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It is generally recognized that the growth of smaller areas is primarily determined by the potential volume of export sales by regional business establishments. The purpose of this study is to outline a model of area economic growth which introduces variables relevant to local decisions concerning capital and current government expenditures. Given a representation of local government decision processes, an analysis determining impacts of alternative levels and kinds of local services would facilitate local government planning. A framework is needed to facilitate the spatial planning and evaluation of Federal and Provincial community infrastructure grants.

Objectives of the Study

The main objective of the study is to analyze the contribution of local government services to area economic growth. Alternative assumptions are made concerning the number and size of area trade centers. Urban consolidation can be promoted by means of public policies such as local infrastructure grants designed to stimulate urban growth in particular centers, and also by mobility assistance. The chief issue of concern in this study is the magnitude of development impacts accruing to public investment in large towns as against smaller towns.

Among individual communities, the mill rate and capital loan levels are major decision variables which can be manipulated by local government councils. Elected representatives must assess community preferences in the specification of the tax burden and the magnitude of the local debt. If a potential for National and Provincial grants exists, there is an incentive for local officials to lobby for grants which will increase local service standards at minimal cost to local residents. From a Federal and Provincial point of view, population centers are too numerous to permit an allocation to equalize service standards for all communities. The problem is particularly acute for the small trade centers of Manitoba, due to the relative decline in opportunities to expand area agricultural exports and to the relative dominance of Winnipeg in the urban hierarchy.

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This paper is organized into six sections. In the first, public service expenditures are related to concepts of area economic growth. The determination of all public program expenditures in the Interlake Rural Development Area by Federal, Provincial, local and FRED (Fund for Rural Economic Development) institutions is also summarized. The focus in the study on the local service component of government expenditure is a first step in the analysis of the role of all public service expenditures in stimulating area economic development. The second section specifies a schematic representation of a model for analyzing regional economic development planning, as well as the linkage with a local service submodel. The third section is a review of public service revenue and expenditure projection methodology. In the fourth section a general assessment of the potential benefits and costs of consolidation is given, with particular reference to local decision processes. The fifth section deals with the concept of agglomeration economies as examined relative to analyzing town-specific impacts of local service expenditures. The sixth section outlines a town-specific input-output table.

Public Services in Area Economic Development

Numerous generalizations have been made by regional economists concerning the efficacy of a growth center policy in stimulating economic development.¹ There is, however, a scarcity of empirical analysis relevant to evaluating the potential impact of concentrating public investment in designated centers, according to Maki [9, p. 103]. A synthesis of relevant urban-regional economic concepts is therefore required. Essential theoretical relationships include:

1. Area economic growth concepts. Examples include North's export base theory [12], the linkage between export and the service sector growth outlined by Thompson [16], the importance of urban-regional product and factor linkages, by Schultz [13], and Berry's concept of a hierarchy of urban regions [1].
2. Economy of scale concepts applied to the production of public and private local services, as discussed by Isard [6] and Hirsch [5].
3. Political and welfare concepts relevant to the analysis of spillover impacts associated with urban consolidation, or growth center designation accruing to the local, Provincial and National community as discussed by Breton [2] and Smallwood [14].

¹The terms growth and development are used synonymously in referring to the process of change which is the critical concern in analyzing change in area economic activity over time.

The exports of an area, historically determined by resource endowments and comparative advantage, are the prime cause of area economic growth.² Export activity creates a need for local service sector establishments to provide markets for inputs and products of area households, businesses, and government. The magnitude of the resource base, plus output-labour and output-income relationships, are important factors in the determination of the magnitude of the export sector labour force and the estimation of the market demand for local non-basic goods. Spatial trading relationships determine the structure of centers in the area urban hierarchy. Economy of scale concepts determine the threshold size of local private service establishments, and the quantity and quality of the available public services. Concepts of both political theory and welfare theory indicate the need to measure trade-offs between the loss of local identity and the increased rate of area economic growth.

In contrast to the dialogue relating to Federal and Provincial policy, the role of local government in achieving policy development objectives has received little attention. In addition, a relevant spatial dimension for effective Federal, Provincial, and local policy formulation and implementation has not been articulated.

There is need for coordination of government expenditures at all levels to achieve economic and social objectives. Preliminary estimates of expenditures by level of government (Table 1) illustrate the relative importance of Federal, Provincial, and local non-development plan government expenditures in Manitoba's Interlake Development Area. General expenditures by the Federal government include categories such as public works, postal services and defense, with the latter comprising 40 percent of the total. General provincial government expenditures are primarily for education, health and welfare, highways, and natural resources.

Development program expenditures of the size allocated to the Interlake would be large if the program was applied to the whole province or to all of Canada. The Interlake population of 55 thousand represents only 5.5 percent of Manitoba's population. The annual FRED program expenditures are 109 dollars per capita (Table 1). On a province-wide basis, the program would require 109 million dollars, and on a national scale 2 billion dollars would be needed.

Coordination of provincial departmental program expenditures with development plan expenditures is facilitated by the administration of the developmental activity by the Provincial Planning and Priorities Secretariat

²It is implicitly assumed that for small areas where export trade is a large proportion of gross sales, the opportunity for import substitution is restricted to the trade and service sectors, and that the effects of technological change are represented by changes in comparative advantage.

