

# Centrality and Local Spending in Japan

SIMEON AGUSTIN ILAGO\*

*The study focuses on the role of cities as central places and its relationship with variations in the spending patterns of Japanese cities. Its main aim is to explain changes in spending levels using centrality—the position of the city as a central place in the urban hierarchy—as an alternative factor. A regression model using centrality and three other explanatory variables: income, dependency on the national government, and bureaucratic features is tested. Results show that centrality is a significant explanation of variance in local spending in total, and on specific services such as public works, health and social welfare. Another finding is the significant impact of national government disbursement in local spending variations. Although the findings are all exploratory, the study suggests that policymakers should try to recognize the unique pressures faced by cities that function as central places.*

## Introduction

Several approaches had been used in the past to identify factors which could help explain variations in the level and structure of public spending among local governments. One approach was to treat local expenditures as a form of policy output influenced by organizational, political and economic factors operating within and outside the local government system. Such output studies assumed that local expenditures reflect the policy commitments of government and provide indirect insights on aspects of policy such as the identification of policy priorities and the consequent allocation of resources.

At the same time, the study of local policies had proceeded largely from an intergovernmental framework dominated by the centralist tendencies of the national government. Within this framework, the budgetary behavior of local governments are expected to be incremental and stable over time. Local policy outputs are expected as well to be consistent with the policy priorities of the national government. Yet, even within this framework, there were studies on

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\*University Researcher, Local Government Center, College of Public Administration, University of the Philippines.

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local governments in Japan which brought into focus active, politicized local governments (Reed 1986; Steiner *et al.* 1980) that are willing to deviate from centrally-mandated guidelines in the implementation of such policies as medical care for the aged, housing, or pollution control. Such deviations took the form of either surpassing the intentions of the centrally-mandated program or undercutting it when such program runs counter to local priorities.

This study attempts to explain the pattern of spending of central city governments in Japan. The research gap which it tries to fill in is in explaining whether or not local spending levels can be related to the spatial role a city plays in the urban system. Every city performs multifarious functions, and this research focuses on the city's role as a center for distribution and processing of goods and services. This function grows in complexity and importance as the city assumes a greater role in the nationwide system of cities and urban centers. Put simply, the study asks if the position of cities as market service centers associate with variations in their spending patterns. It is a search for an alternative way of explaining local policy outputs apart from the economic, political and social factors that have had dominated the literature.

To achieve this end, the following objectives were set:

- (1) establish an indicator of centrality among cities in Japan which could be used for the analysis;
- (2) establish some indications of spending patterns among central cities;
- (3) determine if centrality is significantly associated with the level of spending of central cities; and
- (4) determine if centrality remains a significant factor even after other factors were introduced into the analysis.

### *Policy Significance*

What makes the study of spending patterns of Japanese local governments, particularly central cities, significant? Viewed as diverse units, it is tempting to think that their policy preferences, priorities and choices as reflected in their budgetary activities have marginal effects on the national economy. But the actions of local governments as well as their policy decisions have become crucial during recent periods. Their financial decisions and fiscal behavior combined have a powerful impact on the economy.

The volume of local government expenditure in Japan has grown large in recent years to become an important component of the total public finance. The share of local government expenditures in the national economy was higher than that of the national government, accounting for 12.0 percent of the gross national expenditures in 1985 and 12.1 percent in 1987 (Jichi Sogo Center 1988:9; CLAIR 1990:97). As one author has observed, such level of expenditures indicates "the extent to which public authorities are willing to extract societal resources ... to pursue governmental objectives" (Solano 1983:440). Recent moves to manage the growth of local expenditures further emphasize the need to understand the patterns of local spending and the factors that could help explain them.

It is important to understand whether or not a city's role as a center for the distribution of goods and services puts pressure on its administrative ability to provide public services, not only for its own population but also for those who make use of its facilities. This last argument is indirectly related to decentralization strategies which Japan's government might pursue as part of administrative reform. In pursuing a decentralization policy, prefectures and central cities are the more likely candidates for the turnover and delegation of powers from the national government to its sublevels. This stems from their stronger absorptive capacities as well as from their being more established as important settlement areas. As such, it is essential to understand the nature and pattern of their finance since any devolution of governmental authority, or the addition of administrative responsibilities, would increase the pressure on their financial and administrative positions.

This study is at the same time exploratory in nature. Its other contribution is in the area of concept-building. There is a growing literature on Japanese local government in various disciplines. What this study hopes to add is a little emphasis on a spatial aspect of local government spending decisions. The concept of centrality has been tried in another country's setting to explain expenditure decisions or variations in local policies. It seems worth trying in the case of Japanese cities as such attempts had been rarely done.

### *Methodology*

The choice of cities included in this study was based on the concentration of retail trade in the city as measured in the total amount of retail sales. This is indicative of difficulties in obtaining data broken down at the city level which could have led to a more comprehensive measure. Ideally, a composite measure would have been preferred. The same limitations also restricted the choice of the other explanatory variables included in the analysis.

The years under study were 1976, 1979, 1982, 1985 and 1988. These corresponded to the years when data on retail trade were available. Data on local expenditures and explanatory variables were taken from the statistical yearbook, *Nihon Toshi Nen Kan* (roughly translated as the *Municipal Yearbook of Japan*). Figures for retail sales for the various years were taken from reports of the *Census of Commerce*, undertaken every three years, and published by Japan's Ministry of International Trade and Industry (MITI). All money values were converted into 1985 figures.

### **Traditional Explanations and the Search for an Alternative**

Available literature identifies several approaches to explaining local public spending. Several studies explained local public spending in terms of the institutional features and decisionmaking processes of local governments, the fiscal and financial aspects of local government finance, the influence of population and other demographic factors, or the political factors and processes operating at the local system.

The common and normatively assumed explanation of changes in local public spending is that of incrementalism. Wildavsky (1975:15) observed that:

Budgeting is incremental, not comprehensive. The beginning of wisdom about an agency budget is that it is almost never actively reviewed as a whole every year in the sense of reconsidering the value of all existing programs as compared to all possible alternatives. Instead, it is based on last year's budget with special attention given to a narrow range of increases or decreases. Thus, the men who make the budget are concerned with relatively small increments to an existing base.

Incrementalism assumes that each governmental function would receive "approximately the same share of available resources in the coming year as the current one" (Rickards 1985:380). As such, governments are described as having little room to adjust functional fair shares in their budgets in response to environmental changes. Even though the levels of spending for a government's various functions may increase absolutely, a given function's share in the budget would remain extraordinarily stable over time (Rickards 1985).

Charles Tiebout formulated an economic explanation that offers a "solution for the level of expenditures for local public goods which reflects the preferences of the population" (Tiebout 1972:514). The model assumes that revenue and expenditure patterns of local units mirror the desires of their respective residents, whom Tiebout called the "consumer-voters." In his model, consumer-voters move to the community where the public goods (or services) offered and the price of these goods (taxes) best satisfy their set of preferences. The approach makes use of restrictive assumptions as full mobility and set preference patterns of

consumer-voters, full knowledge by consumer-voters of differences among revenue patterns, a large number of communities in which consumer-voters may choose to live, a single source of income for all consumer-voters, absence of external economies or diseconomies, and an optimal community size for every pattern of community services.

The approach, no doubt, is viewed as an ideal. However, it is limited by its insensitivity to relevant political and organizational forces acting on the budgetary process. Still, it has been applied to explain variations in local government outputs in Britain. One study suggested that migration of consumer-voters between small and competing local units may result in public goods equilibrium (Foster *et al.* 1980); another study opined that by "voting with their feet," consumer-voters may help stabilize population distribution (Aranson 1974); while yet another study assigned the Tiebout hypothesis a central role in the evaluation of local outputs (Barnett and Topham 1977).

A more recent study by Werner Pommerehne (1978) used a median voter approach to analyze how differences in institutions, the ideological preferences of political parties and the influence of public bureaucracy affect the outcome of public expenditure decisions. The study found out that using the demand-oriented median voter model and including collective decisionmaking process and institutional setup provide a more powerful explanation of public expenditure than traditional approaches.

