2.52E-05	5.363E-06	-8.151E-05
CONSTANT	-1.669E-05	4.107E-05	1.178E-05	3.940E-06	-0.00039

	LPCINC	METHQ	METBLKC	NOE	MDW
LPCINC	0.09578				
METHQ	-0.0002855	2.483E-05			
METBLKC	0.0004753	3.401E-06	0.000145		
NOE	-0.001149	-2.522E-06	-4.347E-05	6.391E-05	
MDW	0.0003484	-4.492E-06	-2.393E-05	2.287E-05	4.234E-05
W	0.0003227	3.629E-06	-6.451E-06	1.654E-05	1.734E-05
CONSTANT	-0.0003378	-1.791E-05	8.599E-07	- 1.166E-05	-2.090E-05

Model II of Decentralization (1979-89) of Business Oriented Services

(continued)

W	9.796E-05	
CONSTANT	-2.574E-05	4.683E-05
	W	CONSTANT

Correlation Matrix of Coefficients

PCEB	1.0000				
INERTIA	0.20703	1.0000			
PCLCM	0.028765	0.34817	1.0000		
PCCOM	-0.10528	-0.13617	0.19781	1.0000	
LMPOPC	-0.28072	-0.21499	-0.12788	-0.13586	1.0000
LPCINC	-0.36256	0.020497	0.10307	-0.076843	-0.27161
METHQ	0.19115	-0.16755	0.036680	0.079694	0.026964
METBLKC	-0.12846	-0.050822	0.047287	-0.0056678	-0.48110
NOE	0.11106	-0.26621	-0.24443	-0.0045930	0.53772
MDW	-0.080599	-0.20262	-0.21206	-0.17508	0.46700
W	0.057056	-0.43709	-0.12605	0.067727	-0.018221
CONSTANT	-0.38635	0.28147	0.085251	0.072005	-0.12574
	PCEB	INERTIA	PCLCM	PCCOM	LMPOPC

LPCINC	1.0000				
METHQ	-0.18514	1.0000			
METBLKC	0.12736	0.056588	1.0000		
NOE	-0.46430	-0.063317	-0.45091	1.0000	
MDW	0.17299	-0.13855	-0.30499	0.43970	1.0000
W	0.10534	0.073582	-0.054044	0.20907	0.26919
CONSTANT	-0.15949	-0.52511	0.010419	-0.21310	-0.46938
	LPCINC	METHQ	METBLKC	NOE	MDW

W	1.0000	
CONSTANT	-0.38007	1.0000
	W	CONSTANT

R-Square Between Observed and Predicted = 0.21442
Sum of Absolute Residuals = 0.63093
Sum of Residuals = 2.34188E-16
Standard Error of Residuals = 0.016306
Skewness of Residuals = 4.8443
Kurtosis of Residuals = 34.261
First-Order Rho = -0.082458
Durbin-Watson Statistic = 2.1504
Standardized Von-Neumann Ratio Statistic = 0.65582
Durbin-H Statistic = NA

Model of Decentralization (1969-89) of Consumer Oriented Services

* Location Coefficient:

lcon59	lcon69	lcon79	lcon89	pcclc
1.021	1.005	0.9828	0.9702	-0.03237

standard deviation:

0.09906	0.09046	0.07593	0.1024	0.08801

LSQ/GAUSS Version 3.1: Applied Data Associates. (1994/04/10/01:37:13)

Ordinary Least Squares Estimation

Dependent Variable = DEP
Estimation Range = 1 72
Number of Observations = 72
Mean of Dependent Variable = -0.032368
Standard Error of Dependent Variable = 0.088009

R-Square = 0.51591 R-Square Adjusted = 0.45444
Standard Error of the Estimate = 0.065006
Log-Likelihood = 99.440

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.28372	8	0.035465	8.3926	1.1159E-07
Residual	0.26622	63	0.0042257		
Total	0.54994	71	0.0077456		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 63 DF	Prob >|t|
LPCPCON	-1.1371	0.92505	-1.2292	0.22356
INERLC	0.69352	0.10873	6.3785	2.3882E-08
PCECON	0.045695	0.031340	1.4581	0.14979
LPCCINC	-1.5563	1.2642	-1.2311	0.22288
PCBLK	-0.022756	0.016903	-1.3463	0.18304
NOE	0.013090	0.026494	0.49407	0.62297
MDW	0.011846	0.026919	0.44006	0.66140
W	-0.027317	0.034494	-0.79195	0.43136
CONSTANT	0.027808	0.038100	0.72986	0.46818

Variance-Covariance Matrix of Coefficients

LPCPCON	0.85571				
INERLC	0.0099050	0.01182			
PCECON	-0.018096	-0.001143	0.000982		
LPCCINC	0.26279	0.007335	-0.02369	1.5982	
PCBLK	-0.0048174	7.007E-05	1.426E-05	-0.004831	0.000286
NOE	0.013169	0.000164	-0.0001226	0.001602	-0.000173
MDW	0.013182	-0.000126	-0.0002552	0.01650	-0.00021
W	-0.0036921	8.535E-05	8.754E-05	0.009746	-0.00014
CONSTANT	-0.0097386	0.000825	0.000312	-0.03943	0.00016
	LPCPCON	INERLC	PCECON	LPCCINC	PCBLK

NOE	0.000702			
MDW	0.000402	0.000725		
W	0.000155	0.000265	0.00119	
CONSTANT	-0.000316	-0.000722	-0.000441	0.00145
	NOE	MDW	W	CONSTANT

Correlation Matrix of Coefficients

LPCPCON	1.0000

Model of Decentralization (1969-89) of Consumer Oriented Services
(continued)

INERLC	0.098481	1.0000			
PCECON	-0.62419	-0.33534	1.0000		
LPCCINC	0.22471	0.053360	-0.59799	1.0000	
PCBLK	-0.30810	0.038127	0.026916	-0.22606	1.0000
NOE	0.53735	0.056980	-0.14762	0.047816	-0.38723
MDW	0.52936	-0.043034	-0.30248	0.48478	-0.46066
W	-0.11571	0.022757	0.080979	0.22349	-0.24500
CONSTANT	-0.27631	0.19918	0.26139	-0.81865	0.25461
	LPCPCON	INERLC	PCECON	LPCCINC	PCBLK

NOE	1.0000			
MDW	0.56356	1.0000		
W	0.16960	0.28543	1.0000	
CONSTANT	-0.31267	-0.70427	-0.33533	1.0000
	NOE	MDW	W	CONSTANT

R-Square Between Observed and Predicted = 0.51591
Sum of Absolute Residuals = 3.2674
Sum of Residuals = -4.71151E-15
Standard Error of Residuals = 0.061234
Skewness of Residuals = -0.52222
Kurtosis of Residuals = 4.1676
First-Order Rho = 0.010525
Durbin-Watson Statistic = 1.9348
Standardized Von-Neumann Ratio Statistic = -0.28047
Durbin-H Statistic = NA
=== Heteroskedasticity Test (Breusch-Pagan Test) ===
s2
0.0036975

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 72
Number of Observations = 72
Mean of Dependent Variable = 0.0036975
Standard Error of Dependent Variable = 0.0067495

R-Square = 0.34804 R-Square Adjusted = 0.26525
Standard Error of the Estimate = 0.0057855
Log-Likelihood = 273.62

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.0011257	8	0.00014071	4.2040	0.00044276
Residual	0.0021087	63	3.3472E-05		
Total	0.0032344	71	4.5555E-05		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 63 DF	Prob >|t|
LPCPCON	-0.1018	0.08233	-1.2367	0.22080
INERLC	-0.02476	0.009677	-2.5589	0.012914

Model of Decentralization (1969-89) of Consumer Oriented Services

(continued)

PCECON	0.0003306	0.002789	0.11851	0.90604
LPCCINC	0.2203	0.1125	1.9581	0.054652
PCBLK	-0.0003885	0.001504	-0.25828	0.79704
NOE	-0.0001535	0.002358	-0.065116	0.94829
MDW	0.001613	0.002396	0.67316	0.50331
W	0.01427	0.00307	4.6497	1.750E-05
CONSTANT	-0.004196	0.00339	-1.2374	0.22051