TABLE 1: Estimated Expenditures by Levels of Government in the Interlake Area of Manitoba, 1968-69^a

Level of Government	Expenditure (Million \$)	Percent	Dollars per Capita
Federal	21	44	382
Provincial	15	34	273
Local	5	10	91
FRED Plan (Federal Provincial)	6	12	109
Total	47	100	855

^aA population figure of 55,000 was used to place expenditures on a per capita basis; unpublished data collected for the evaluation of the Interlake Development Plan by the Department of Agricultural Economics, University of Manitoba, was used for the estimates of expenditures.

and the Federal Department of Regional Economic Expansion. For example, highway and education development expenditures are administered by the appropriate departments in conjunction with the development administration. However, a problem which is neglected by planners concerns the potential development contribution of government expenditures for all functions. Can effective development be achieved at a reasonable cost by means of non-poverty programs, as discussed by Martin [10, p. 1271]?

Public Services and Regional Development Planning

In a general systems framework, regional development planning is analogous to a management control activity.³ Planning administrators utilize economic information relating to the area economic base in the allocation of input expenditures. The process of regional development determines the output and income effects of changing input magnitudes. Regional accounts and special studies are necessary to measure the essential elements of the linkages between input changes and development outcomes. Estimated and projected development impacts can then be utilized to reallocate program expenditures, in order to achieve more desirable outcomes.

³Management control in a systems context refers to a quantitative analysis of the planning process. It is broader than the concepts of financial control and efficient management of program activities.

Quantification of the general systems framework essential for the specification of alternatives is a difficult task. Considerable controversy exists, for example, concerning the relative pay-off to public investment in manpower programs, versus infrastructure highways and drainage programs. Initial efforts are being directed towards analyzing regional accounts for the area economy and to special studies that will relate programs to the accounts.⁴ A schematic representation of the regional account structure of area development and the linkages with the public service submodel are outlined in Figures 1 and 2. Local final demand expenditures, including FRED, result in direct and indirect local components of total local business sales (Figure 1). Local business sales activity generates local income and local employment. Sales activity and local economic opportunities determine out-migration and in-migration.

The emphasis of this study is placed on the public service submodel (Figure 2). Interrelationships between area economic activity, the local tax base, borrowing capacity, grant structure, and council preferences, are based on the assumption that expenditures are determined by the revenue potential. Discussions with municipal planners substantiate this representation. Local governments tend to decide on the allocation of revenue, rather than specifying desirable expenditures on facilities before setting tax rates to match service preferences.

Determinants of Local Government Revenues and Expenditures

As economic growth occurs in an economy, the revenue of local governments will increase. Estimations of tax revenues can be made by projecting time trends, either for the tax collections or for the tax base. An alternate method involves the "explanation" of changes in the tax base by means of functional relationships. The complex interrelationships between economic growth and public sector expenditures are summarized by Mushkin [11], who states:

...expenditures will increase (a) as population growth and migration and price-level increases raise the outlays necessary to continue existing levels of public services per beneficiary; (b) as national recognized needs for new public services or the expansion of existing programs are met with Federal assistance; (c) as generally recognized demands for new types of levels of public services or pressures to remedy deficiencies in public services are met by states and localities without a federal grant program; and (d) as experiments with new directions and innovations in public programs occur.

⁴Research is currently in progress on additional submodels relating to other FRED programs, including drainage, manpower, education, and transportation. The diagrams are simplified. For example, assessments are determined by sales to assessment ratios and industry location is likely to be affected by assessment levels.