Another common approach can be summed up as the demographic approach. The approach is atheoretical in nature and simply assumes that demography and socioeconomic factors influence, in one way or another, the spending patterns of local government units. In other words, it assumes that there is some kind of linkage between socioeconomic characteristics and policy outputs. A criticism against this approach has been its assumption that governments are mainly engaged in reflecting the objective socioeconomic characteristics of its citizens (Sharpe and Newton 1984). It ignores the likelihood that demand for public policies could be generated not only by the socioeconomic composition of a locality, but also by the function it performs within a wider economic system.

Despite such limitations, several studies had been done using this framework. An analysis of the relations between migration, demographic change, and state and local government budgets showed evidence of the positive effects of in-migration on spending levels (Weinstein and Firestone 1978). Population size and density, as well as concentrations of the poor have also been identified as significant factors explaining the level of public spending (Bahl *et al.* 1980).

Still, the explanatory power of the demographic approach remains inconclusive. James Alt (1976), for example, tried to show that significant associations can be found between levels of expenditure in certain public service areas and both socioeconomic and political variables. In his study, Alt chose a sample of English and Welsh urban centers (county boroughs) and attempted to relate population, wealth, party control and competition (independent variables) with the level of expenditures on services (as one of the dependent variables). The results showed the low explanatory power of the independent variables, which was due to the simplification of the way the variables were formulated for the study.

Another British study noted that previous empirical studies on local government spending revealed a wide assortment of economic and demographic factors influencing expenditure (Ashford *et al.* 1976). Among the factors noted were population levels and density, and other measures of urbanization. The same study adopted a simultaneous model incorporating income, population, urbanization, intergovernmental transfers, politicization and partisanship to explain the expenditure financing decision of British local governments. The model was found to be highly accurate and consistent, accounting for between 75 percent and 85 percent of the variance in local government expenditure.

Variations in local expenditure decisions had been explained also in terms of the influence of the national government in financing public services at the local level. Rhodes (1984), for example, wrote of the prevailing concern about finances in the current relationship between central and local government in the British setting. The impact of such involvement was often analyzed in the role of central grants and subsidies in unitary forms of government. In the case of Japan, it was noted that the national government raises a substantial share of tax revenues, but local governments actually spend the lion's share of total expenditures. As such, massive intergovernmental transfers take place, indicating heavy fiscal dependence on the part of local governments (Wright and Sakurai 1987:125).

Another explanation focuses on the influence of public bureaucracy on local public expenditure. Bush and Denzau (1984) suggested two reasons why public sector employees may have an expansionary effect on public expenditures. First, public sector employees derive an additional benefit from an increase in public expenditure in both nonmonetary (e.g., public esteem and prestige) and monetary (additional income) forms. Second, cost of collecting and processing information on issues is very low for bureaucrats and their productivity in dealing with political problems is very high compared with the rest of the population (Bush and Denzau 1984).

The political approach attempts to predict local government expenditures from political process variables such as party in power or level of interparty competition. However, Godwin and Shepard (1976) noted that in most studies

employing political process variables, the variables were viewed as determinants of expenditure in the same way that income, for example, causes increases in various expenditure levels. Godwin and Shepard argued that more correctly, political process attributes should be construed as mediational factors—variables which influence the accurate translation of demands into outputs (Godwin and Shepard 1976).

At the same time, there are conceptual difficulties in applying the political approach to Japan's local political system. Steven Reed (1979), among others, has recognized that a rigid, partisan political system does not operate at the local level. The system can be characterized more as distributive rather than partisan; political affiliation being more of an expedient way of pursuing local interests. The makeup of Japanese political parties at the local level is not patently ideological as compared, for example, to British parties at the local level. Ronald Aqua's study (1980) of changes in local finance policy seemed to have reached the same conclusion. He noted that the notion of "conservative-progressive split in local politics is an inadequate device for analyzing the substance of local policy making" (1980:380). Although the significance of political forces as important determinants of policy outcomes cannot be totally discounted, Aqua observed that the relationship "between local decisionmaking and partisan ties seems to be tenuous and even inconsequential," and that strands of political development "intrinsic to each separate locality are more significant in affecting local performance than national political currents or even many conspicuous socioeconomic factors" (Aqua 1980:380, 382).

As for the idea that centrality influences the level of spending of local authorities, Sharpe and Newton (1984) examined the expenditure patterns of English county boroughs and found out that the patterns are related to the position that the boroughs hold in the urban hierarchy. Moreover, they found out that the economic role that the urban center plays (for example, as a tourist center, industrial area, etc.) also helps to explain levels of spending.

This brief review of selected literature leads to two observations significant to the study. Firstly, a number of factors can be culled to explain variations in local government spending, each having support. Second, given the inadequacy of political factors to account for local spending policies, an alternative approach must be explored in Japan's local level setting. Can the concept of a city's centrality offer an alternative?

### **Cities as Central Places**

The notion of a central place has been deeply rooted in geography and in discussions involving location theory. In fact, there is a part in the domain of

location theory, called the *central place theory* which is essential to any consideration of an urban system or an urban hierarchy. In economic sense, the theory is concerned with how markets organize production into a system of urban centers (Winger 1977:31-54). It has been used by economists, geographers, and even sociologists in explaining the distribution and location of industry, commerce and leisure facilities.

### *Central Place Theory Briefly Explained*

In the production of various goods and services, division of labor and locational specialization arise, resulting from and in turn causing disparities in resources and capabilities for production that are available. The result is differentiation in production capacity among cities, towns, and regions. In order for products and services from specialized locations where they are produced to reach consumers in other places where these goods and services are wanting, a well-articulated system of commodity flow must exist—a system of distribution and exchange where goods are assembled through local collection points, dispersed through distribution points, and made available to consumers through local markets. These various points form a settlement system involved in production, distribution and exchange (Sharpe and Newton 1984; Rondinelli 1983:17-20).

Central place theory assumes a rational consumer who is concerned with minimizing his travel time and costs. Since travel time and costs must vary with the cost of the good to be purchased and the frequency with which it is consumed, there is a need for many distribution points spread over space that would provide the often used or "lower-order" goods such as basic necessities and daily consumption items. Larger number and more varied types of products, more durable and less frequently purchased goods and services (e.g., malls and airports) for which the rational consumer would be willing to travel greater distances and incur greater cost are to be provided by other locations. Such locations must be larger in population size or be accessible from greater distances to attract a sufficient number of consumers to support the wide range of goods they offer. Settlements with sufficiently large populations to provide both services for the area and outside its boundaries and basic functions (the production of goods and services for consumption outside the settlement area) are defined as "central places" (Rondinelli 1983:17).

The interaction and exchange between smaller service centers offering lower-order goods and larger centers offering higher-order goods facilitate the integration of the system of central places, with the lower-order centers being interlinked with the trade areas of larger centers. A hierarchy is formed, with



each city providing all the services and facilities of the cities below it, plus an additional range of more specialized services and facilities (Sharpe and Newton 1984:117-131). The interdependence and interlocking of market areas of goods and services of the central places integrate the hierarchy into a central place system.

In this central place system, retail outlets for lower priced and basic goods and services will exist and be distributed in greater numbers than retail outlets for higher priced and more durable goods. It is within this system that people living in or near small towns have access to basic goods and services through local markets, and to more specialized functions through bigger cities. The role of urban centers, thus, is to provide specialized services not only for their own population but also for the populations of their adjacent areas. The more central a city is, the higher is its relative position in the urban system.

This study proceeds from an important assumption that a system of central places exists in Japan, and that there exists an urban hierarchy of central cities. It has been noted that the evolution of central places was an important element in the internal economic development of such places as Japan, Europe and North America (Richardson 1973). In these countries, the relationship between urban centers and the countryside, and the emergence of market towns and small and intermediate size cities provided the stimulus for the efficient production and exchange of goods throughout the space economy. As these lower levels of the spatial hierarchy were strengthened, many of the smaller centers grew and diversified, and trade arrangements were established among them. As a result, the linkages among dispersed market centers and between lower order and larger places provided the basis not only for economic growth "but the means by which a large majority of the population was drawn into economic activities and benefited from the development process" (Richardson 1973).