Variance-Covariance Matrix of Coefficients

LPCPCON	0.00678				
INERLC	7.846E-05	9.364E-05			
PCECON	-0.000143	-9.051E-06	7.78E-06		
LPCCINC	0.00208	5.810E-05	-0.0001877	0.01266	
PCBLK	-3.816E-05	5.55E-07	1.129E-07	-3.83E-05	2.263E-06
NOE	0.000104	1.30E-06	-9.708E-07	1.269E-05	-1.374E-06
MDW	0.000104	-9.977E-07	-2.021E-06	0.0001307	-1.66E-06
W	-2.925E-05	6.76E-07	6.934E-07	7.719E-05	-1.13E-06
CONSTANT	-7.714E-05	6.536E-06	2.472E-06	-0.000312	1.299E-06
	LPCPCON	INERLC	PCECON	LPCCINC	PCBLK

NOE	5.556E-06			
MDW	3.184E-06	5.740E-06		
W	1.228E-06	2.099E-06	9.425E-06	
CONSTANT	-2.50E-06	-5.72E-06	-3.491E-06	1.150E-05
	NOE	MDW	W	CONSTANT

Correlation Matrix of Coefficients

LPCPCON	1.0000				
INERLC	0.098481	1.0000			
PCECON	-0.62419	-0.33534	1.0000		
LPCCINC	0.22471	0.053360	-0.59799	1.0000	
PCBLK	-0.30810	0.038127	0.026916	-0.22606	1.0000
NOE	0.53735	0.056980	-0.14762	0.047816	-0.38723
MDW	0.52936	-0.043034	-0.30248	0.48478	-0.46066
W	-0.11571	0.022757	0.080979	0.22349	-0.24500
CONSTANT	-0.27631	0.19918	0.26139	-0.81865	0.25461
	LPCPCON	INERLC	PCECON	LPCCINC	PCBLK

NOE	1.0000			
MDW	0.56356	1.0000		
W	0.16960	0.28543	1.0000	
CONSTANT	-0.31267	-0.70427	-0.33533	1.0000
	NOE	MDW	W	CONSTANT

R-Square Between Observed and Predicted = 0.34804
Sum of Absolute Residuals = 0.25237
Sum of Residuals = 5.56413E-16
Standard Error of Residuals = 0.0054498
Skewness of Residuals = 1.9563
Kurtosis of Residuals = 11.585
First-Order Rho = -0.048374
Durbin-Watson Statistic = 2.0598
Standardized Von-Neumann Ratio Statistic = 0.25713
Durbin-H Statistic = NA

Model of Decentralization (1969-89) of Consumer Oriented Services

(continued)

=== Heteroskedasticity Test (White Test) ===

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 72
Number of Observations = 72
Mean of Dependent Variable = 0.0036975
Standard Error of Dependent Variable = 0.0067495

R-Square = 0.53598 R-Square Adjusted = 0.38990
Standard Error of the Estimate = 0.0052719
Log-Likelihood = 285.86

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.0017336	17	0.00010198	3.6691	0.00013504
Residual	0.0015008	54	2.7793E-05		
Total	0.0032344	71	4.5555E-05		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 54 DF	Prob >|t|
LPCPCON	-0.28816	0.10785	-2.6718	0.00995
INERLC	-0.029806	0.033000	-0.90320	0.37043
PCECON	0.00038851	0.0089257	0.043527	0.96544
LPCCINC	0.69781	0.54667	1.2765	0.20725
PCBLK	-0.0018716	0.0063444	-0.29501	0.76912
NOE	0.0022945	0.0025182	0.91118	0.36625
MDW	0.0027026	0.0024668	1.0956	0.27812
W	0.015357	0.0029619	5.1848	3.320E-06
LPCPCON^2	2.9209	2.7101	1.0778	0.28591
INERLC^2	- 0.046324	0.12235	-0.37863	0.70645
PCECON^2	-0.0074503	0.0048080	-1.5496	0.12709
LPCCINC^2	-13.978	11.712	-1.1935	0.23791
PCBLK^2	0.0014415	0.0011472	1.2565	0.21435
LPCPCON.*	-3.3791	0.78807	-4.2878	7.498E-05
INERLC.*	0.044833	0.032141	1.3949	0.16876
PCECON.*	0.50987	0.38422	1.3270	0.19008
LPCCINC.*	-0.081645	0.18991	-0.42992	0.66897
CONSTANT	-0.0099865	0.0078944	-1.2650	0.21130

Variance-Covariance Matrix of Coefficients

LPCPCON	0.01163				
INERLC	0.000117	0.00109			
PCECON	0.0002576	-0.0001194	7.967E-05		
LPCCINC	-0.02437	0.000363	-0.00313	0.2989	
PCBLK	-0.000254	4.89E-06	-1.075E-05	0.00074	4.025E-05
NOE	9.358E-05	6.486E-06	5.718E-07	7.874E-05	-3.024E-06
MDW	6.544E-05	-1.379E-05	-1.779E-07	0.0004	2.130E-07
W	-5.160E-05	1.179E-05	-5.951E-06	0.000376	-4.294E-07
LPCPCON^2	-0.0999	-0.00736	-0.00558	0.4776	-0.001403
INERLC^2	0.00055	0.00367	-0.0002716	7.882E-06	3.985E-05
PCECON^2	0.00014	1.660E-05	8.385E-06	-0.00079	4.251E-06
LPCCINC^2	0.6058	-0.0257	0.07459	-5.918	-0.00659
PCBLK^2	1.136E-05	-7.231E-06	9.588E-07	-3.723E-05	-1.118E-06

Model of Decentralization (1969-89) of Consumer Oriented Services

(continued)

LPCPCON.*	0.04024	0.00145	-5.869E-05	-0.0586	-0.000195
INERLC.*	-0.00088	-0.000868	9.899E-05	0.00145	1.981E-05
PCECON.*	-0.0204	0.00139	-0.00255	0.139	0.000284
LPCCINC.*	0.00563	0.000845	0.000194	-0.0213	-0.00101
CONSTANT	0.00023	4.642E-05	1.970E-05	-0.00372	-1.719E-05
	LPCPCON	INERLC	PCECON	LPCCINC	PCBLK
NOE	6.341E-06				
MDW	3.445E-06	6.085E-06			
W	1.098E-06	1.519E-06	8.773E-06		
LPCPCON^2	0.001526	0.00174	-0.0004775	7.344	
INERLC^2	4.494E-05	-3.050E-05	2.564E-05	-0.00716	0.01497
PCECON^2	-3.222E-06	-2.112E-06	2.583E-07	-0.01055	7.60E-07
LPCCINC^2	-0.0024	-0.00445	-0.007144	-14.675	-0.0640
PCBLK^2	1.073E-06	4.508E-07	2.283E-07	0.00039	-2.16E-05
LPCPCON.*	-0.000315	-0.000157	-3.995E-05	-0.8357	0.003816
INERLC.*	3.253E-06	1.707E-05	-1.089E-05	0.02708	-0.002775
PCECON.*	0.0001194	7.225E-05	0.0002029	0.6312	0.004444
LPCCINC.*	-3.486E-05	-9.34E-05	-2.891E-05	-0.00292	0.001929
CONSTANT	-3.741E-06	-1.091E-05	-4.955E-06	-0.00552	9.09E-05
	NOE	MDW	W	LPCPCON^	INERLC^2
PCECON^2	2.312E-05				
LPCCINC^	0.03003	137.18			
PCBLK^2	-4.536E-07	0.000846	1.316E-06		
LPCPCON.	0.00177	2.2894	-8.794E-05	0.62106	
INERLC.*	-4.83E-05	-0.02581	8.354E-06	-0.011278	0.0010
PCECON.*	-0.01378	-3.887	1.425E-05	-0.10864	0.000908
LPCCINC.	-6.961E-05	0.1477	-7.842E-05	0.013968	-0.00161
CONSTANT	8.003E-06	0.06193	4.519E-08	.00076483	-6.970E-05
	PCECON^2	LPCCINC^	PCBLK^2	LPCPCON.	INERLC.*
PCECON.*	0.1476				
LPCCINC.	-0.009339	0.03607			
CONSTANT	-0.00114	0.0005727	6.232E-05		
	PCECON.*	LPCCINC.	CONSTANT		