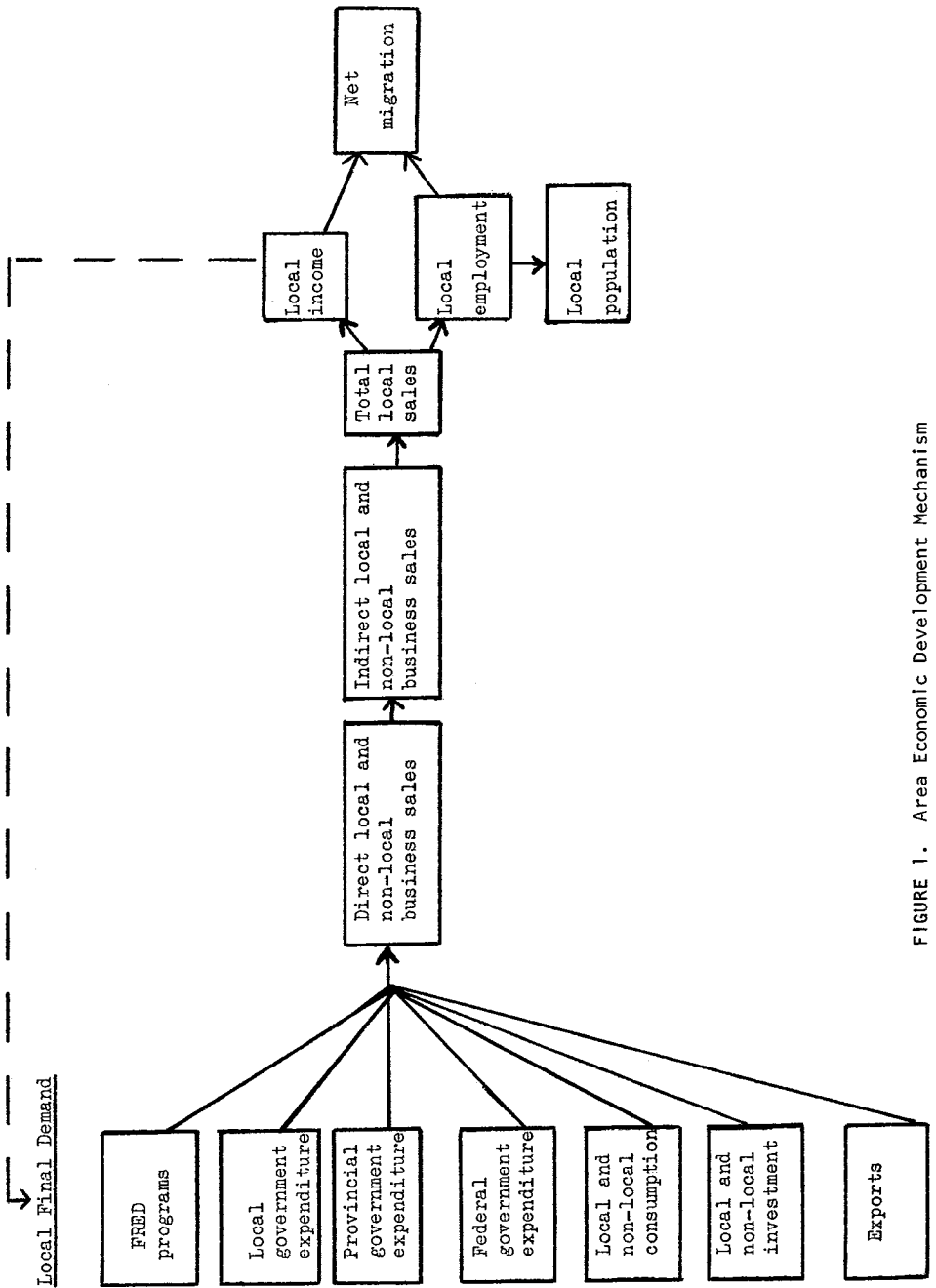


FIGURE 1. Area Economic Development Mechanism

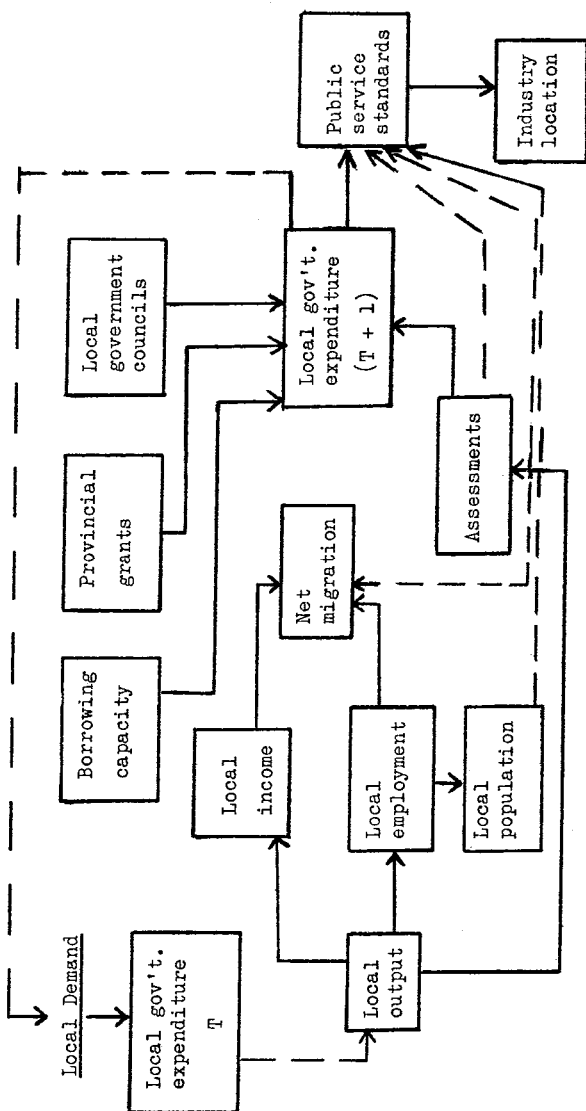


FIGURE 2. Local Public Services in Area Economic Development

Program expenditure projections are generally of three types. The first type estimates time trends of expenditure by function. In the second type, a program caseload can be correlated with total program expenditures by means of unit cost data. A third approach attempts to analyze factors affecting the demand and supply of different public service categories. The approach taken in this study is based on the assumption that current expenditures are determined by the amount of revenue available for local government planning, and that new facility investment is based on community preferences and borrowing capacity.

Local revenues represent the source of funds for current expenditures, and municipal bonds generate funds for the capital allocations of local governments. A functional specification of factors determining local revenues is required in order to form a quantitative basis for simulating the potential revenue for alternative urban spatial arrangements.