### *The Link Between Centrality and Local Spending*

How then can a city's centrality affect public service provision and spending. It can be argued that the connection between a city's role as a market service center and as a public service center may not be directly established. The important link, however, lies in the pressures and demands that the market service role places on the city for public services that would enable it to provide its market and nonmarket services to nonresidents. A city that thrives on its position as a leading market service center is likely to pursue policies designed to maintain or enhance that advantage. As such, its role as a central place can likely explain some of the policies it formulates (Sharpe and Newton 1984).

Sharpe and Newton (1984:117) sum up the reasons why a city's centrality could influence public service provision and spending:

First, urban authorities are likely to provide a range of specialized services in accordance with their city's importance as a central place.... (The higher the city ranks in the central place hierarchy the more likely it is to spend on the public services which form part of the city's function as a service center.

Second, the higher the city's position in the central place hierarchy, the greater the use made of its public services by those living outside it. High-order central places are likely to carry larger than average costs (for various services) because the need for these services is generated not only by the resident population but also by the people who travel to it for business and pleasure purposes.

### *Central Cities in Japan*

Early studies involving centrality and central places made use of various indicators. Some of the indicators used were the presence of dentists, health centers and hospitals (Sharpe and Newton 1984:118), and the location and distribution of business headquarters (Pred 1977:98-107). Other studies emphasized the range of political influence of a particular location or settlement (Yeates 1980:11), while still others used a composite index of several variables related to urban settlements. Recent studies had been exhaustive in approach. One example, albeit on a developing country setting, used at least eleven functional indicators to come up with a measure of centrality of a particular city (Rondinelli 1985).

The study of Sharpe and Newton used a composite index based on a much earlier study of the shopping patterns of 74 major shopping centers in England and Wales. The composite index was a weighted value of the shopping centers' type and amount of trade, the theoretical net loss or gain of trade for each local area, and the existence of selected facilities for more specialized goods (Sharpe and Newton 1984:119). The index score was used to rank each county borough, and the measure was then used for the regression equations.

In trying to come up with a working measurement for the case of Japanese cities, this study was restricted by available data which are broken down at the city or municipal level. Hence, no comprehensive indicator was used. Rather, the study depended on the most often used traditional measure of centrality: the degree to which retail trade activities concentrate on the city (Ullman 1970:110). This measure corresponded to one classification of central-place cities as those which perform centralized services such as retail trade and political administration for the adjacent areas (Mayer 1965:87).

The choice of retail sales as an indicator of centrality is based on the fact that retail efficiency is highly dependent on location, and within a location, highly dependent upon site (Balchin and Kieve 1977:21). Firms locate to where they can benefit from both highest revenues and lowest costs, thus maximizing profits.

The choice of the cities also appears consistent with another characteristic of central cities as centers for political administration of their respective areas. Except for five cities (Omiya, Iiwaki, Shimonoseki, Hamamatsu, Yokkaichi), all the cities serve as capitals of their prefectures.

### *Retail Sales Concentration Among the Central Cities*

Tables 1 and 2 summarize the percentage shares of central cities from the total retail sales in their respective prefectures, and compare the shares with those of cities holding the next largest shares for the five years under study. The idea was to have an indication of retail trade concentration within the prefecture as seen from two points: the central city's share from the total volume of prefectural retail sales; and the gap between the share of the central city and that of the next dominant city.

**Table 1. City Distribution by Percentage Share of Total Retail Sales in Prefecture**

| <i>Percent Share</i>              | <i>Number of Cities</i> |      |      |      |      |
|-----------------------------------|-------------------------|------|------|------|------|
|                                   | 1976                    | 1979 | 1982 | 1985 | 1988 |
| 50 percent and over               | 4                       | 4    | 4    | 4    | 4    |
| 40 percent - less than 50 percent | 13                      | 13   | 11   | 11   | 11   |
| 30 percent - less than 40 percent | 11                      | 12   | 10   | 12   | 14   |
| 20 percent - less than 30 percent | 12                      | 10   | 13   | 12   | 10   |
| 10 percent - less than 20 percent | 6                       | 7    | 8    | 8    | 7    |
| less than 10 percent              | 1                       | 1    | 1    | 1    | 1    |

Source: Census of Commerce, MITI.

It can be seen from Table 1 that several cities accounted for more than half of the retail sales occurring within their respective prefectures. These were Tokyo, Kyoto, Kochi and Osaka. In 1985 and 1988, though, Osaka's share fell slightly below 50 percent and was surpassed by Takamatsu in 1988.

As befits their status as competing centers between the Eastern and Western portions of Japan, Tokyo and Kyoto had the most concentrated portion of their respective prefectural retail sales among all cities. Both accounted for at least two-thirds of their prefectural total sales, and Tokyo's share accounted for almost 80 percent of Tokyo prefecture's total.

A large number of the central cities accounted for around 20 to 50 percent of their respective prefectural retail sales total. The least dominating city in terms of its own percentage share of the total was Omiya, and this could be clearly attributed to the large number of cities composing Saitama prefecture, and the presence of other competing centers as Kawaguchi, Kawagoe and Urawa cities.

The concentration of retail trade in the city could also be seen from the gap between the central city's share and that of the next dominant city within the prefecture. Table 2 shows that the largest gaps are for two cities, Tokyo and Kyoto, which simply reinforces the earlier observation about their dominance of commerce in their respective prefectures. In the case of ten central cities, the difference between each and the next dominant city was from 30 percent to 40

**Table 2. Gap Between Central City and Next Dominant City: Retail Sales as Percentage Share of Total in Prefectures**

| <i>Percent Share</i>              | <i>Number of Cities</i> |      |      |      |      |
|-----------------------------------|-------------------------|------|------|------|------|
|                                   | 1976                    | 1979 | 1982 | 1985 | 1988 |
| 50 percent and over               | 2                       | 2    | 2    | 2    | 2    |
| 40 percent - less than 50 percent | 3                       | 3    | 2    | 2    | 4    |
| 30 percent - less than 40 percent | 10                      | 10   | 10   | 10   | 8    |
| 20 percent - less than 30 percent | 8                       | 9    | 10   | 9    | 9    |
| 10 percent - less than 20 percent | 13                      | 12   | 10   | 11   | 12   |
| less than 10 percent              | 11                      | 11   | 13   | 13   | 12   |

Source: Census of Commerce, MITI.

percent, although their number declined to eight in 1988. Gaps amounting to less than 10 percent were seen in 11 cities in 1976 and 1979, increasing to 13 cities in 1982 and 1985 and decreasing to 12 in 1988. In some cities, the difference was less than 1 percent as in the case of Iiwaki and the next city, or Tottori and the next city.

Taking into account the central cities' share in the total retail sales volume of the central cities as a percentage share of the total for all cities, the dominance of Tokyo as a center for commerce on a city-wide scale became apparent. Alone, it held about 18 percent of the total retail sales for all cities.

Comparison between the central cities' percentage share of the total retail sales in the prefecture and in all cities showed a distinct pattern: some central cities which dominated their respective prefectures moved down when all cities were considered, while others that were not as dominating in the prefectures moved up.

These observations were summarized by the correlation coefficients between the cities' share in the prefecture and among all cities in Japan (table 3). The coefficients indicate that although a correlation existed between a central city's share in the prefecture and in its share in the city-wide total, the correlation was not that strong.

**Table 3. Correlation Between Central City's Percentage Share of Total Retail Sales in Their Prefecture and Among Cities**

|   | 1976 | 1979 | 1982 | 1985 | 1988 |
|---|------|------|------|------|------|
| r | 0.61 | 0.61 | 0.62 | 0.61 | 0.59 |

The important observation is that while some cities exercised a centralizing role in their respective prefectures by dominating their retail trade, their centrality did not extend further to the wider urban system involving all cities.

In turn, other cities which exhibited lesser centrality within their prefectures became more important when all cities nationwide were considered, while others (such as Tokyo and Osaka) retained their centrality in both instances. These indicate that the influence of these cities in the distribution of goods and services extends beyond the limits of their own prefectures. It remains to be seen, however, whether or not this feature of centrality can be significant in explaining variations in spending levels among the cities.