Correlation Matrix of Coefficients

LPCPCON	1.0000				
INERLC	0.032883	1.0000			
PCECON	0.26756	-0.40522	1.0000		
LPCCINC	-0.41342	0.020142	-0.64178	1.0000	
PCBLK	-0.37175	0.023351	-0.18989	0.21415	1.0000
NOE	0.34456	0.078044	0.025440	0.057199	-0.18928
MDW	0.24599	-0.16944	-0.0080814	0.29591	0.013608
W	-0.16153	0.12058	-0.22510	0.23212	-0.022849
LPCPCON^	-0.34184	-0.082333	-0.23082	0.32236	-0.081582
INERLC^2	0.041643	0.90991	-0.24869	0.000118	0.051339
PCECON^2	0.27169	0.10459	0.19540	-0.30176	0.13935
LPCCINC^	0.47961	-0.066479	0.71348	-0.92433	-0.088717
PCBLK^2	0.091788	-0.19099	0.093636	-0.059359	-0.15362
LPCPCON.	0.47341	0.055860	-0.0083431	-0.13600	-0.038966
INERLC.*	-0.25498	-0.81868	0.34507	0.082734	0.097167
PCECON.*	-0.49292	0.10980	-0.74474	0.66184	0.11657

Model of Decentralization (1969-89) of Consumer Oriented Services

(continued)

LPCCINC.	0.27490	0.13478	0.11469	-0.20482	-0.84183
CONSTANT	0.26977	0.17819	0.27957	-0.86298	-0.34318
	LPCPCON	INERLC	PCECON	LPCCINC	PCBLK
NOE	1.0000				
MDW	0.55454	1.0000			
W	0.14719	0.20796	1.0000		
LPCPCON^	0.22367	0.26044	-0.059482	1.0000	
INERLC^2	0.14585	-0.10105	0.070739	-0.021596	1.0000
PCECON^2	-0.26610	-0.17808	0.018137	-0.80956	0.001292
LPCCINC^	-0.081712	-0.15390	-0.20592	-0.46234	-0.044659
PCBLK^2	0.37145	0.15929	0.067178	0.12543	-0.15392
LPCPCON.	-0.15857	-0.080608	-0.017113	-0.39131	0.039578
INERLC.*	0.040196	0.21530	-0.11434	0.31093	-0.70568
PCECON.*	0.12339	0.076228	0.17828	0.60620	0.094526
LPCCINC.	-0.072888	-0.19946	-0.051403	-0.00567	0.08302
CONSTANT	-0.18816	-0.56001	-0.21192	-0.25794	0.094087
	NOE	MDW	W	LPCPCON^	INERLC^2
PCECON^2	1.0000				
LPCCINC^	0.53324	1.0000			
PCBLK^2	-0.082234	0.062958	1.0000		
LPCPCON.	0.46585	0.24804	-0.097264	1.0000	
INERLC.*	-0.31275	-0.068568	0.22657	-0.44526	1.0000
PCECON.*	-0.74569	-0.86384	0.032336	-0.35880	0.073487
LPCCINC.	-0.076236	0.066400	-0.35994	0.093330	-0.26357
CONSTANT	0.21085	0.66984	0.0049893	0.12294	-0.27468
	PCECON^2	LPCCINC^	PCBLK^2	LPCPCON.	INERLC.*
PCECON.*	1.0000				
LPCCINC.	-0.12798	1.0000			
CONSTANT	-0.37596	0.38202	1.0000		
	PCECON.*	LPCCINC.	CONSTANT		

R-Square Between Observed and Predicted = 0.53598
Sum of Absolute Residuals = 0.23682
Sum of Residuals = 9.91394E-16
Standard Error of Residuals = 0.0045977
Skewness of Residuals = 1.1006
Kurtosis of Residuals = 6.4799
First-Order Rho = -0.090400
Durbin-Watson Statistic = 2.1471
Standardized Von-Neumann Ratio Statistic = 0.63269
Durbin-H Statistic = NA

=== Weighted L-SQ Model ===

Weighted Least Squares Estimation

Dependent Variable = DEP
Estimation Range = 1 72
Number of Observations = 72
Mean of Dependent Variable = 0.0057792
Standard Error of Dependent Variable = 0.26856

Model of Decentralization (1969-89) of Consumer Oriented Services
(continued)

WARNING: No Constant Term. @ Since the whole model was weighted, there is no constant term; the original constant became 1/weight. @

R-Square, AOV may not be reliable! @ In the Weighted Least Squares, the R-Square Between Observed and Predicted is interpreted instead of the adjusted R-Square. @

R-Square = 0.71233 R-Square Adjusted = 0.67124
Standard Error of the Estimate = 0.15291
Log-Likelihood = 37.851

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	3.6478	9	0.40531	17.334	5.5092E-14
Residual	1.4731	63	0.023383		
Total	5.1209	72	0.071124		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 63 DF	Prob >|t|
LPCPCON	-2.3160	1.3465	-1.7200	0.090333
INERLC	1.0667	0.19534	5.4604	8.5717E-07
PCECON	0.026773	0.026045	1.0280	0.30789
LPCCINC	-2.1156	1.6046	-1.3185	0.19211
PCBLK	-0.045447	0.023778	-1.9113	0.060520
NOE	0.030215	0.042296	0.71437	0.47763
MDW	-0.015689	0.031720	-0.49462	0.62259
W	0.018295	0.24733	0.073970	0.94127
WEIGHT	0.080530	0.046151	1.7449	0.085874

Variance-Covariance Matrix of Coefficients

	LPCPCON	INERLC	PCECON	LPCCINC	PCBLK
LPCPCON	1.813				
INERLC	0.1157	0.0382			
PCECON	-0.02204	-0.00104	0.000678		
LPCCINC	-0.5878	-0.110	-0.00939	2.5746	
PCBLK	-0.02165	0.000269	0.000231	0.00665	0.000565
NOE	0.03658	0.0039	-0.000352	-0.011245	-0.00043
MDW	0.02367	0.00086	-0.000324	0.025186	-0.00035
W	-0.00266	0.00027	-9.358E-06	0.016280	-4.882E-05
WEIGHT	0.00323	0.00043	0.000135	-0.064698	-0.0001755

	NOE	MDW	W	WEIGHT
NOE	0.00179			
MDW	0.000639	0.001006		
W	0.000112	0.0003147	0.06117	
WEIGHT	-0.000159	-0.001054	-0.000534	0.00213

Correlation Matrix of Coefficients

	LPCPCON	INERLC	PCECON	LPCCINC	PCBLK
LPCPCON	1.0000				
INERLC	0.43996	1.0000			
PCECON	-0.62848	-0.20484	1.0000		
LPCCINC	-0.27205	-0.35165	-0.22347	1.0000	
PCBLK	-0.67618	0.057942	0.37370	0.17424	1.0000
NOE	0.64226	0.47193	-0.31919	-0.16570	-0.42853

Model of Decentralization (1969-89) of Consumer Oriented Services
(continued)

MDW	0.55408	0.13888	-0.39261	0.49485	-0.46479
W	-0.0079914	0.0056428	-0.001453	0.041022	-0.0083010
WEIGHT	0.051902	0.047813	0.11206	-0.87370	-0.15992
	LPCPCON	INERLC	PCECON	LPCCINC	PCBLK

NOE	1.0000			
MDW	0.47627	1.0000		
W	0.010692	0.040115	1.0000	
WEIGHT	-0.081600	-0.71969	-0.046794	1.0000
	NOE	MDW	W	WEIGHT

R-Square Between Observed and Predicted = 0.71233
Sum of Absolute Residuals = 6.9522
Sum of Residuals = -5.35683E-15
Standard Error of Residuals = 0.14404
Skewness of Residuals = -0.70247
Kurtosis of Residuals = 5.5279
First-Order Rho = -0.096524
Durbin-Watson Statistic = 2.1880
Standardized Von-Neumann Ratio Statistic = 0.80869
Durbin-H Statistic = NA

=== Heteroskedasticity Re-Test (Breusch-Pagan Test) ===
s2
0.020460

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 72
Number of Observations = 72
Mean of Dependent Variable = 0.097828
Standard Error of Dependent Variable = 0.35689

WARNING: No Constant Term.
R-Square, AOV may not be reliable!