Revenues of town and rural municipal governments are determined primarily by the productivity of agricultural and urban business firms. The analysis derives revenues in three stages. First, land values in towns and rural municipal government areas are estimated. Then, assessments are calculated from land values by means of sales to assessment ratios. Finally, revenues are estimated by multiplying the assessments by the mill rates for specific functions.

It is hypothesized that dollar land and building values for towns and municipalities per acre, denoted by x_1 , are a function of local determinants of economic rent, represented by the distance from Winnipeg, which is shown as x_2 , agricultural sales per acre, which are shown as x_3 , business sales per acre, signified by x_4 , and population density, denoted by x_5 . Concepts of agricultural production location express land rent as a function of distance from a central market, yield per unit of land, product price, production cost, and transportation costs [3, p. 6]. The distance from Winnipeg and the value of farm products sold per acre are used as surrogates to represent the determinants of agricultural land values. Business productivity is represented by business sales per acre, and population density is used as a proxy for the influence of accessibility and availability [8, p. 118]. It is hypothesized that a significant population density regression coefficient implies competition for land.

Data for 8 towns and for 13 rural municipalities were grouped in the estimation of least-squares estimators for the parameters of the equations. Due to multi-collinearity between population density and business sales per acre, it is not possible to isolate the influence of each variable on land values.⁵ Instead, the least-squares estimations are obtained for

⁵The simple correlation coefficient between population density and business sales per acre is 0.96; data sources are cited in the Appendix.

two equations, one including population density and one including business sales per acre:⁶

$$x_1 = 251.020 - 6.050x_2 + 41.294x_3 + 3277.769x_5; R^2 = .88$$

(-15.896)	(70.196)	(315.48)
-.38	.46	10.39

$$x_1 = 845.160 - 11.889x_2 + 33.801x_3 + .749x_4; R^2 = .77$$

(22.032)	(125.474)	(.108)
-.54	.27	6.96

In both equations, the coefficients for the distance from Winnipeg and the value of farm products per acre are not statistically significant, yet the signs are as hypothesized. The equation with the population density variable has the largest R^2 , due to the fact that population density is more highly correlated with land values. The results indicate that the equations require further analysis with regard to possible interpretations and inferences concerning causality.

Property tax assessments are estimated by multiplying the estimated total land value by the average ratio of assessments to sales. Revenues are calculated by multiplying the assessment by the sum of mill rates for particular functional categories.

$$\hat{R}_j = \sum_i M_{ij} AS_j AC_j \hat{X}_{1j}$$

Where:

\hat{R}_j = estimated property tax revenues for the j^{th} town or municipality

$\sum_i M_{ij}$ = weighted sum of i mill rates for the j^{th} town or municipality

AS_j = average sales to assessment ratio for the years following the last reassessment for the j^{th} town or municipality

⁶The regression coefficient is significant at the 0.01 level for the one tailed 't' test. Values in parentheses are standard errors; 't' values are presented immediately below the values for the standard errors.

AC_j = total acres in the j^{th} town or municipality

\hat{x}_{1j} = estimated per acre land values for the j^{th} town or municipality

Local Government Decision Processes and Consolidation

In general, the analytical problem is concerned with the construction of a model to represent theoretical concepts relating to the general theory of public facility location. The issue is succinctly expressed by Tietz [17], who states:

Although theorists may have assumed that public facilities followed private decisions, a powerful feedback of public decisions on private also seems likely. If government can use public facilities as instruments to shape urban growth and social and economic behaviour, then a new level of evaluation is superimposed on the usual consideration of public services.

The essential viewpoint is that public services are a policy instrument. This contrasts with the usual approach which emphasizes the public service requirements associated with an urban industry of given structure and size.

The proportion of expenditures currently allocated to local functions varies widely among towns and rural municipalities in Manitoba's Interlake area. Uncontrolled expenditures (predominantly school expenditures) vary from 24 to 61 percent of the total budget. Other major categories, including public works, protection, sanitation and waste, health, and recreation, also illustrate the wide variation in budgetary allocation. Revenue sources illustrate the dependence on the local property tax. Generally, the provincial grants to local government tend to be inversely related to the equalized assessment per capita.

Discussions with local government administrators of rural municipalities and towns reveal that expenditure decisions are of two general categories. Firstly, current operating and maintenance decision estimates are made, based on past performance by function. Then a mill rate is established, based on expenditure and assessment estimates. Major categories of new expenditure are budgeted if a surplus of revenue from property tax collections and grants appears likely. Secondly, the council may determine that the community needs a new facility, such as watermains, sewers, or paving. In this case, the council requests a detailed budget from planning consultants, and a decision is made concerning the feasibility of raising the mill rate or of floating a bond issue. A major constraint on the borrowing of local government councils appears to be risk aversion behaviour, as none of the local governments are currently close to the

legislated maximum of 350 dollars per capita.⁷

Rural municipalities spend the largest proportion of their budget on roads and schools. However, school expenditures are not subject to the control of the municipal and town governments. Therefore, with consolidation of rural municipalities, the gain from efficiency would relate primarily to expenditure reductions in public works, in the organization of road grading and maintenance, and in administrative costs. Reduced operation costs per unit of current operations could result from consolidation of urban protection, streets, sidewalks, sewers, and watermains, for example. Expansion of present facilities, as well as the addition of new facilities, would be feasible due to a larger tax base and economies of scale.⁸

There are 13 towns in the Interlake area, with populations varying from 374 to 9,157 (Table 2). Although it is recognized that urban consolidation is presently politically unacceptable to local residents, the determination of the tax base, and the local service standards attainable with consolidation, would illustrate the upper limit to the potential cost reductions and/or service increases associated with urban consolidation. Projected revenues and expenditures and associated service standards for the present 13 towns forms a basis for comparing the potential benefits of urban consolidation.