### **Expenditures of Central Cities**

Expenditures of local authorities in Japan are usually classified in two ways: by purpose (or objective) and by nature (Jichi Sogo Center 1987). By purpose, expenditures are allocated for: (1) general administration, (2) social welfare, (3) health and sanitation, (4) labor relations, (5) agriculture, forestry, and fisheries, (6) commerce and industry, (7) public works, (8) fire service, (9) police, (10) education, (11) loan charges, and other miscellaneous expenses.

Classifying expenditures by purpose reflects the public goods and urban services that cities and other local governments are expected to provide as part of the public service center function.

Expenditures for general administration cover expenses for the maintenance and operation of local assemblies and other general affairs necessary for the administration of the city. These include expenses related to the collection of taxes or statistics, and the holding of elections.

Expenditures for education are mainly for the provision of compulsory education, which is generally provided for by municipalities.

Public works expenses primarily cover construction, maintenance and repair of roads, river and harbor management, city planning and housing provision.

Industry and commerce expenses are mainly for the promotion and development of medium scale enterprises. Social welfare expenses include payments for the operation and maintenance of such facilities as day care centers, nursery schools, and welfare facilities for the aged or physically handicapped. Health and sanitation expenditures cover the collection and disposal of general refuse and waste, as well as the maintenance of public health centers and hospitals.

By nature, expenditures are usually classified into (1) obligatory expenditures, (2) capital expenditures, and other expenses.

#### *Expenditure Profile of Central Cities*

Six expenditure items were selected for analysis in this study: education, general administration, social welfare, health and sanitation, industry and commerce, and public works. These expenses relate directly to the minimum services demanded from a city by its population. Combined, these services make up most of any local government's spending decision.

Table 4 (see next page) presents a comparison of the spending distribution among purposes by all local governments, all municipalities, and the central cities included in this study. The amounts are in real terms and the percentage shares of each spending item are shown for the five years under study.

*Spending Among All Local Governments.* Looking across the various services, spending for education registered the highest share for all years but 1988, followed by spending for public works and social welfare. Together, these three services accounted for at least half of the total expenditures. The high percentage of education spending is due to the fact that compulsory education and high school education are financed largely by local governments (Ishihara 1986). However, looking across the years, it should be noted that the percentage share of spending for education has declined, from 25.44 percent in 1976 to just over 20 percent in 1988. The share of social welfare spending remained at around 11 percent, while public works spending increased from 19.11 percent in 1976 to 22.30 percent in 1988. This affirms the belief on public works spending as a way of social capital formation that provides long-run benefits (Furuta and Kanou 1986:73). (See Table 4.)

*Spending Among All Municipalities.* Slightly similar observations can be obtained from the table regarding all municipalities. Education spending retained a large share of total expenditures, but the largest share was spent for public works. Social welfare expenses also maintained a substantial share of total spending for all five years. A similar decline for education spending is noted, and an increase, on the other hand, for public works expenses. (See Table 4.)

*Spending Among Central Cities.* In a similar way, spending for the three expenditure items (education, public works and social welfare) held the largest percentage share of total spending among the services considered. Of these three, the largest amount went to public works, followed by expenses for social welfare. Moreover, the share of public works expenses from total expenditures appeared to increase from 1976 to 1988, while in contrast, education expenses seemed to decline within the same period. (See Table 4.)

Comparing figures among all municipalities and the central cities, it is seen that spending for public works, social welfare, health and sanitation, and industry and commerce (as percentages of total) were higher in central cities than in all municipalities considered, while the percentage share of general administration expenses was lower for central cities.

#### *Percentage Rates of Change*

Table 5 presents a slightly different way of looking at the spending patterns of local governments. Percentage rates of change were computed on a scaled basis

**Table 4. Expenditures for Selected Purposes As a Percentage of Total: All Local Governments, All Municipalities, All Central Cities**

| Purpose               | All Local Governments |        |        |        |        | All Municipalities |        |        |        |        | All Central Cities |        |        |        |        |
|-----------------------|-----------------------|--------|--------|--------|--------|--------------------|--------|--------|--------|--------|--------------------|--------|--------|--------|--------|
|                       | 1976                  | 1979   | 1982   | 1985   | 1988   | 1976               | 1979   | 1982   | 1985   | 1988   | 1976               | 1979   | 1982   | 1985   | 1988   |
| Gen. Administration   | 10.25                 | 10.07  | 9.62   | 9.71   | 11.25  | 14.96              | 13.81  | 13.60  | 13.87  | 15.29  | 12.41              | 11.14  | 10.96  | 10.86  | 12.09  |
| Social Welfare        | 11.31                 | 11.09  | 11.24  | 11.11  | 10.86  | 17.57              | 16.95  | 17.22  | 16.53  | 16.29  | 19.86              | 19.43  | 19.59  | 18.68  | 18.39  |
| Health and Sanitation | 6.68                  | 6.09   | 6.11   | 6.08   | 5.75   | 8.29               | 7.91   | 7.91   | 8.09   | 7.79   | 9.63               | 8.96   | 8.71   | 8.59   | 8.15   |
| Industry and Commerce | 3.75                  | 3.58   | 3.95   | 4.00   | 4.13   | 2.36               | 2.31   | 2.52   | 2.59   | 2.87   | 3.57               | 3.37   | 3.62   | 3.66   | 3.58   |
| Public Works          | 19.11                 | 20.76  | 20.07  | 20.45  | 22.30  | 19.68              | 20.34  | 20.06  | 20.86  | 22.37  | 21.57              | 22.76  | 23.17  | 23.59  | 25.18  |
| Education             | 25.44                 | 25.36  | 24.36  | 23.58  | 21.85  | 18.64              | 19.14  | 17.58  | 16.12  | 14.98  | 17.88              | 18.98  | 17.12  | 16.46  | 15.27  |
| Total*                | 100.00                | 100.00 | 100.00 | 100.00 | 100.00 | 100.00             | 100.00 | 100.00 | 100.00 | 100.00 | 100.00             | 100.00 | 100.00 | 100.00 | 100.00 |

**Table 5. Percentage Rates of Change of Local Expenditures by Purpose**

| Purpose                | All Local Governments |        |        |        |        | All Municipalities |        |        |        |        | All Central Cities |        |        |        |        |
|------------------------|-----------------------|--------|--------|--------|--------|--------------------|--------|--------|--------|--------|--------------------|--------|--------|--------|--------|
|                        | 1976                  | 1979   | 1982   | 1985   | 1988   | 1976               | 1979   | 1982   | 1985   | 1988   | 1976               | 1979   | 1982   | 1985   | 1988   |
| General Administration | 100.00                | 123.27 | 99.85  | 104.59 | 134.81 | 100.00             | 118.94 | 104.22 | 104.26 | 127.09 | 100.00             | 121.81 | 129.14 | 133.62 | 170.26 |
| Social Welfare         | 100.00                | 122.96 | 108.00 | 102.40 | 113.71 | 100.00             | 124.25 | 107.54 | 98.20  | 113.57 | 100.00             | 129.48 | 141.62 | 141.63 | 159.82 |
| Health and Sanitation  | 100.00                | 114.41 | 104.80 | 103.17 | 110.02 | 100.00             | 122.97 | 105.86 | 104.45 | 111.09 | 100.00             | 128.96 | 133.82 | 137.80 | 152.91 |
| Industry and Commerce  | 100.00                | 119.61 | 115.46 | 104.92 | 120.06 | 100.00             | 126.11 | 115.11 | 105.43 | 127.61 | 100.00             | 132.53 | 152.29 | 167.46 | 185.36 |
| Public Works           | 100.00                | 136.30 | 101.11 | 105.58 | 128.82 | 100.00             | 133.12 | 104.39 | 106.33 | 123.60 | 100.00             | 142.25 | 156.76 | 169.42 | 208.86 |
| Education              | 100.00                | 120.34 | 100.46 | 100.29 | 107.78 | 100.00             | 132.30 | 97.24  | 93.74  | 107.15 | 100.00             | 142.50 | 138.24 | 141.53 | 150.78 |
| Total*                 | 100.00                | 125.44 | 104.60 | 103.60 | 116.33 | 100.00             | 128.80 | 105.88 | 102.24 | 115.26 | 100.00             | 132.24 | 142.94 | 150.13 | 172.30 |

Formula:  $(Y/1976 \text{ total}) * 100$ ; Y = year, n = 1976, ... 1988.