R-Square = 0.72791 R-Square Adjusted = 0.68904
Standard Error of the Estimate = 0.19763
Log-Likelihood = 19.382

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	6.5828	9	0.73142	18.727	1.0254E-14
Residual	2.4606	63	0.039057		
Total	9.0434	72	0.12560		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 63 DF	Prob >|t|
LPCPCON	0.78380	1.7402	0.45041	0.65396
INERLC	0.72021	0.25247	2.8527	0.0058569
PCECON	-0.0020170	0.033660	-0.059923	0.95241
LPCCINC	3.3888	2.0738	1.6341	0.10722

Model of Decentralization (1969-89) of Consumer Oriented Services

(continued)

PCBLK	-0.086007	0.030731	-2.7987	0.0068013	
NOE	0.029059	0.054664	0.53158	0.59689	
MDW	0.067182	0.040995	1.6388	0.10624	
W	0.034955	0.31965	0.10936	0.91327	
WEIGHT	-0.044989	0.059646	-0.75426	0.45350	

Variance-Covariance Matrix of Coefficients

LPCPCON	3.0283				
INERLC	0.19329	0.06374			
PCECON	-0.036814	-0.00174	0.00113		
LPCCINC	-0.98177	-0.184	-0.0156	4.3004	
PCBLK	-0.036162	0.00045	0.00039	0.0111	0.0009
NOE	0.061097	0.00651	-0.000587	-0.01878	-0.00072
MDW	0.039528	0.001437	-0.00054	0.04207	-0.000586
W	-0.00445	0.000455	-1.563E-05	0.02719	-8.15E-05
WEIGHT	0.00539	0.000720	0.000225	-0.1081	-0.00029
	LPCPCON	INERLC	PCECON	LPCCINC	PCBLK

NOE	0.00299			
MDW	0.001067	0.00168		
W	0.000187	0.0005257	0.10217	
WEIGHT	-0.000266	-0.00176	-0.00089	0.003558
	NOE	MDW	W	WEIGHT

Correlation Matrix of Coefficients

LPCPCON	1.0000				
INERLC	0.43996	1.0000			
PCECON	-0.62848	-0.20484	1.0000		
LPCCINC	-0.27205	-0.35165	-0.22347	1.0000	
PCBLK	-0.67618	0.057942	0.37370	0.17434	1.0000
NOE	0.64226	0.47193	-0.31919	-0.16570	-0.42853
MDW	0.55408	0.13888	-0.39261	0.49485	-0.46479
W	-0.00799	0.00564	-0.00145	0.0410	0.00830
WEIGHT	0.051902	0.047813	0.11206	-0.87370	-0.15992
	LPCPCON	INERLC	PCECON	LPCCINC	PCBLK

NOE	1.0000			
MDW	0.47627	1.0000		
W	0.010692	0.040115	1.0000	
WEIGHT	-0.081600	-0.71969	-0.04679	1.0000
	NOE	MDW	W	WEIGHT

R-Square Between Observed and Predicted = 0.72791
Sum of Absolute Residuals = 8.3541
Sum of Residuals = -4.12864E-15
Standard Error of Residuals = 0.18616
Skewness of Residuals = 2.2234
Kurtosis of Residuals = 11.160
First-Order Rho = 0.19967
Durbin-Watson Statistic = 1.5984
Standardized Von-Neumann Ratio Statistic = -1.7279
Durbin-H Statistic = NA

Model of Decentralization (1969-89) of Consumer Oriented Services
(continued)

=== Heteroskedasticity Re-Test (White Test) ===
Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 72
Number of Observations = 72
Mean of Dependent Variable = 0.097828
Standard Error of Dependent Variable = 0.35689

WARNING: No Constant Term.
R-Square, AOV may not be reliable!

R-Square = 0.80252 R-Square Adjusted = 0.73669
Standard Error of the Estimate = 0.18186
Log-Likelihood = 30.920

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	7.2575	18	0.40319	12.191	4.1470E-13
Residual	1.7859	54	0.033072		
Total	9.0434	72	0.12560		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 54 DF	Prob >|t|
LPCPCON	2.5086	3.3271	0.75398	0.45414
INERLC	0.28786	0.41625	0.69156	0.49218
PCECON	0.017511	0.14740	0.11880	0.90588
LPCCINC	-5.7545	12.227	-0.47062	0.63980
PCBLK	-0.10428	0.083285	-1.2521	0.21593
NOE	0.11695	0.058873	1.9864	0.052072
MDW	0.088982	0.043319	2.0541	0.044819
W	0.010468	0.29545	0.035432	0.97187
LPCPCON^	64.707	74.920	0.86368	0.39159
INERLC^2	2.5522	2.4644	1.0356	0.30499
PCECON^2	-0.077905	0.097402	-0.79982	0.42732
LPCCINC^	94.584	263.73	0.35864	0.72126
PCBLK^2	0.10611	0.033161	3.1999	0.0023027
LPCPCON.	34.617	23.305	1.4854	0.14325
INERLC.*	-0.19124	0.69953	-0.27338	0.78560
PCECON.*	4.5593	8.3649	0.54505	0.58796
LPCCINC.	-7.9793	2.9779	-2.6795	0.0097535
WEIGHT	0.061293	0.16209	0.37815	0.70680

Variance-Covariance Matrix of Coefficients

LPCPCON	11.070				
INERLC	0.40444	0.17326			
PCECON	0.097018	-0.012307	0.02173		
LPCCINC	-21.857	-0.12835	-1.365	149.51	
PCBLK	-0.19120	-0.0088806	-0.001324	0.51099	0.00694
NOE	0.099294	0.0046231	-0.0007564	-0.047053	-0.00123
MDW	0.013233	-0.00093190	-0.001681	0.21864	0.00016
W	-0.036015	0.0033674	-0.001973	0.17242	0.00040
LPCPCON^	-189.33	-10.383	-3.2348	477.19	3.5228
INERLC^2	-0.10188	0.41492	-0.04157	1.4913	-0.0018

Model of Decentralization (1969-89) of Consumer Oriented Services

(continued)

PCECON^2	0.15194	-0.00060691	0.007297	-0.61369	-0.00284
LPCCINC^	381.85	-15.557	33.51	-3024.8	-7.5458
PCBLK^2	0.035767	-0.0016397	-0.00061	-0.027009	-0.00103
LPCPCON.	-7.3405	0.20583	1.0749	-72.466	-0.5947
INERLC.*	-0.30853	-0.18365	-0.009544	1.8840	0.0242
PCECON.*	-10.685	0.59991	-1.034	72.199	0.1779
LPCCINC.	2.0612	0.44568	0.07696	-12.086	-0.1304
WEIGHT	0.30543	0.0086376	0.01273	-1.8418	-0.00891
	LPCPCON	INERLC	PCECON	LPCCINC	PCBLK

NOE	0.00347				
MDW	0.00118	0.001877			
W	4.640E-05	0.0005737	0.087289		
LPCPCON^	-0.283	0.8040	0.35237	5613.0	
INERLC^2	-0.0020	0.003513	-0.010215	5.9852	6.0732
PCECON^2	-0.00068	-0.001181	-0.000806	-5.6168	-0.066703
LPCCINC^	-0.40449	-3.922	-3.5919	-9785.4	-134.07
PCBLK^2	0.000863	0.000199	-9.833E-05	0.05389	-0.016262
LPCPCON.	-0.02048	0.02433	0.13135	138.67	11.380
INERLC.*	-0.000138	0.003157	-0.0078433	14.053	-0.71415
PCECON.*	0.0536	0.09935	0.11865	352.71	5.7371
LPCCINC.	-0.0512	-0.0369	-0.0163	-103.66	1.6710
WEIGHT	0.000326	-0.003947	-0.00220	-6.9902	-0.011696
	NOE	MDW	W	LPCPCON^	INERLC^2

PCECON^2	0.00949				
LPCCINC^	16.980	69553			
PCBLK^2	-0.000528	-0.36717	0.0011		
LPCPCON.	0.1541	1266.3	0.10489	543.12	
INERLC.*	-0.00185	-12.246	-0.00126	-10.451	0.48934
PCECON.*	-0.7089	-1930.2	0.05085	-31.564	-0.19277
LPCCINC.	0.1223	226.04	-0.05056	9.1294	-0.61848
WEIGHT	0.007574	33.742	0.000824	0.93189	-0.035264
	PCECON^2	LPCCINC^	PCBLK^2	LPCPCON.	INERLC.*

PCECON.*	69.972				
LPCCINC.	-8.8740	8.8681			
WEIGHT	-0.74594	0.19952	0.026273		
	PCECON.*	LPCCINC.	WEIGHT		

Correlation Matrix of Coefficients

LPCPCON	1.0000				
INERLC	0.29203	1.0000			
PCECON	0.19783	-0.20059	1.0000		
LPCCINC	-0.53725	-0.025218	-0.75734	1.0000	
PCBLK	-0.68999	-0.25616	-0.10785	0.50178	1.0000
NOE	0.50692	0.18865	-0.087163	-0.065363	-0.25170
MDW	0.091813	-0.051682	-0.26324	0.41278	0.044570
W	-0.036639	0.027382	-0.045308	0.047727	0.016331
LPCPCON^	-0.75956	-0.33294	-0.29292	0.52090	0.56458
INERLC^2	-0.01243	0.40448	-0.11443	0.049490	-0.00888
PCECON^2	0.46885	-0.014969	0.50826	-0.51528	-0.35048
LPCCINC^	0.43518	-0.14171	0.86212	-0.93800	-0.34354