TABLE 2: Interlake Urban Population, 1966 (towns > 350)^a

	Name	Population
1	Selkirk	9,157
2	Gimli	2,262
3	Stonewall	1,577
4	Stony Mountain	1,451
5	Arborg	891
6	Riverton	817
7	Teulon	817
8	Winnipeg Beach	753
9	Lundar	649
10	Fisher Branch	444
11	Ashern	<u>374</u>
	Total	19,192

^aD.B.S. Cat. 92-633 and 92-606 for unincorporated and incorporated centers, respectively.

⁷Many of the rural municipalities have no capital debt. Dollars of debt per capita vary among towns, such as Arborg, with a debt per capita of 262, and Selkirk, with a debt per capita of .241, which both have substantial debts.

⁸It is recognized that local service expenditures are relatively small; therefore benefits due to consolidation are likely to be small. However, the emphasis of the present study is on the specification of a framework applicable to all categories including major expenditures, such as schools.

Agglomeration Economies

As exports of area goods increase, the area economic system becomes more and more a self-sustaining economic entity. The extent of purchases of imports by business establishments and consumption purchases by households occurring in the area is directly related to the range of goods and services produced and merchandised locally. As a result, if the economic activity of an area is widely dispersed among numerous small towns, the threshold firm size for many non-public service goods will not be achieved. In addition, due to high costs per unit, the quantity of public goods will be reduced relative to the case of urban consolidation.

Analysis of spatial trading relations is required to permit generalizations concerning the potential benefits of consolidating the functions of the smaller towns in an area. The size of the urban center and its distance from Winnipeg are both related to its functional role in the urban regional system and in the hierarchic structure of the urban centers in Manitoba. While Winnipeg may dominate the urban regional system, each sub-area in an urban region has its own community of interests, and its own trading center for purchases of day-to-day needs.

A critical issue for urban policy is the extent to which the population will decline in the northern part of the Interlake area, while the population centers in close proximity to Winnipeg continue to grow. Due to the high rate of out-migration, the northern part of the Interlake area will suffer a reduced tax base and an inability to provide high quality services competitive with the southern urban centers. Moreover, the northern Interlake will not benefit from this industrial decentralization, which is likely to be confined to urban centers within 25 miles of Winnipeg, (specifically, Selkirk with a population of 9,000 and Stonewall with a population of 1,600). The factors outlined support the division of the Interlake area into two regions, a northern and a southern area.

Economies of scale for firms, industries, and towns, are generally utilized to support growth center policy recommendations. However, the complex interrelationships have prevented adequate measurement of agglomeration economies associated with increases in urban size. Isard [6, p. 186] outlines three problems inherent in defining agglomeration economies:

1. There are no standard cities and there are logical difficulties in selecting representative economy of scale functions,
2. Industrial composition, income, cultural and social organization, consumption patterns, and geographic setting create a weighting problem,

3. Public and private economic activity in intraurban and urban-rural net economy functions are interrelated.

A model is required to quantify the explanatory variables underlying the outlined complexities. An analysis of the hierarchical relationships among towns of increasing size is required in order to permit an explicit consideration of the above problems as outlined by Isard. The geographic distribution of retail and service businesses in central areas approximates an equilibrium adjustment to the geographic distribution of consumers, according to Berry [1]. Based on descriptive analysis, according to laws of retail gravitation, it is hypothesized that towns of a certain size perform specific functions. However, it is observed that the theory is not satisfactory when manufacturing and other non-distributive activities are among the more important local economic activities.

An hierarchic input-output table which includes different total urban sales size classes provides a means of summarizing the hierarchical relationships identified by central place theory, and of measuring the changes in structure due to the presence of specified industries. Adjustments can be made to standardize the model for variations in industrial composition, incomes, and consumption patterns. Furthermore, the economic interrelationships among public and private activities are identified.

It is hypothesized that economies of scale exist in the provision of public services for growth centers. To measure economies of scale, it is necessary to specify an envelope of cost functions for a service unit of a given quality. However, due to the difficulty in measuring quality differentials, the measurement of cost functions standardized for quality, as well as a rigorous analysis of economies of scale for public services, is not feasible.

Attempts have been made by Hirsch [4] to formulate a methodology for service quality identification for refuse collection and education. Multiple regression analyses of government expenditures generally fail to make adjustments for variations in service quality. It is difficult to draw conclusions concerning economies of scale, because explanatory variables relate to both demand and supply determinants represented in published expenditure data. Isard and Coughlin [7] utilize data from planning engineers and public service administrators, in order to synthesize cost functions for municipal services which attempt to standardize local service units for roads, schools, sewers, fire, and other expenditures. Alternative population density and income levels are assumed for a community of 25,000 expanding in population over a 20 year period.