\*Total includes percentages of other items not included in this study.

Source: *Nihon Toshi Nen Kan* (Municipal Yearbook of Japan)



for all five years, with 1976 as the base year. The reason for scaling was to correct for differences due to the relative size of spending outlays for the various items (Rakoff 1976:37).

All local governments considered, outlay for general administration purposes registered the largest rate of change, followed by expenses for promoting industry and commerce, and public works. It should be noted that education expenses had the smallest rate of change among the items considered. (See Table 5.)

Among all municipalities, rates of change were higher for general administration, and industry and commerce expenses. Public works spending had the next highest rate of change, but education registered the lowest rate (table 5).

For the central cities included in the study, public works accounted for the highest rate of change in all five years, followed by the rate of change for general administration spending. Education, as in other local governments, showed the smallest rate of change.

Thus far, the discussion uncovered a few patterns common to the central cities as well as to all local governments. However, it is not seen yet how changes in the growth of specific expenditure items compared with the growth of total expenditures. The following discussion tries to look into this comparison by introducing a *coefficient of priority* for all the spending items of the central cities.

#### *Coefficient of Priority*

The coefficient of priority was computed by dividing each separate item's percentage rate of change by the percentage rate of change for total expenditures. The coefficient thus indicates the extent of change above or below a normal level of "1". A coefficient of "2" for a particular item indicates that the item increased at twice the rate of total expenditures. Thus, if spending change is considered an indicator of policy priorities, the higher the coefficient of priority, the higher the priority given to a particular item in the years covered by the study (Aqua 1980:360).

Table 6 summarizes the coefficients of priority of the various spending items for all central cities. The coefficients clarify earlier observations made in the previous sections. For example, although the percentage share of spending for commerce and industry is minimal compared to other items, the rate of increase for this item as against total expenditures is faster compared to others. In contrast, although education has one of the highest percentage shares among the items, its rate of change has not kept pace with the rate of change in total

expenditures. To summarize among the items, spending for public works and industry and commerce increased at a higher rate than the rate of change for total expenditure (1.21 for public works and 1.08 for industry and commerce) while all the other spending items failed to keep pace. This indicates that of the incremental changes in total spending, more has been allocated for public works and industry and commerce expenses and less for the other expenditure items.

**Table 6. Coefficiency of Priority of Expenditure Items:  
Central Cities**

| <i>Item</i>            | <i>Coefficient</i> |
|------------------------|--------------------|
| Education              | 0.88               |
| General Administration | 0.98               |
| Health and Sanitation  | 0.89               |
| Industry and Commerce  | 1.08               |
| Public Works           | 1.21               |
| Social Welfare         | 0.93               |

Formula: % rate of item/ % rate of change total expenditures

Source: *Nihon Toshi Nen Kan* (Municipal Yearbook of Japan)

**Table 7. Coefficients of Priority for Selected Expenditure Items:  
Against Rate of Change of Items in All Municipalities  
and All Local Governments**

| <i>Item</i>            | <i>All Municipalities</i><br>(a) | <i>All Local Gov'ts.</i><br>(b) |
|------------------------|----------------------------------|---------------------------------|
| Education              | 1.41                             | 1.40                            |
| General Administration | 1.20                             | 1.13                            |
| Health and Sanitation  | 1.35                             | 1.39                            |
| Industry and Commerce  | 1.45                             | 1.54                            |
| Public Works           | 1.69                             | 1.65                            |
| Social Welfare         | 1.41                             | 1.41                            |

Formula: (a) % rate of change for item, all central cities/%rate of change for item, all municipalities

(b) % rate of change for item, all central cities/% rate of change for item, all local governments

Source: *Nihon Toshi Nen Kan* (Municipal Yearbook of Japan)

Table 7 modifies the coefficient of priority used for the analysis. Instead of the rate of change for total expenditures as the basis for comparison, the rate of change for the specific item in (1) all municipalities and (2) all local governments were used. It is clear from the coefficients that the rate of change in spending by central cities was higher than the rate of change in spending in all municipalities for all items, indicating a higher level of priority given for the items by the central cities.

The same results were achieved when the basis for comparison was the rate of change in spending for each item by all local governments. The table indicates that the rates of change were higher among the central cities than among local governments for all items considered. In a similar way, central cities seem to pay more priority to the same set of items than the rest of local governments.

### *Can Centrality Explain Level of Spending*

Previous sections tried to piece arguments related to the idea that the status of cities as central places can be an alternative explanation to variations in the way resources are allocated for urban services.

This section attempts to analyze the assumption that the level of spending of cities in total and on specific urban services are related to their position as central places in the urban hierarchy of the country as a whole.

As a first step, a measure of centrality used in the study (the central city's retail sales as a percentage of total retail sales of all cities in Japan) was correlated with per capita service expenditures, and the results were presented in Table 8 for all five years. The main objective in doing the correlation analysis was to get some indication of the possible relationship that centrality could have with level of service spending.

The measure of centrality was significantly related to the level of service spending in total and on several of the specific services. The correlation coefficients were highly significant in the case of total expenditures, public works, and health. Moreover, the correlations were also consistent with the expectations regarding centrality and spending for public works and health. Although the coefficients were also significant with respect to level of spending for education and social welfare, the size of the coefficients indicated that the correlations were not as strong as in the previous service items cited. In contrast, the measure of centrality did not seem to relate with level of spending for the promotion of industry and commerce and for general administration purposes.

**Table 8. Simple Correlation Between Per Capita Service Expenditures and Measure of Centrality**

| Item                   | Years  |        |        |        |        |
|------------------------|--------|--------|--------|--------|--------|
|                        | 1976   | 1979   | 1982   | 1985   | 1988   |
| Total Expenditure      | 0.738' | 0.738' | 0.775' | 0.780' | 0.795' |
| Education              | 0.486' | 0.338' | 0.454' | 0.422' | 0.489' |
| Health                 | 0.680' | 0.635' | 0.563' | 0.600' | 0.640' |
| Public Works           | 0.733' | 0.732' | 0.739' | 0.756' | 0.508' |
| Social Welfare         | 0.365' | 0.409' | 0.465' | 0.482' | 0.508' |
| General Administration | 0.051  | 0.297  | 0.271  | 0.305  | 0.224  |
| Industry and Commerce  | 0.316  | 0.282  | 0.330  | 0.267  | 0.394  |

'Significant at 0.05 level. n=46

The other point of interest is that the pattern of correlations appeared to be consistent over time, thus indicating that the significance of the relationships were not isolated or occurring for just one specific year.

The coefficients, however, provide limited information on the bivariate relationship between the measure of centrality and level of total and specific service spending. As statistical analysis would caution, correlation analysis can only show "the degree of association between two variables" (Hu 1973:53). In this case, the previous analysis cannot confirm if centrality explains variations in level of spending among cities. What it simply shows is that centrality is somehow "associated" with level of spending. The previous sections provided an insight: other factors were suggested to significantly explain level of service spending.

For the assumption to hold true that beyond mere association, centrality can explain level of spending, it must be tested along with other factors recognized to be important. If, after these factors were introduced, the measure of centrality remained related with level of spending, then it is likely that centrality is a significant factor.

The framework that follows indicated how this analysis was carried out. It also presented other factors selected for the analysis.

Past studies had identified several factors as determinants of local public spending. While it would have been ideal to accommodate all the possible factors in the analysis, the choice of the factors in the framework was restricted for several reasons.