Model of Decentralization (1969-89) of Consumer Oriented Services

(continued)

PCBLK^2	0.32418	-0.11879	-0.12479	-0.066611	-0.37164
LPCPCON.	-0.094669	0.021219	0.31292	-0.25430	-0.30640
INERLC.*	-0.13256	-0.63070	-0.092565	0.22027	0.41530
PCECON.*	-0.38392	0.17229	-0.83881	0.70588	0.25534
LPCCINC.	0.20804	0.35955	0.17533	-0.33193	-0.52568
WEIGHT	0.56636	0.12802	0.53290	-0.92928	-0.66011
	LPCPCON	INERLC	PCECON	LPCCINC	PCBLK

NOE	1.0000				
MDW	0.46276	1.0000			
W	0.0026678	0.044824	1.0000		
LPCPCON	-0.064157	0.24774	0.015919	1.0000	
INERLC^2	-0.01387	0.032907	-0.014030	0.032417	1.0000
PCECON^2	-0.1179	-0.27998	-0.028010	-0.76970	-0.27788
LPCCINC^	-0.02605	-0.34331	-0.046098	-0.49525	-0.20628
PCBLK^2	0.4419	0.13865	-0.010037	0.021691	-0.19899
LPCPCON.	-0.01493	0.024096	0.019077	0.079420	0.19814
INERLC.*	-0.003343	0.10419	-0.037950	0.26814	-0.41426
PCECON.*	0.10884	0.27416	0.048011	0.56280	0.27831
LPCCINC.	-0.29210	-0.28638	-0.018544	-0.46460	0.22769
WEIGHT	0.034203	-0.56207	-0.046011	-0.57562	-0.02928
	NOE	MDW	W	LPCPCON^	INERLC^2

PCECON^2	1.0000				
LPCCINC^	0.66101	1.0000			
PCBLK^2	-0.16348	-0.041984	1.0000		
LPCPCON.	0.067868	0.20602	0.13572	1.0000	
INERLC.*	-0.027139	-0.066380	-0.054468	-0.64105	1.0000
PCECON.*	-0.87000	-0.87497	0.18331	-0.16191	-0.032943
LPCCINC.	0.42159	0.28781	-0.51202	0.13155	-0.29690
WEIGHT	0.47971	0.78932	0.15326	0.24669	-0.31100
	PCECON^2	LPCCINC^	PCBLK^2	LPCPCON.	INERLC.*

PCECON.*	1.0000		
LPCCINC.	-0.35624	1.0000	
WEIGHT	-0.55016	0.41334	1.0000
	PCECON.*	LPCCINC.	WEIGHT

R-Square Between Observed and Predicted = 0.80252
Sum of Absolute Residuals = 7.0707
Sum of Residuals = -5.76480E-12
Standard Error of Residuals = 0.15860
Skewness of Residuals = 1.8709
Kurtosis of Residuals = 11.041
First-Order Rho = 0.20047
Durbin-Watson Statistic = 1.5983
Standardized Von-Neumann Ratio Statistic = -1.7285
Durbin-H Statistic = NA

Model I of Decentralization (1969-89) of Business Oriented Services

* Location Coefficient

mean:

lcb64	lcb69	lcb79	lcb89	pcblc
1.11247	1.12755	1.10503	1.10130	-0.00458699

standard deviation:

0.202637	0.205427	0.160992	0.144381	0.150598

LSQ/GAUSS Version 3.1: Applied Data Associates. (1994/04/10/02:36:38)

Ordinary Least Squares Estimation

Dependent Variable = DEP
Estimation Range = 1 50
Number of Observations = 50
Mean of Dependent Variable = -0.0045870
Standard Error of Dependent Variable = 0.15060

R-Square = 0.65548 R-Square Adjusted = 0.56714
Standard Error of the Estimate = 0.099082
Log-Likelihood = 50.855

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.72844	10	0.072844	7.4200	1.8824E-06
Residual	0.38287	39	0.0098173		
Total	1.1113	49	0.022680		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 39 DF	Prob >|t|
PCEB	0.047316	0.011495	4.1163	0.00019309
INERTIA	0.67191	0.14501	4.6335	3.9515E-05
PCLCM	-0.070598	0.15206	-0.46427	0.64504
LMPOPC	-1.5044	1.4289	-1.0528	0.29890
PCINC	-0.31350	0.17488	-1.7927	0.080784
CORPSLS	4.0953E-07	6.5744E-07	0.62291	0.53697
METBLKC	0.032146	0.030037	1.0702	0.29110
NOE	-0.045922	0.052903	-0.86804	0.39068
MDW	-0.022855	0.050185	-0.45542	0.65133
W	0.19819	0.069319	2.8591	0.0067877
CONSTANT	-0.0097028	0.070377	-0.13787	0.89105

Variance-Covariance Matrix of Coefficients

	PCEB	INERTIA	PCLCM	LMPOPC	PCINC
PCEB	0.00013				
INERTIA	-0.00013	0.02103			
PCLCM	-8.444E-05	0.009130	0.02312		
LMPOPC	-0.0032	0.01617	-0.01924	2.042	
PCINC	-0.000777	-0.007667	-0.003597	0.01283	0.03058
CORPSLS	5.892E-10	-1.688E-08	-1.705E-09	-1.615E-08	2.581E-08
METBLKC	-1.30E-05	-0.000159	-0.0003389	-0.01358	-0.001291
NOE	6.638E-05	-0.002619	-0.001810	0.04115	0.001238
MDW	-1.840E-05	-0.002016	-0.001013	0.03431	0.004177
W	0.00013	-0.003265	-8.741E-06	-0.002360	0.002673
CONSTANT	-2.087E-05	0.004224	0.002523	-0.02999	-0.009587

	CORPSLS	METBLKC	NOE
CORPSLS	4.322E-13		
METBLKC	8.718E-10	0.000902	
NOE	-2.745E-09	-0.000463	0.002799

Model I of Decentralization (1969-89) of Business Oriented Services

(continued)

MDW	2.1525E-09	-0.000612	0.001764	0.002519	
W	4.8256E-09	-0.00028	0.001173	0.001289	0.004805
CONSTANT	-1.3145E-08	0.00043	-0.002011	-0.002665	-0.002008
	CORPSLS	METBLKC	NOE	MDW	W
CONSTANT	0.0049529				
	CONSTANT				

Correlation Matrix of Coefficients

PCEB	1.0000				
INERTIA	-0.079475	1.0000			
PCLCM	-0.048308	0.41402	1.0000		
LMPOPC	-0.19594	0.078030	-0.088538	1.0000	
PCINC	-0.38634	-0.30234	-0.13527	0.051333	1.0000
CORPSLS	0.077959	-0.17707	-0.017056	-0.017187	0.22452
METBLKC	-0.037688	-0.036495	-0.074207	-0.31639	-0.24586
NOE	0.10916	-0.34141	-0.22500	0.54430	0.13384
MDW	-0.031903	-0.27700	-0.13270	0.47849	0.47596
W	0.16690	-0.32482	-0.000829	-0.023822	0.22050
CONSTANT	-0.025794	0.41391	0.23577	-0.29823	-0.77893
	PCEB	INERTIA	PCLCM	LMPOPC	PCINC
CORPSLS	1.0000				
METBLKC	0.044146	1.0000			
NOE	-0.078936	-0.29138	1.0000		
MDW	0.065240	-0.40571	0.66432	1.0000	
W	0.10589	-0.13490	0.31977	0.37049	1.0000
CONSTANT	-0.28409	0.20199	-0.54016	-0.75444	-0.41165
	CORPSLS	METBLKC	NOE	MDW	W
CONSTANT	1.0000				
	CONSTANT				

R-Square Between Observed and Predicted = 0.65548
Sum of Absolute Residuals = 3.2517
Sum of Residuals = -2.08167E-17
Standard Error of Residuals = 0.088395
Skewness of Residuals = 0.58851
Kurtosis of Residuals = 5.8575
First-Order Rho = 0.064507
Durbin-Watson Statistic = 1.8592
Standardized Von-Neumann Ratio Statistic = -0.50813
Durbin-H Statistic = NA