If the Interlake area urban population was moved to a new site, the costs of private housing and the local service infrastructure would likely be prohibitive. The current annual reduction in expenditures would not offset the cost of new facilities. An alternative policy would be consolidation of the Interlake into two separate centers. In this case, if the consolidation were to be promoted in an existing center in the

southern part of the area, and an existing center in the northern part of the area, the cost of new facilities would be substantially reduced, relative to the construction of a new townsite. They would still be prohibitive in the short-run, however.

In the northern part of the Interlake, there are six towns with a total present population of 5,347 and the urban population is not expected to increase substantially in the future. For the six towns, there are current minor differences in the range of local services. Most towns have paved main streets, sidewalks, garbage disposal, police, fire, and recreation facilities. However, not all of the towns have sewers and water.

It is not likely that the cost reductions in current annual operating costs for the six towns would be greater than the amortized cost of adding to the scale of existing public service facilities in a town of 2,200, such as Gimli, an additional 3,000 people. The investment analysis is currently being carried out. In addition, consideration of the net social valuation of improved standards, loss of individual identity, and time-travel costs for rural households, is required to complete the analysis. For the community as a whole, considering local, Provincial and Federal facilities, consolidation based on technical efficiency criteria is justified when the present value of the annual reductions in net current operating and maintenance expenditures over the life of facilities is equal to the cost of the new facilities required with consolidation.

In addition to expenditure implications of consolidation, revenue changes must be considered. From a revenue point of view, increases in urban size are associated with increases in property tax revenue potential, as land values increase with urban economic growth. Therefore, net increases in property tax revenues result from a growth center policy relative to the sum of local tax assessments occurring if growth is distributed across 13 towns. To the extent that land values are a function of local business sales, it is implied that economies of scale for local business result in larger profits, higher economic rents, and increased urban land values.

A Town-Specific Input-Output Table

To provide a spatial dimension for the estimation of development impacts of public infrastructure expenditures, it is necessary to identify import leakages for towns of different size classes. Import leakages vary with the magnitude of town sales and the distance from Winnipeg. The calculation of sector import leakages by town size indicates a relative increase in development occurring with public programs in large towns. The model can also be used to estimate the local impact of adding a new industry to a town.

The structure of the model is outlined in partitioned matrix form:

$$(1) \quad \begin{bmatrix} X_{u1} \\ \text{---} \\ X_{u2} \\ \text{---} \\ X_{u3} \end{bmatrix} = \begin{bmatrix} A_{u1} & 0 & 0 \\ \text{---} & \text{---} & \text{---} \\ 0 & A_{u2} & 0 \\ \text{---} & \text{---} & \text{---} \\ 0 & 0 & A_{u3} \end{bmatrix} \begin{bmatrix} X_{u1} \\ \text{---} \\ X_{u2} \\ \text{---} \\ X_{u3} \end{bmatrix} + \begin{bmatrix} Y_{u1} \\ \text{---} \\ Y_{u2} \\ \text{---} \\ Y_{u3} \end{bmatrix}$$

Output in the model excludes the agricultural sector, as well as excluding local sales and purchases from agricultural firms. The omission permits the calculation of town-specific impacts, ignoring interrelations between farms and non-agricultural businesses. The magnitude of additional impacts due to interdependencies with agriculture requires the identification of farm trading patterns associated with each center. With the addition of agricultural sectors to equation (1), the linkages between rural and urban production activity can be measured.

The output of the k^{th} town, X_{uk} , is shown for the case where there are three towns. The model can be generalized to include any number of towns in the hierarchy. The coefficient matrices, A_{uk} , include both an import row and primary input sectors. The block diagonal matrix form implies that no transactions occur between businesses in different towns in the area. In the Interlake area, very few business transactions occur among towns; transactions occur with firms in Winnipeg, the regional capital. Final demand categories, summarized in Y_{uk} , include households, government, capital formation, and exports. In contrast to business purchase patterns, small town households shop in larger towns for higher-order goods and services. As a result, government wage expenditures in small towns will have an induced consumption effect on towns of a larger size.

The solution for gross output requirements from producing sectors is:

$$(2) \quad \begin{bmatrix} X_{u1} \\ X_{u2} \\ X_{u3} \end{bmatrix} = \begin{bmatrix} (1-A_{u1})^{-1} & 0 & 0 \\ 0 & (1-A_{u2})^{-1} & 0 \\ 0 & 0 & (1-A_{u3})^{-1} \end{bmatrix} \begin{bmatrix} Y_{u1} \\ Y_{u2} \\ Y_{u3} \end{bmatrix}$$

In the solution, the primary inputs and imports would be omitted from the coefficient matrix. The induced consumption effects would be calculated on an iterative basis rather than with the inclusion of households as an endogenous sector. Consumption functions and a conversion of household expenditure categories to sectors are required to complete the projection of town-specific development impacts of consolidation.