First, conceptual considerations necessitated that population size and density be dropped from the regression equation. Population size has always been

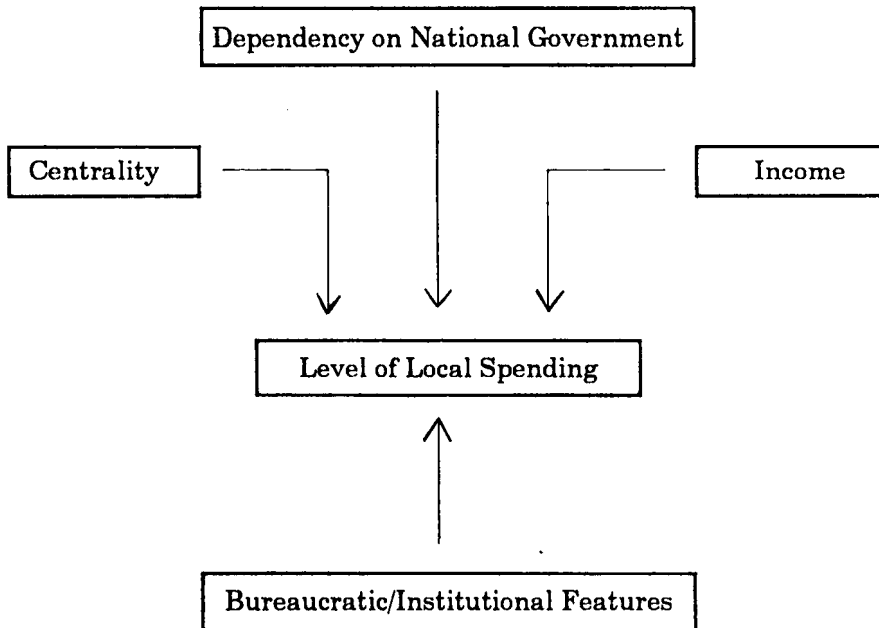
used as a surrogate of centrality, and together with population density, is highly correlated with other measures of centrality. At the same time, there were studies which argue that the effect of population size as an explicator of service spending is inconclusive (Boaden 1971; Sharpe and Newton 1984). It was also argued that centrality "covers a much broader range of phenomena and offers far greater theoretical and explanatory potential" than population size (Sharpe and Newton 1984).

By the nature of most explanatory factors for local spending, several of them were highly correlated with one another. Thus, multicollinearity can exist as a serious problem in the regression analysis. The factors thus chosen were those which at least minimized this problem. Finally, there were certain limitations on the kind of data available which were broken down at the city level.

### *The Conceptual Framework*

At the conceptual level, the framework suggested that aside from *centrality*, the level of spending by a city can be explained by its *dependency on the central government*, its *socioeconomic and demographic characteristics*, and its *institutional or bureaucratic features*. (Refer to figure 1.)

**Figure 1. Centrality and Level of Local Spending: A Framework Involving Other Explanatory Variables**



The underlying assumptions behind these conceptual relationships are discussed briefly below.

*Dependency on the central government.* In studies elsewhere, the dependence of local authorities on central government financial assistance has long been viewed as an important influence on local budgetary behavior (Boyne 1990:207-33; Boaden 1971). In the case of Japanese local public finance, the weight and scope of national government disbursements in the execution of public policies at the local level are generally recognized to have an impact (Ishihara 1986; Yonehara 1986).

*Income.* Individuals exhibit income-related preferences for public goods in the same way as they express income-related preferences for private goods. Moreover, differences in income distribution also measure differences in the social and economic environment of a community. Income also indicates ability to pay and therefore, affects the demand for services and benefits (Ashford 1976:76).

*Bureaucratic Features.* This factor has been discussed earlier in the review of literature. There is a natural tendency for public bureaucracies to expand and behave as budget-maximizers. There is always pressure on the bureaucracy to maintain itself or to expand its influence.

### *Operational Measures*

For this study, centrality was measured as the percentage of a city's total retail sales from the total retail sales of all cities in Japan. The amount of national government disbursements to the city (NGD) was used as indicator of dependency on the central government. Since population size and density cannot be included in the study, income (INC) was used as indicator of socioeconomic and demographic characteristics, while bureaucratic features were indicated by the number of city government personnel (EMP).

### *The Regression Model*

The relationships among the variables were summarized in the regression model:

$$\text{EXP} = B_0 + B_1(\text{INC}) + B_2(\text{CEN}) + B_3(\text{EMP}) + B_4(\text{NGD}) + u$$

where:

$B_0$  was the constant;

$B_1, B_2, B_3,$  and  $B_4$  were the regression coefficients;

INC was per capita income;

CEN was total retail sales of the city as a percentage of total per capita retail sales in all cities;

EMP was the number of local government personnel per 1,000 population;

NGD was per capita national government disbursements for a city for a specified year; and,

$u$  was the error term.

A basic assumption of this model was that the relationships can be expressed linearly and the variance was constant. Since it was possible that nonconstant variances increase with the population of each observed city, relevant variables were estimated using per capita data.

Regressions were applied for all five years: 1976, 1979, 1982, 1985 and 1988 for all sample central cities except Tokyo.

### Results of the Study

The analysis was applied on level of spending in total and on four specific spending items: education, public works, social welfare, and health. Spending for general administration purposes and for the promotion of industry and commerce were not included in the regression analysis based on the results of the correlation analysis in the last section. Residual patterns were examined, and when extreme observation points (outliers) were detected, the model was analyzed by excluding the outliers and using the reduced set of observations. Correlations among the explanatory variables were also noted to detect serious problems of multicollinearity.

### *Total Spending as the Dependent Variable*

Analysis using the full data set showed that the regression model can explain the variance in level of total spending quite well. There were relatively high values of the multiple correlation coefficient ( $r^2$ ), with the highest value being 0.920 in 1982 and the lowest value, 0.687 in 1988. The measure of centrality (retail sales percentage) related very well with changes in level of total spending as shown from the significant values of its estimated coefficients. The measure of central government dependency (national government disbursements) also appeared to be a good indicator. It should be noticed also that the strength of the two variables mentioned earlier remained consistent throughout the five years of observation.

The other two explanatory variables (income and local government personnel) were also significant, but their ability to account for changes in local spending seemed to be less than that of the first two variables mentioned. Values of the t-statistics for these two variables were at times significant only at the five-percent and ten-percent levels. Moreover, these two variables were not significant at certain years of observation.

The same observations were also apparent from the regression results of the reduced data set. (See Table 9.) Excluding the outliers enhanced the explanatory power of the model as seen from the improved  $r^2$  values. All of the  $r^2$  values were better than 0.80.

The same patterns earlier observed in the full data set seemed to hold true also in the reduced data set. Centrality and national government dependency measures remained consistent as significant explanatory variables, while the relative weaknesses of the local government size and income measures were also apparent.

What is important to note from Table 9 is that the strength of the variables, particularly that of centrality and local government size, were retained and improved by the exclusion of outliers. The significance of local government size was also improved, except that it did not remain significant in 1988 as it was in the regressions involving the full data set. One plausible reason could be that changes in administrative size might have occurred in response to the changes in the national economy during the early 1980s. Another plausible reason for this could be the effect of proposals on administrative reform in the early 1980s and the resulting pressure on local governments to rationalize their structure and size.



**Table 9. Regression Results: Total Expenditures  
As Dependent Variable (Reduced Data Set)**

| <i>Independent<br/>Variables</i> | <i>Years</i>        |                     |                    |                    |                     |
|----------------------------------|---------------------|---------------------|--------------------|--------------------|---------------------|
|                                  | 1976                | 1979                | 1982               | 1985               | 1988                |
| Constant                         | -43.983<br>(-1.151) | -13.655<br>( 0.723) | 59.145<br>(2.070)  | 82.067<br>(0.031)  | 119.441<br>(3.615)  |
| Income                           | 0.103*<br>(2.825)   | 0.094**<br>(2.679)  | 0.054**<br>(2.292) | 0.031<br>(1.069)   | 0.040<br>(1.710)    |
| NG Disbursement                  | 1.663*<br>(4.240)   | 1.095*<br>(4.531)   | 1.335*<br>(7.901)  | 1.415*<br>(6.819)  | 1.448*<br>(5.262)   |
| LG Personnel                     | 6.963*<br>(4.061)   | 4.770*<br>(3.172)   | 2.976**<br>(2.370) | 3.938**<br>(2.892) | 0.367<br>(1.236)    |
| Retail Sales                     | 7.666*<br>(2.611)   | 19.099*<br>(5.982)  | 20.528*<br>(7.567) | 19.948*<br>(6.160) | 31.553*<br>(10.228) |
| R-Squared                        | 0.835               | 0.889               | 0.825              | 0.917              | 0.878               |
| Adjusted R-Squared               | 0.816               | 0.875               | 0.807              | 0.908              | 0.865               |
| S.E. of Regression               | 15.447              | 14.835              | 22.562             | 14.251             | 19.272              |
| F-Statistics                     | 69.497              | 48.155              | 197.129            | 66.849             | 25.649              |
| No. of Observations              | 40                  | 40                  | 40                 | 40                 | 40                  |

\* Significant at 0.01 level.