=== Heteroskedasticity Test (Koenkar-Basset Test) ===
ko
0.00029899

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 50

Model I of Decentralization (1969-89) of Business Oriented Services
(continued)

Number of Observations = 50
Mean of Dependent Variable = 0.0076575
Standard Error of Dependent Variable = 0.017467

R-Square = 0.60688 R-Square Adjusted = 0.50608
Standard Error of the Estimate = 0.012276
Log-Likelihood = 155.27

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.0090726	10	0.00090726	6.0205	1.8590E-05
Residual	0.0058771	39	0.00015069		
Total	0.014950	49	0.00030510		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 39 DF	Prob >|t|
PCEB	0.0012376	0.0014241	0.86904	0.39014
INERTIA	-0.018733	0.017966	-1.0427	0.30352
PCLCM	-0.030974	0.018840	-1.6441	0.10820
LMPOPC	0.17449	0.17704	0.98563	0.33039
PCINC	0.0053005	0.021666	0.24464	0.80802
CORPSLS	7.4276E-09	8.1454E-08	0.091188	0.92781
METBLKC	0.0011195	0.0037214	0.30083	0.76514
NOE	0.0049840	0.0065544	0.76041	0.45158
MDW	0.0012609	0.0062177	0.20279	0.84035
W	0.054309	0.0085883	6.3237	1.840E-07
CONSTANT	-0.0037456	0.0087193	-0.42957	0.66987

Variance-Covariance Matrix of Coefficients

	PCEB	INERTIA	PCLCM	LMPOPC	PCINC
PCEB	2.028E-06				
INERTIA	-2.033E-06	0.00032			
PCLCM	-1.296E-06	0.00014	0.000355		
LMPOPC	-4.940E-05	0.000248	-0.000295	0.03134	
PCINC	-1.192E-05	-0.000118	-5.522E-05	0.000197	0.000469
CORPSLS	9.043E-12	-2.591E-10	-2.617E-11	-2.478E-10	3.962E-10
METBLKC	-1.997E-07	-2.440E-06	-5.203E-06	-0.000208	-1.982E-05
NOE	1.019E-06	-4.020E-05	-2.778E-05	0.00063	1.901E-05
MDW	-2.825E-07	-3.094E-05	-1.555E-05	0.000527	6.412E-05
W	2.041E-06	-5.012E-05	-1.342E-07	-3.622E-05	4.103E-05
CONSTANT	-3.203E-07	6.484E-05	3.873E-05	-0.0004604	-0.000147

	CORPSLS	METBLKC	NOE	MDW	W
CORPSLS	6.635E-15				
METBLKC	1.338E-11	1.385E-05			
NOE	-4.214E-11	-7.107E-06	4.296E-05		
MDW	3.304E-11	-9.388E-06	2.707E-05	3.866E-05	
W	7.407E-11	-4.311E-06	1.800E-05	1.978E-05	7.376E-05
CONSTANT	-2.018E-10	6.554E-06	-3.087E-05	-4.090E-05	-3.083E-05

	CONSTANT
CONSTANT	7.603E-05

Correlation Matrix of Coefficients

Model I of Decentralization (1969-89) of Business Oriented Services

(continued)

PCEB	1.0000				
INERTIA	-0.079475	1.0000			
PCLCM	-0.048308	0.41402	1.0000		
LMPOPC	-0.19594	0.078030	-0.088538	1.0000	
PCINC	-0.38634	-0.30234	-0.13527	0.051333	1.0000
CORPSLS	0.077959	-0.17707	-0.017056	-0.017187	0.22452
METBLKC	-0.037688	-0.036495	-0.074207	-0.31639	-0.24586
NOE	0.10916	-0.34141	-0.22500	0.54430	0.13384
MDW	-0.031903	-0.27700	-0.13270	0.47849	0.47596
W	0.16690	-0.32482	-0.0008292	-0.023822	0.22050
CONSTANT	-0.02579	0.41391	0.23577	-0.29823	-0.77893
	PCEB	INERTIA	PCLCM	LMPOPC	PCINC

CORPSLS	1.0000				
METBLKC	0.044146	1.0000			
NOE	-0.078936	-0.29138	1.0000		
MDW	0.065240	-0.40571	0.66432	1.0000	
W	0.10589	-0.13490	0.31977	0.37049	1.0000
CONSTANT	-0.28409	0.20199	-0.54016	-0.75444	-0.41165
	CORPSLS	METBLKC	NOE	MDW	W

CONSTANT	1.0000
	CONSTANT

R-Square Between Observed and Predicted = 0.60688
Sum of Absolute Residuals = 0.30916
Sum of Residuals = -1.42421E-15
Standard Error of Residuals = 0.010952
Skewness of Residuals = 1.2544
Kurtosis of Residuals = 12.784
First-Order Rho = 0.27369
Durbin-Watson Statistic = 1.4512
Standardized Von-Neumann Ratio Statistic = -1.9800
Durbin-H Statistic = NA

=== Weighted L-SQ Model ===

Weighted Least Squares Estimation

Dependent Variable = DEP
Estimation Range = 1 50
Number of Observations = 50
Mean of Dependent Variable = -0.041675
Standard Error of Dependent Variable = 0.47237

WARNING: No Constant Term. @ Since the whole model was weighted, there is no constant term; the original constant became 1/weight. @

R-Square, AOV may not be reliable! @ In the Weighted Least Squares, the R-Square Between Observed and Predicted is interpreted instead of the adjusted R-Square. @

Model I of Decentralization (1969-89) of Business Oriented Services
(continued)

R-Square = 0.75918 R-Square Adjusted = 0.69125
Standard Error of the Estimate = 0.25983
Log-Likelihood = 2.6504

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	8.3003	11	0.75457	11.177	5.9761E-09
Residual	2.6330	39	0.067513		
Total	10.933	50	0.21867		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 39 DF	Prob >|t|
PCEB	0.0058420	0.015778	0.37026	0.71319
INERTIA	0.097143	0.12693	0.76533	0.44868
PCLCM	-0.37157	0.21341	-1.7411	0.089543
LMPOPC	0.59040	1.1348	0.52028	0.60581
PCINC	0.078779	0.24719	0.31870	0.75166
CORPSLS	1.1817E-07	4.9129E-07	0.24053	0.81118
METBLKC	-0.050947	0.054264	-0.93888	0.35357
NOE	0.051544	0.046947	1.0979	0.27897
MDW	0.047224	0.022774	2.0736	0.044771
W	0.20300	1.1316	0.17940	0.85856
WEIGHT	-0.058387	0.055041	-1.0608	0.29531

Variance-Covariance Matrix of Coefficients

	PCEB	INERTIA	PCLCM	LMPOPC	PCINC
PCEB	0.00025				
INERTIA	-0.0005	0.01611			
PCLCM	-0.00027	0.01843	0.04554		
LMPOPC	0.0049	-0.08615	-0.1345	1.2877	
PCINC	-0.00294	-0.006383	-0.008881	0.02238	0.06110
CORPSLS	-2.320E-10	-9.933E-10	1.621E-08	-5.648E-08	1.893E-08
METBLKC	-4.951E-05	0.001652	0.001454	-0.02279	-0.0002781
NOE	0.00032	-0.003532	-0.005136	0.04374	-0.001697
MDW	-6.863E-05	-0.001315	-0.001422	0.01083	0.003163
W	7.070E-05	0.0005802	0.003577	-0.01183	-0.001685
WEIGHT	0.0004222	0.002382	0.002181	-0.01319	-0.01256

	CORPSLS	METBLKC	NOE	MDW	W
CORPSLS	2.414E-13				
METBLKC	7.204E-09	0.002945			
NOE	-6.054E-09	-0.001655	0.0022		
MDW	-2.103E-09	-0.0003651	0.000376	0.000519	
W	-5.901E-10	-0.0005979	-5.688E-05	-4.291E-05	1.2805
WEIGHT	-6.833E-09	-0.0003488	0.0001765	-0.0007676	0.0004209

	WEIGHT
WEIGHT	0.0030295

Correlation Matrix of Coefficients

	PCEB	INERTIA	PCLCM	LMPOPC
PCEB	1.0000			
INERTIA	-0.24699	1.0000		
PCLCM	-0.079391	0.68044	1.0000	
LMPOPC	0.27499	-0.59813	-0.55541	1.0000

Model I of Decentralization (1969-89) of Business Oriented Services

(continued)