Alternative measurement units for input-output transactions include gross sales at purchaser's or producer's prices. The distinction between purchaser's and producer's prices is made on the basis of the treatment of distribution services and trade margins. In producer's prices, transactions are valued in terms of the firm's selling prices (farm receipts for agricultural products and value of shipments for manufacturers). The trade and transportation charges associated with area transactions are assigned to the purchaser. For example, agricultural inputs of manufacturing goods would consist of the dollar value at the manufacturing plant for goods, (such as tractor parts) and the transportation, retail, and wholesale distribution charges would be assigned to their respective sectors. The main emphasis of this method is the production interrelationships among firms by means of the separation of distribution and trade services from all transactions.

A variation of the producer's valuation, referred to as the direct method, does not allocate input purchases to the industry of origin, according to Stone [15, p. 48]. Input purchases by sectors are made from the wholesale and retail trade sectors. The direct method emphasizes the trade relationships rather than the production relationships in an area economy; it would appear to be the most useful for rural areas which have a relatively small component of manufacturing activity. Development programs will affect distribution activities in the specific area as well as manufacturing activity in Winnipeg or the rest of Canada.

If input transactions among manufacturing firms are important, the direct method would not be satisfactory. However, for the Interlake area, the direct method would appear to be the most useful, due to the predominance of trade activity in the economy. In addition, the direct procedure calculations are not complex; the interfirm transactions are easily followed and the transactions correspond to actual trade relations among firms.

In contrast to the producer's price valuation procedure, in the purchaser's price tables, the trade and distribution costs are added to all transactions. The entries consist of the producer's price at the plant, plus the trade and transportation mark-up. The entries for trade and transportation sectors are on a gross margin basis.

The complex structural relationships of a town-specific area transactions table are illustrated by the preliminary results for towns in six municipalities (Table 3). The effects of consolidation on each urban economy depends upon the magnitude of the changes in imports and induced local consumption. Further analysis is required to verify the entries in the table. Sector multipliers and projection of final demand are also required to complete the input-output component of the simulation model.

Summary and Conclusions

An analysis of the role of public services in urban-regional development

(\$6 million sales)

TABLE 3: Industry Transactions by Urban Sales Class^a (preliminary) - \$1,000

Urban Sales	Urban Purchases	Towns with sales <\$5 million	Local Final Demand										Exports out of Interlake	Total Sales		
			Urban Sales <\$5 million	Urban Purchases <\$5 million	Mfg.	Non-Mfg.	Retail	Wholesale	Services	Total Intermed.	Household	Government			Exports to Interlake	Total Local
		1,477								10,026	21	2,443	13,961	426	3,052	17,438
Manufacturing			0	5	0	0	33	38	0	0	0	0	38	203	712	953
Non-Manufacturing			50	10	25	57	8	151	120	2	2	0	273	0	58	331
Retail			0	17	5	7	0	29	1,780	0	0	39	1,848	204	356	2,407
Wholesale			0	0	50	0	1	52	1,209	134	826	2,222	2	0	0	2,224
Service			8	6	33	9	5	62	336	0	0	398	0	22	420	
Primary Inputs			3,488	115	92	41	284	157	689							
Imports from Interlake			650	674	0	0	130	0	804							
Imports from Outside Interlake			11,829	105	199	2,253	1,737	216	4,511							
Total Purchases			17,438	953	331	2,407	2,224	420	6,336							

(\$7 million sales)

TABLE 3: Industry Transactions by Urban Sales Class^a (preliminary) - \$1,000

Urban Sales Purchases →	Towns with sales < \$5 million		Towns with sales < \$5 mill. sales		Local Final Demand					Exports out of Interlake	Total Sales		
	Mfg.	Non-Mfg.	Retail	Wholesale	Services	Total Intermed.	Household	Government	Exports to Interlake			Total Local	Other Unallocated
Manufacturing	0	5	0	0	0	5	0	0	38	43	210	678	931
Non-Manufacturing	20	18	16	2	16	73	228	0	0	301	34	251	586
Retail	2	0	0	2	0	3	3,962	94	48	4,108	23	925	5,262
Wholesale	1	0	64	0	3	69	179	30	118	395	29	38	462
Service	3	16	25	1	3	48	203	0	0	251	0	2	253
Primary Inputs	83	251	582	31	196	1,144							
Imports from Interlake	776	0	0	0	0	776							
Imports from Outside Interlake	46	296	4,575	427	34	5,574							
Total Purchases	931	586	5,262	462	253	7,495							

SELKIRK

(\$38 million sales)

TABLE 3: Industry Transactions by Urban Sales Class^a (preliminary) - \$1,000

Urban Sales Urban Purchases	Towns with million sales <\$5		Towns with million sales <\$5 mil.		Local Final Demand					Exports out of Inter- lake	Total Sales		
	Urban Sales	Urban Purchases	Non-Mfg.	Mfg.	Retail	Wholesale	Services	Total Inter-med.	Household			Government	Exports to Inter-lake
Manufacturing	0	28	3	0	0	31	35	10	227	302	322	18,511	19,134
Non-Manufacturing	68	112	55	4	52	292	416	9	0	717	1,285	127	2,129
Retail	1	18	3	54	5	81	5,919	191	931	7,122	592	482	8,196
Wholesale	25	2	163	3	116	309	666	365	1,295	2,635	1,616	925	5,177
Service	13	49	87	25	73	247	1,280	40	16	1,582	0	1,744	3,326
Primary Inputs	8,105	1,019	1,700	709	1,332	12,865							
Imports from Interlake	517	0	0	0	0	517							
Imports from Outside Interlake	10,405	901	6,185	4,382	1,748	23,621							
Total Purchases	19,134	2,129	8,196	5,177	3,326	37,962							69,231

^a Unpublished data from a 1968 survey of Interlake business firms conducted by the Department of Agricultural Economics, University of Manitoba

requires a theoretical basis. Most research has been of a partial nature. A synthesis of regional growth concepts is required to explain the impacts of public investment. A conceptual basis for evaluating alternative development policies involving public service expenditures must be derived in the context of a general model of urban regional growth.