\*\* Significant at 0.05 level.

\*\*\* Significant at 0.10 level.

### *Education Spending as the Dependent Variable*

The regression model cannot adequately explain variations in the level of spending for education.

In the full data set, several variables appeared significant in some specific years but the findings were not consistent for the five observation periods. A large part of the variance in education spending remained unexplained, as indicated by the low  $r^2$  values (0.271 to 0.526) where some variables appeared significant. The highest  $r^2$  value was only 0.526 (in 1976), which meant that only about half of the variance in spending for education for that year was explained by the variables included in the model.

Exclusion of extreme data points strengthened the explanatory power of the model (see  $r^2$  values in table 10), but only to a certain extent. The model remained inadequate in accounting for variations in education spending. Although spending for education was positively explained by income, national government disbursements and local government size in 1976, this seemed to be an exceptional year than the rest. Income, however, did appear significant in all years save one. It is possible that along with additional variables other than the ones used in the regressions, income may have an influence on local spending for education. It is also possible that a linear function was not the best representation of the relationships among the variables studied.

**Table 10. Regression Results: Total Expenditures As Dependent Variable (Reduced Data Set)**

| <i>Independent Variables</i> | <i>Years</i>        |                     |                    |                    |                   |
|------------------------------|---------------------|---------------------|--------------------|--------------------|-------------------|
|                              | 1976                | 1979                | 1982               | 1985               | 1988              |
| Constant                     | -29.734<br>(-3.717) | -17.104<br>(-1.459) | 0.446<br>(0.036)   | -13.614<br>(1.136) | 21.886<br>(2.041) |
| Income                       | 0.055*<br>(6.697)   | 0.053*<br>(4.703)   | 0.025**<br>(2.405) | 0.038*<br>(3.961)  | 0.007<br>(0.930)  |
| NG Disbursement              | 0.159**<br>(2.498)  | 0.104<br>(1.476)    | 0.014<br>(0.182)   | 0.210*<br>(2.965)  | 0.078<br>(0.848)  |
| LG Personnel                 | 1.321*<br>(3.737)   | 0.559<br>(1.324)    | 1.157**<br>(2.338) | 0.536<br>(1.101)   | 0.102<br>(1.114)  |
| Retail Sales                 | -0.45<br>(-0.711)   | 6-0.321<br>(-0.349) | 0.132<br>(0.118)   | 0.126<br>(0.113)   | 2.577*<br>(2.784) |
| R-Squared                    | 0.733               | 0.524               | 0.402              | 0.511              | 0.494             |
| Adjusted R-Squared           | 0.701               | 0.471               | 0.338              | 0.458              | 0.324             |
| S.E. of Regression           | 3.668               | 4.713               | 5.762              | 5.259              | 5.889             |
| F-Statistics                 | 23.308              | 9.915               | 6.228              | 9.663              | 5.679             |
| No. of Observations          | 39                  | 41                  | 42                 | 42                 | 40                |

\* Significant at 0.01 level.

\*\* Significant at 0.05 level.

\*\*\* Significant at 0.10 level.

With respect to the primary focus of this study, the important finding was that centrality cannot significantly explain education spending. This simply considered what the simple correlation analysis earlier had indicated about the weak relationship between these two variables. Interestingly, this finding was

similar to that by Sharpe and Newton (1984), who observed that their measure of centrality did not seem to relate well with spending for education in general as compared to special education.

### *Spending for Health as the Dependent Variable*

In the analysis using the full data set, income and national government disbursements appeared to be the strongest explanations for the variance in health expenditure. Retail sales and local government size were weaker explanations as seen from the significance of their t-statistics and from their nonsignificance at certain observation years.

As it was, the model utilizing the full data set was a weak explanation of changes in the level of health spending. Only half of the variance in health spending was explained by the model, and this variance was accounted for chiefly by only two variables—income and national government disbursements.

**Table 11. Regression Results: Health Expenditure As Dependent Variable (Reduced Data Set)**

| <i>Independent Variables</i> | <i>Years</i>       |                     |                     |                    |                    |
|------------------------------|--------------------|---------------------|---------------------|--------------------|--------------------|
|                              | 1976               | 1979                | 1982                | 1985               | 1988               |
| Constant                     | -6.782<br>(-0.900) | -12.690<br>(-1.251) | -15.055<br>(-1.638) | -9.896<br>(-0.403) | -5.070<br>(-0.760) |
| Income                       | 0.015<br>(1.908)   | 0.018***<br>(1.583) | 0.022**<br>(2.837)  | 0.011*<br>(1.986)  | 0.017*<br>(3.041)  |
| NG Disbursement              | 0.120<br>(2.028)   | 0.194*<br>(3.220)   | 0.182*<br>(3.330)   | 0.248*<br>(4.772)  | 0.030<br>(0.548)   |
| LG Personnel                 | 0.520<br>(1.586)   | 0.522<br>(1.475)    | 0.448<br>(1.241)    | 0.816<br>(2.870)   | 0.156<br>(2.724)   |
| Retail Sales                 | 2.123*<br>(3.487)  | 2.090*<br>(2.673)   | 1.527***<br>(1.888) | 1.274*<br>(1.849)  | 2.222**<br>(2.513) |
| R-Squared                    | 0.709              | 0.691               | 0.630               | 0.875              | 0.535              |
| Adjusted R-Squared           | 0.678              | 0.657               | 0.590               | 0.760              | 0.482              |
| S.E. of Regression           | 3.459              | 4.075               | 4.181               | 3.259              | 3.633              |
| F-Statistics                 | 22.589             | 20.661              | 15.757              | 31.890             | 10.067             |
| No. of Observations          | 42                 | 42                  | 42                  | 42                 | 42                 |

\*Significant at 0.01 level.

\*\*Significant at 0.05 level.

\*\*\*Significant at 0.10 level.

However, when extreme observation points were removed from the analysis after an examination of residuals, the regression results improved, implying that there was underestimation due to the presence of extreme data points. The  $r^2$  values ranged from 0.535 to 0.875, which meant that from about half to three-fourths of the variance in health spending can be explained by the variables included in the model (table 11).

Regarding the variables, income and national government disbursements remained significant as explanatory variables, but the more interesting finding was that centrality appeared to be a significant factor as well. The three variables were consistently significant across the years, although at different degrees. Of the three variables mentioned, national government disbursements seemed to be the most significant as indicated by its t-statistics.

#### *Spending for Public Works as the Dependent Variable*

Retail sales and national government disbursement appeared to explain very well the variance in public works spending for all sample central cities. Between the two variables, however, retail sales seemed to be the stronger explanation as seen from the significance of its t-statistics and the consistency of its significance throughout the observation years. The strength of the model in explaining public works spending was quite high, from a low of 0.658 to a high of 0.758.

When outliers were excluded (reduced data set), the  $r^2$  value improved to around 0.80 percent. This indicates that around 80 percent of changes in the level of public works can be accounted for by the significant variables in the model. (See table 12.) Income also appeared to be significant as an explanatory variable, but its relative weight was less compared to the other two variables earlier mentioned. This was evident in the weaker significance of its regression coefficients, as indicated by the t-statistics.

The finding of the analysis for public works confirms earlier expectation about the influence of centrality in local public works spending. The spatial role of cities as central places brings greater pressure for cities to provide infrastructure and other physical facilities not only for the use of their own populations but also for the population of other areas. The facilities provided for by central cities are also subject to greater wear and tear.