PCINC	-0.75346	-0.20345	-0.16835	0.079776	1.0000
CORPSLS	-0.029933	-0.015928	0.15457	-0.10130	0.15588
METBLKC	-0.057828	0.23982	0.12555	-0.37007	-0.020729
NOE	0.42908	-0.59270	-0.51263	0.82094	-0.14621
MDW	-0.19098	-0.45474	-0.29263	0.41893	0.56180
W	0.0039595	0.0040397	0.014810	-0.0092093	-0.0060230
WEIGHT	0.48612	0.34099	0.18571	-0.21114	-0.92313
	PCEB	INERTIA	PCLCM	LMPOPC	PCINC

CORPSLS	1.0000				
METBLKC	0.27021	1.0000			
NOE	-0.26249	-0.64960	1.0000		
MDW	-0.18793	-0.29544	0.35172	1.0000	
W	-0.0010614	-0.0097370	-0.0010706	-0.001665	1.0000
WEIGHT	-0.25270	-0.11678	0.068314	-0.61233	0.0067584
	CORPSLS	METBLKC	NOE	MDW	W

WEIGHT	1.0000
	WEIGHT

R-Square Between Observed and Predicted = 0.75918
Sum of Absolute Residuals = 7.9462
Sum of Residuals = -7.71744E-14
Standard Error of Residuals = 0.23181
Skewness of Residuals = 0.80972
Kurtosis of Residuals = 4.1677
First-Order Rho = -0.064330
Durbin-Watson Statistic = 2.1133
Standardized Von-Neumann Ratio Statistic = 0.40873
Durbin-H Statistic = NA

=== Heteroskedasticity Re-Test (Koenkar-Basset Test) ===
ko
0.0092610

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 50
Number of Observations = 50
Mean of Dependent Variable = 0.11107
Standard Error of Dependent Variable = 1.2957

WARNING: No Constant Term.
R-Square, AOV may not be reliable!

R-Square = 0.85503 R-Square Adjusted = 0.81414
Standard Error of the Estimate = 0.55299
Log-Likelihood = -35.115

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	70.338	11	6.3944	20.910	4.9699E-13

Model I of Decentralization (1969-89) of Business Oriented Services

(continued)

Residual	11.926	39	0.30580	
Total	82.264	50	1.6453	

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 39 DF	Prob >|t|
PCEB	-0.11294	0.033580	-3.3633	0.0017371
INERTIA	-0.81474	0.27014	-3.0160	0.0044913
PCLCM	-0.54417	0.45419	-1.1981	0.23810
LMPOPC	5.2862	2.4151	2.1888	0.034663
PCINC	-0.38040	0.52608	-0.72308	0.47395
CORPSLS	1.2240E-07	1.0456E-06	0.11706	0.90741
METBLKC	0.034812	0.11549	0.30143	0.76469
NOE	0.044957	0.099915	0.44995	0.65524
MDW	-0.084362	0.048469	-1.7405	0.089654
W	-0.15790	2.4083	-0.065562	0.94806
WEIGHT	0.35052	0.11714	2.9923	0.0047830

Variance-Covariance Matrix of Coefficients

	PCEB	INERTIA	PCLCM	LMPOPC	PCINC
PCEB	0.001128				
INERTIA	-0.002241	0.07298			
PCLCM	-0.001211	0.08349	0.2063		
LMPOPC	0.0223	-0.3902	-0.6092	5.833	
PCINC	-0.0133	-0.02891	-0.04022	0.1014	0.2768
CORPSLS	-1.051E-09	-4.499E-09	7.341E-08	-2.558E-07	8.575E-08
METBLKC	-0.0002243	0.007482	0.006586	-0.1032	-0.001259
NOE	0.001440	-0.0160	-0.02326	0.1981	-0.007685
MDW	-0.0003108	-0.005954	-0.006442	0.04904	0.01433
W	0.0003202	0.002628	0.01620	-0.05357	-0.007631
WEIGHT	0.001912	0.01079	0.009881	-0.05973	-0.05689

	CORPSLS	METBLKC	NOE	MDW	W
CORPSLS	1.093E-12				
METBLKC	3.263E-08	0.01334			
NOE	-2.742E-08	-0.007496	0.009983		
MDW	-9.524E-09	-0.001654	0.001703	0.002349	
W	-2.673E-09	-0.002708	-0.0002576	-0.0001943	5.8001
WEIGHT	-3.095E-08	-0.00158	0.0007996	-0.003477	0.0019066

	WEIGHT
WEIGHT	0.013722

Correlation Matrix of Coefficients

	PCEB	INERTIA	PCLCM	LMPOPC	PCINC
PCEB	1.0000				
INERTIA	-0.24699	1.0000			
PCLCM	-0.079391	0.68044	1.0000		
LMPOPC	0.27499	-0.59813	-0.55541	1.0000	
PCINC	-0.75346	-0.20345	-0.16835	0.079776	1.0000
CORPSLS	-0.02993	-0.015928	0.15457	-0.10130	0.15588
METBLKC	-0.05783	0.23982	0.12555	-0.37007	-0.020729
NOE	0.42908	-0.59270	-0.51263	0.82094	-0.14621
MDW	-0.19098	-0.45474	-0.29263	0.41893	0.56180
W	0.0039595	0.0040397	0.014810	-0.0092093	-0.0060230
WEIGHT	0.48612	0.34099	0.18571	-0.21114	-0.92313

	CORPSLS	METBLKC	NOE	MDW	W
CORPSLS	1.093E-12				
METBLKC	3.263E-08	0.01334			
NOE	-2.742E-08	-0.007496	0.009983		
MDW	-9.524E-09	-0.001654	0.001703	0.002349	
W	-2.673E-09	-0.002708	-0.0002576	-0.0001943	5.8001
WEIGHT	-3.095E-08	-0.00158	0.0007996	-0.003477	0.0019066

	WEIGHT
WEIGHT	0.013722

Model I of Decentralization (1969-89) of Business Oriented Services

(continued)

CORPSLS	1.0000				
METBLKC	0.27021	1.0000			
NOE	-0.26249	-0.64960	1.0000		
MDW	-0.18793	-0.29544	0.35172	1.0000	
W	-0.00106	-0.009737	-0.00107	-0.001665	1.0000
WEIGHT	-0.25270	-0.11678	0.068314	-0.61233	0.0067584
	CORPSLS	METBLKC	NOE	MDW	W

WEIGHT	1.0000
	WEIGHT

R-Square Between Observed and Predicted = 0.85503
Sum of Absolute Residuals = 14.746
Sum of Residuals = 1.99868E-13
Standard Error of Residuals = 0.49335
Skewness of Residuals = 1.4035
Kurtosis of Residuals = 8.5725
First-Order Rho = -0.11802
Durbin-Watson Statistic = 2.2332
Standardized Von-Neumann Ratio Statistic = 0.84116
Durbin-H Statistic = NA

Model II of Decentralization (1969-89) of Business Oriented Services

```
* Location Coefficient
mean:
lcb64      lcb69      lcb79      lcb89      pcblc
1.12302    1.13678    1.09963    1.09697   -0.0156185
standard deviation:
0.210743   0.221277   0.154727   0.136315   0.141080
LSQ/GAUSS Version 3.1: Applied Data Associates. (1994/04/10/00:47:52)

Ordinary Least Squares Estimation
---------------------------------
Dependent Variable = DEP
Estimation Range =  1          69
Number of Observations = 69
Mean of Dependent Variable = -0.015618
Standard Error of Dependent Variable = 0.14108

R-Square = 0.59381      R-Square Adjusted = 0.52378
Standard Error of the Estimate = 0.097358
Log-Likelihood = 68.810

Sum of Squares        SS          DF         MSS         F       Prob>F
Explained         0.80369          10    0.080369    8.4790   2.5125E-08
Residual          0.54976          58   0.0094786
Total              1.3534          68    0.019904

Variable       Estimated      Standard      t-Ratio          Prob
Name         Coefficient         Error        58 DF          >|t|
PCEB            0.038990      0.010429       3.7387    0.00042537
INERTIA          0.70292       0.12298       5.7157    3.9910E-07
PCLCM           0.016491       0.13636      0.12094       0.90416
LMPOPC            -1.5314        1.1061      -1.3846       0.17149
PCINC           -0.28908       0.13456      -2.1483      0.035875
METHQ           0.015852      0.029665      0.53435       0.59514
METBLKC         0.016136      0.026303      0.61348       0.54196
NOE            -0.039143      0.043386     -0.90222       0.37067
MDW            -0.015119      0.039317     -0.38455       0.70198
W               0.11072      0.053129       2.0839      0.041582
CONSTANT     -0.0031804      0.060899    -0.052224       0.95853

Variance-Covariance Matrix of Coefficients
PCEB        0.000109
INERTIA  -8.395E-05      0.0151
PCLCM    -8.733E-05   0.007686      0.01859
LMPOPC    -0.003886  -0.005069    -0.01355       1.2234
PCINC     -0.000634   -0.00310   -0.000305    -0.00063      0.0181
METHQ      1.705E-05  -0.000963   -0.000982     0.00862    0.000306
METBLKC   -1.570E-05   -0.00053   -0.000409    -0.00976   -0.000355
NOE        3.001E-05   -0.00216    -0.00169     0.02376    0.000126
MDW       -4.286E-05    -0.0011   -0.000938     0.02107     0.00207
W          3.679E-05  -0.001818  -9.671E-05    -0.00209     0.00204
CONSTANT   7.076E-07     0.0034     0.00238     -0.0188   -0.005376
                PCEB     INERTIA       PCLCM      LMPOPC       PCINC

METHQ       0.00088
METBLKC  -5.783E-05   0.000692
NOE       0.0001765  -0.000253      0.00188
```