From the developmental point of view, it is essential to coordinate all public expenditures to stimulate regional development. An example of this need is found in the Interlake plan, where no provisions are made for local service grants or for coordinating current local expenditures needed to achieve development. A substantial potential is presently being overlooked; for example, the annual defense service expenditure of 8 million dollars in 1969 was larger than the FRED expenditure of 5 million dollars for the same year.

The current deficiencies of public expenditure and revenue methodology are reviewed. Variables relevant to local decisions omitted from past studies need to be considered. A regression model is estimated for the projection of local land values as a basis for projecting revenues and expenditures. A general assessment of the potential benefits and costs of consolidation is given and a method of testing the hypothesis outlined.

The concepts of public and private agglomeration economies are reviewed. The use of a town-specific input-output table provides a means of summarizing urban economies of scale, and a preliminary table is presented. The town-specific input-output table provides a basis for simulating the development impacts of alternative levels of local investment in large versus small towns, and changes in the agricultural base and the associated impacts on the viability of rural trade centers. The methodology provides a means, not previously possible, of testing hypotheses in these areas.

The town-specific input-output table, based on total sales by town, provides a means of estimating the local and non-local impacts of public service expenditures. Impacts are classified into three categories:

1. local induced consumption resulting from changes in public service wage expenditure,
2. local sales effects of change in public service material expenditure,
3. the range of impacts by town size provides a basis for judgments concerning the probable effects of promoting town growth in alternative sized towns in the area.

Growth center policy recommendations have typically been based on the size of town population or on employment. Population is the major variable in the geographer's central place theory. The town-specific table provides a means of overcoming deficiencies by focusing on town sales and on differences in the industrial structure of towns.

APPENDIX

Definition and Source of Data for Regression Variables

- x_1 - The value of land and buildings per acre is obtained by multiplying the average sales to assessment ratio by the total assessment. This is then divided by the acreage to find the value per acre. Acreage for municipalities was obtained from the 1967 Statistical Information, the Department of Municipal Affairs. Town acreage was estimated by the use of maps obtained from the Department of Municipal Affairs.
- Note: The sales to assessment ratio is not reassessed each year for each municipality; i.e., the sales figure of the ratio is changed each year, but the assessment figure is changed every 5 years, and not all municipalities are reassessed simultaneously. Therefore, errors existing in the value of lands and buildings need to be determined.
- x_2 - The road distance from Winnipeg for towns is estimated from a map of the Interlake and the road mileage for municipalities is taken from the center of the municipality to Winnipeg.
- x_3 - Productivity index for 1966 is calculated by dividing the 1966 acres in crops by the 1966 total improved acres. This data is obtained from the 1966 Census of Canada D.B.S. Cat. No. 96-608.
- x_4 - The town business sales data is obtained from a survey of the Interlake area. The municipality business sales consist of the summation of all town business sales in the municipality.
- x_5 - Population density 1966. Population figures are from the 1967 Statistical Information book from the Department of Municipal Affairs.

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REGIONAL SCIENCE AND PUBLIC POLICY

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Scholars have suggested three distinct aspects of regional science: its interdisciplinary approach; orientation to the spatial aspects of society; its concentration on the solution of practical problems [8, 12]. The third of these is the major concern of this paper. Its thesis is that regional scientists claim to be handling practical problems, but do not seem to be doing so in reality.

John R. Meyer [12] discusses several policy problems that motivate regional scientists and economists. One major area of interest has been transportation planning, including the development of origin and destination studies and gravity models to aid in forecasting demand. While early projections tended to take a mechanical approach, later ones tried to consider more behavioral characteristics. Meyer notes also that regional economists and scientists have been involved in many studies of urban problems other than transportation, for example, the New York Metropolitan Region Study, the Pittsburgh Regional Planning Association Study, and the Upper Midwest Study. Thus, Meyer [12, p.31] is led to say,

In general, regional analysis apparently has filled a void by developing tools applicable to economic planning problems at a time when economic planning has been increasingly in favor in many circles and governments. Thus, the great strength of appeal of regional analysis would appear to be its essentially pragmatic character and, in particular, its willingness to integrate theory and data and to undertake empirically difficult analysis.

Economists in other fields, however, might object to distinguishing regional economics because it is pragmatic. International trade, public finance, and monetary economics are all oriented to what public policy is appropriate under alternative circumstances. Perhaps a better argument, therefore, is that regional science is not distinctive because it is pragmatically oriented, but because the problems it deals with are newer and more critical today.

To really judge the contribution of regional science to public policy we need to look at the subject itself. It would appear difficult to criticize a body of theory that seems to deal with important and relevant

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