**Table 12. Regression Results: Public Works Expenditure As Dependent Variable (Reduced Data Set)**

| <i>Independent Variables</i> | <i>Years</i>        |                     |                     |                     |                     |
|------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                              | 1976                | 1979                | 1982                | 1985                | 1988                |
| Constant                     | 15.231<br>(1.039)   | -19.216<br>(-0.873) | -35.727<br>(-1.858) | -28.002<br>(-1.459) | -28.649<br>(-1.647) |
| Income                       | 0.004<br>(0.253)    | 0.040***<br>(1.977) | 0.058*<br>(3.592)   | 0.055*<br>(3.486)   | 0.056*<br>(4.022)   |
| NG Disbursement              | 0.266***<br>(1.927) | 0.556*<br>(3.718)   | 0.791*<br>(6.124)   | 0.701*<br>(4.945)   | 0.074<br>(0.501)    |
| LG Personnel                 | 0.047<br>(0.072)    | 0.380-<br>(0.517)   | 0.208<br>(-0.290)   | -0.182<br>(-0.244)  | 0.676*<br>(4.829)   |
| Retail Sales                 | 7.838*<br>(6.845)   | 7.279*<br>(4.585)   | 6.176*<br>(3.848)   | 8.080*<br>(4.380)   | 11.543*<br>(7.311)  |
| R-Squared                    | 0.812               | 0.791               | 0.810               | 0.831               | 0.848               |
| Adjusted R-Squared           | 0.790               | 0.768               | 0.790               | 0.813               | 0.830               |
| S.E. of Regression           | 6.410               | 9.949               | 7.880               | 8.591               | 9.477               |
| F-Statistics                 | 37.715              | 34.961              | 39.460              | 45.550              | 48.670              |
| No. of Observations          | 40                  | 42                  | 42                  | 42                  | 40                  |

\*Significant at 0.01 level.

\*\*Significant at 0.05 level.

\*\*\*Significant at 0.10 level.

*Spending for Social Welfare as the Dependent Variable*

In the full data set, the only significant and consistent variable in the model was national government disbursements. It should be noted, however, that where national government disbursements was the only significant variable, the explanatory power of the model was weak as seen from the  $r^2$  values. On the other hand, where retail sales was an additional significant variable, the ability of the model to reflect the variance in social welfare spending was enhanced.

This was more evident when outliers were excluded from the data set. Table 13 shows that the significant variables in the equation were national government disbursements and retail sales. What this implies is that if retail sales was

considered as a factor along with national government disbursements, the ability to explain social welfare spending, became more effective. This was indicated by the high  $r^2$  values obtained, all of which were not lower than 0.80, indicating that about 80 percent of the variance in social welfare spending can be explained by these two variables alone.

The other point to consider is that the significance of the two variables was consistent throughout the years of observation as indicated by their t-statistics.

From the analyses above, two points can be made about the variables which account for the level of spending by central cities. One is that as assumed in this study, centrality seems to be an alternative explanation for variations in the level of spending in total and on specific items. The other is the large influence of the national government's involvement in financing public services at the local level.

**Table 13. Regression Results: Social Welfare Expenditure As Dependent Variable (Reduced Data Set)**

| <i>Independent Variables</i> | <i>Years</i>       |                     |                    |                    |                    |
|------------------------------|--------------------|---------------------|--------------------|--------------------|--------------------|
|                              | 1976               | 1979                | 1982               | 1985               | 1988               |
| Constant                     | 28.002<br>(3.228)  | 11.134<br>(1.253)   | 16.912<br>(2.005)  | 21.819<br>(1.789)  | 18.934<br>(1.693)  |
| Income                       | -0.023<br>(-2.688) | -0.006<br>(-0.734)  | -0.013<br>(-1.891) | -0.012<br>(-1.218) | -0.004<br>(-0.447) |
| NG Disbursement              | 0.689*<br>(8.350)  | 0.788**<br>(12.876) | 0.711<br>(2.149)   | 0.622<br>(7.405)   | 0.879*<br>(9.053)  |
| LG Personnel                 | -0.154<br>(-0.405) | 0.265<br>(0.809)    | 0.867*<br>(12.708) | 0.695<br>(1.451)   | 0.040<br>(0.421)   |
| Retail Sales                 | 1.577**<br>(2.199) | 2.062**<br>(2.735)  | 1.720**<br>(2.116) | 2.945<br>(2.568)   | 3.625*<br>(3.787)  |
| R-Squared                    | 0.814              | 0.913               | 0.920              | 0.832              | 0.850              |
| Adjusted R-Squared           | 0.794              | 0.904               | 0.912              | 0.813              | 0.834              |
| S.E. of Regression           | 3.979              | 3.859               | 3.869              | 5.600              | 6.110              |
| F-Statistics                 | 40.594             | 97.632              | 106.880            | 45.669             | 52.364             |
| No. of Observations          | 42                 | 42                  | 42                 | 41                 | 40                 |

\*Significant at 0.01 level.

\*\*Significant at 0.05 level.

\*\*\*Significant at 0.10 level.

### Conclusion

The findings of this study suggest that a city's level of spending is associated with its spatial function as a central place. This is especially true in the case of total spending, and in spending for public works and social welfare.

That the level of spending of a city in the aggregate is related to its role as a central place suggests that there are pressures cities face to maintain the advantage of that status. These pressures may not be evident in the provision of specific programs, but are rather felt in the totality of spending decisions local policymakers make in a year. Specifically, the effects of a city's centrality are evident in the higher costs required to provide *physical services* such as roads, streets, housing and other infrastructure facilities essential to the flow and distribution of goods and services. Centrality's influence is also evident in *welfare services* as in the provision of day care centers and facilities for the aged. Central places seem to be more exposed to the pressures of a varied population and its demand for social services.

The other interesting finding is the pervasive influence of national government involvement in financing the provision of urban services at the local level. From the analysis, it appears that the extent of providing a particular service depends on the scope of assistance a city could get from the national government. There is some debate on the effects of national grants and subsidies on local policymaking (Reed 1979), but the findings of the study imply that cities cannot provide the cost of some services from their local revenues alone, and thus, must be beholden to the central government to a certain extent.

The findings seem to suggest also that some leeway is available to local governments in their allocation of resources for various spending objectives. That variations exist among central cities themselves due to their differences in centrality could imply that some room for discretion is present in their decisionmaking. However, it is tempting to conclude along this line since the scope and limitations of this study were already defined.

As a central place, the central city will always be an attraction to the population of the adjacent areas. It would remain as a source of specialized goods and services, and provider of more sophisticated urban functions and amenities.

The policy concern is how to address the pressures brought on the central city by its economic role as a center for the flow of goods and services from one area to another. This is not to say that a shift in policy with an urban bias should occur, for the problems obtaining in the less urbanized, primarily agricultural areas are also of importance. This study only suggests that the city's value as a central place should be recognized.

The fundamental question is, in what way should this status be recognized? Inasmuch as the study set out to determine the association of centrality with variation in local spending, the most appropriate option is to find a mechanism in the financial arrangements between the national government and cities, wherein the peculiar pressures of a city's centrality are factored into. One possibility is to incorporate the status of a city as a central place in the calculation of the local allocation tax, especially in the computation of *basic financial needs*. The basic financial needs are calculated based on a detailed equation by the national government, and represent the rational and standardized financial requirements of a locality arising from its natural, geographical and social conditions. There are four factors used in calculating basic financial needs, and these are service item (e.g., public works, social welfare expenses), indicator of financial need for the service item (e.g., area of roads and population), unit cost for each indicator, and a modification coefficient. The modification coefficient is used to account for possible imprecision on the amount of total financial needs computed. Such imprecision could have resulted from standardized calculations based on one unit cost for each financial needs<sup>2</sup> indicator.

There are various modification coefficients, such as those that take into account differences in climate and density, or the possible economies of scale brought about by a large population. One modification coefficient is carried out in order to account for peculiarities in the social, economic and institutional characteristics of a specific local government. A possible option is to integrate the status of the city as a central place in this kind of modification.

The other policy implication is related to the other finding of this study—the significance of national government disbursements in the implementation of specific public policies at the local level. The issue of national government disbursements and subsidies has been dealt with in the proposals for administrative reform submitted to the national government. The results of this study simply restate the need to rationalize the scale and scheme of central government disbursements to local governments.

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