Model II of Decentralization (1969-89) of Business Oriented Services

(continued)

MDW	0.000179	-0.00031	0.00101	0.001546	
W	0.000154	-0.00023	0.00063	0.000716	0.00282
CONSTANT	-0.00098	0.000118	-0.00121	-0.00159	-0.00131
	METHQ	METBLKC	NOE	MDW	W
CONSTANT	0.00371				
	CONSTANT				

Correlation Matrix of Coefficients

PCEB	1.0000				
INERTIA	-0.065457	1.0000			
PCLCM	-0.061408	0.45831	1.0000		
LMPOPC	-0.33685	-0.037265	-0.089867	1.0000	
PCINC	-0.45182	-0.18756	-0.016614	-0.00422	1.0000
METHQ	0.055109	-0.26396	-0.24275	0.26278	0.076664
METBLKC	-0.057248	-0.16433	-0.11406	-0.33544	-0.10034
NOE	0.066331	-0.40493	-0.28616	0.49503	0.021523
MDW	-0.10452	-0.22730	-0.17494	0.48444	0.39042
W	0.066400	-0.27821	-0.013349	-0.035522	0.28572
CONSTANT	0.001114	0.45448	0.28638	-0.27937	-0.65606
	PCEB	INERTIA	PCLCM	LMPOPC	PCINC
METHQ	1.0000				
METBLKC	-0.074109	1.0000			
NOE	0.13711	-0.22099	1.0000		
MDW	0.15367	-0.30131	0.58986	1.0000	
W	0.097493	-0.16471	0.27333	0.34268	1.0000
CONSTANT	-0.54267	0.073456	-0.45862	-0.66430	-0.40417
	METHQ	METBLKC	NOE	MDW	W
CONSTANT	1.0000				
	CONSTANT				

R-Square Between Observed and Predicted = 0.59381
Sum of Absolute Residuals = 4.3296
Sum of Residuals = 1.01308E-15
Standard Error of Residuals = 0.089915
Skewness of Residuals = 1.3948
Kurtosis of Residuals = 9.0405
First-Order Rho = 0.095773
Durbin-Watson Statistic = 1.7938
Standardized Von-Neumann Ratio Statistic = -0.86893
Durbin-H Statistic = NA

=== Heteroskedasticity Test (Koenkar-Basset Test) ===
ko
0.00052743

Least Squares Estimation

Dependent Variable = E2
Estimation Range = 1 69

Model II of Decentralization (1969-89) of Business Oriented Services

(continued)

Number of Observations = 69
Mean of Dependent Variable = 0.0079675
Standard Error of Dependent Variable = 0.023134

R-Square = 0.28990 R-Square Adjusted = 0.16746
Standard Error of the Estimate = 0.021108
Log-Likelihood = 174.29

Sum of Squares	SS	DF	MSS	F	Prob>F
Explained	0.010550	10	0.0010550	2.3678	0.019977
Residual	0.025842	58	0.00044556		
Total	0.036392	68	0.00053518		

Variable Name	Estimated Coefficient	Standard Error	t-Ratio 58 DF	Prob >|t|
PCEB	0.00099953	0.0022611	0.44205	0.66010
INERTIA	-0.035933	0.026663	-1.3476	0.18302
PCLCM	-0.040480	0.029564	-1.3692	0.17620
LMPOPC	0.10964	0.23981	0.45721	0.64923
PCINC	0.024194	0.029174	0.82932	0.41033
METHQ	0.0088385	0.0064318	1.3742	0.17467
METBLKC	-0.00053201	0.0057027	-0.093290	0.92599
NOE	0.0072580	0.0094065	0.77160	0.44349
MDW	0.0050076	0.0085243	0.58745	0.55918
W	0.047918	0.011519	4.1599	0.0001066
CONSTANT	-0.017259	0.013204	-1.3071	0.19633

Variance-Covariance Matrix of Coefficients

	PCEB	INERTIA	PCLCM	LMPOPC	PCINC
PCEB	5.113E-06				
INERTIA	-3.946E-06	0.00071			
PCLCM	-4.105E-06	0.000361	0.00087		
LMPOPC	-0.000183	-0.000238	-0.000637	0.0575	
PCINC	-2.981E-05	-0.000146	-1.433E-05	-2.953E-05	0.00085
METHQ	8.014E-07	-4.527E-05	-4.616E-05	0.000405	1.439E-05
METBLKC	-7.382E-07	-2.499E-05	-1.923E-05	-0.0004587	-1.669E-05
NOE	1.411E-06	-0.0001	-7.958E-05	0.001117	5.906E-06
MDW	-2.015E-06	-5.166E-05	-4.409E-05	0.00099	9.709E-05
W	1.729E-06	-8.545E-05	-4.546E-06	-9.813E-05	9.602E-05
CONSTANT	3.326E-08	0.00016	0.000112	-0.000885	-0.000253

	METHQ	METBLKC	NOE	MDW	W
METHQ	4.137E-05				
METBLKC	-2.718E-06	3.252E-05			
NOE	8.295E-06	-1.185E-05	8.848E-05		
MDW	8.425E-06	-1.465E-05	4.730E-05	7.266E-05	
W	7.223E-06	-1.082E-05	2.962E-05	3.365E-05	0.000133
CONSTANT	-4.609E-05	5.531E-06	-5.696E-05	-7.477E-05	-6.147E-05

	CONSTANT
CONSTANT	0.000174

Correlation Matrix of Coefficients

	PCEB
PCEB	1.0000

Model II of Decentralization (1969-89) of Business Oriented Services

(continued)

INERTIA	-0.065457	1.0000			
PCLCM	-0.061408	0.45831	1.0000		
LMPOPC	-0.33685	-0.037265	-0.089867	1.0000	
PCINC	-0.45182	-0.18756	-0.016614	-0.00422	1.0000
METHQ	0.055109	-0.26396	-0.24275	0.26278	0.076664
METBLKC	-0.057248	-0.16433	-0.11406	-0.33544	-0.10034
NOE	0.066331	-0.40493	-0.28616	0.49503	0.021523
MDW	-0.10452	-0.22730	-0.17494	0.48444	0.39042
W	0.066400	-0.27821	-0.013349	-0.035522	0.28572
CONSTANT	0.001114	0.45448	0.28638	-0.27937	-0.65606
	PCEB	INERTIA	PCLCM	LMPOPC	PCINC

METHQ	1.0000				
METBLKC	-0.074109	1.0000			
NOE	0.13711	-0.22099	1.0000		
MDW	0.15367	-0.30131	0.58986	1.0000	
W	0.097493	-0.16471	0.27333	0.34268	1.0000
CONSTANT	-0.54267	0.073456	-0.45862	-0.66430	-0.40417
	METHQ	METBLKC	NOE	MDW	W

CONSTANT	1.0000
	CONSTANT

R-Square Between Observed and Predicted = 0.28990
Sum of Absolute Residuals = 0.63011
Sum of Residuals = -9.45424E-17
Standard Error of Residuals = 0.019494
Skewness of Residuals = 4.4532
Kurtosis of Residuals = 33.642
First-Order Rho = 0.10627
Durbin-Watson Statistic = 1.7845
Standardized Von-Neumann Ratio Statistic = -0.90840
Durbin-H Statistic = NA