

APPROACHES TO REGIONAL ECONOMIC ACCOUNTING IN CANADA

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In the introduction of the paper, Economic Accounts are defined as a *set* of statistics useful in economic analysis and region is defined as a province. The paper is divided into four sections the first of which contains a brief historical outline of the development of demands for provincial economic accounts and the Dominion Bureau of Statistics' response to these needs. Apart from a description of the more well-known conceptual difficulties, some of the fundamental problems of the usefulness and applicability of a national accounting framework to the regional scene are discussed. The resource problems of constructing analytically meaningful and reliable as well as spatially reconcilable regional accounts are described.

Section II outlines the impact of present policies and problems on the development of regional statistics. It describes the reasons for the Bureau's desire to strengthen its data base in regional terms and the decision to await possible construction of regional accounts till the regional data base has been fleshed out in a more systematic manner. With the development of the latter, the ability, advantages and disadvantages of the provinces undertaking their own estimates must also be more fully explored. The third part of the paper deals with an overview of work in Canada on provincial accounts carried out by organizations other than the Dominion Bureau of Statistics. Section IV gives a very summary description of the data gaps which exist in presently available regional statistics.

INTRODUCTION

The purpose of the present paper is to describe the development of regional economic accounts in Canada. A definition of economic accounts as well as region together with an outline of the discussion constitutes the introduction.

Economic accounts are here defined as sets of statistics which measure, broadly speaking, total legal production of value created (and disposed of) within the market or near market boundaries of a specified area. While definition of regional economic accounts as a "set" of statistics implies that the production so measured should be capable of some analysis of its component parts and amenable to an examination of some of its details, the term "accounts" does not necessarily denote a set of balancing and/or double-entry type books. The reference to national accounting or specified areas is not meant to prejudge the technical issue as to whether regional accounts should conceptually be on a "domestic" or "national" basis.

"Policy involves a capability for action, and this in many contexts rests with governments. Accordingly, 'regions' must be defined as political jurisdictions . . ." ¹ Since Canada is a federation of provinces which have significant economic responsibilities these areas have been selected as the basis for the discussion and the main emphasis will be on provincial accounts. The term regional accounts will henceforth refer to accounts for sub-provincial areas.

¹Ruth P. Mack in *Elements of Regional Accounts*, W. Z. Hirsch, ed. John Hopkins Press, Baltimore, 1964 p. 45.

Apart from the conclusion, the paper is divided into four sections. Section I contains a very brief historical outline of the demands for provincial economic accounts and a description of the attitude of the Dominion Bureau of Statistics to these needs. Section II outlines the impact of current policies on the desire for regional data and some of the measures taken to meet this. Section III gives an overview of work in Canada on provincial economic accounts carried out by organizations other than the Dominion Bureau of Statistics. Section IV deals with the data problems, particular emphasis being given to some of the data gaps which exist as well as the present D.B.S. thinking on narrowing or closing such gaps. The conclusion ventures some thoughts on the likely future development of provincial economic accounts in the light of the discussion in the paper.

SECTION I

The first official national accounts, income and expenditure set of tables was published by the D.B.S. in 1946.² The need to give some regional dimensions to such accounts was recognized from the beginning. The first publication included among its few tables provincial details of labor income and net income (including agriculture) of unincorporated business. This was soon followed by the publication of provincial details (commencing with 1926) for total personal income as well as all its major components.³ Not much time passed, however, before demands for provincial data which would reflect the total economic efforts of a province more accurately than personal income were voiced.

Although the need for indicators of provincial production—and its disposition—was over the years expressed in many quarters, the most articulate requests came from provincial governments and found formal expression at a series of federal-provincial conferences on economic statistics.⁴ Since the last such conference the D.B.S. has explored these needs in a series of extensive bilateral discussions with the provinces and the present policy, described in the next section, has emerged from this process. Since the difficulties of the past—both conceptual and statistical—have by no means however disappeared, an outline of the reasons why the D.B.S. has so far found it impractical to actually construct provincial accounts, may be in order.

The absence of a conceptual framework within which one can construct some of the components such as corporation profits, and the lack of data in such vital areas as provincial exports and imports are examples of past and to some extent continuing obstacles to the creation of sound provincial accounts.

For multi-regional companies, it is difficult to determine the economic region of origin for profits and other company derived and determined statistics

²National Accounts, Income and Expenditure 1938–45, D.B.S., Ottawa 1946.

³National Accounts, Income and Expenditure 1941–48, D.B.S., Ottawa 1949.

⁴*Summary Report of First Dominion-Provincial Conference on Economic Statistics*, D.B.S., Ottawa, 1953 (Mimeo. Restricted Document). *Summary Report of Second Dominion-Provincial Conference on Economic Statistics*, D.B.S., Ottawa, 1955 (Mimeo. Restricted Document). *Summary of Proceedings of Fourth Dominion-Provincial Conference on Economic Statistics*, D.B.S., Ottawa, 1962 (Mimeo. Restricted Document). *Summary Report of the Fifth Federal-Provincial Conference on Economic Statistics*, D.B.S., Ottawa, 1964 (Mimeo. Restricted Document). *Summary Report on the Sixth Federal-Provincial Conference on Economic Statistics*, D.B.S., Ottawa, 1967 (Mimeo. Restricted Document).

such as interest and depreciation other than by some arbitrary method such as of the location of the head office, the distribution of salaries and wages, sales, employment or some judgementally or empirically derived combination of these factors. The development of establishment (i.e. sub-company) type information in the past has been such that serious consideration of either allocating company type financial statistics on the basis of—or deriving financial statistics directly from—establishment based surveys was very difficult. Lack of data, rather than conceptual doubt impeded work on the expenditure side. As already mentioned, no provincial balance of payments data were or are available and no information on the provincial breakdown of investment in inventories, consumer expenditure and federal government expenditure exists. Although doubt was also expressed whether a regional distribution of central government expenditure would be analytically meaningful, this question arose perhaps more from considerations of welfare than from any conceptual fuzziness with respect to the final local distribution of production as defined in national accounts theory.

There also exist conceptual and data difficulties with respect to the provincial allocation of a national at market prices concept of production. Similar difficulties with respect to the industrial allocation of these concepts have been encountered in Canada in the construction of country-wide input-output tables and in the real industry of origin type approach to national accounts.⁵ Since the problem in the latter two systems has been solved by opting for a domestic at factor-cost concept of production, the adoption of a similar concept i.e. domestic production at factor cost for provincial accounts will probably prove viable.

As a matter of fact, in the late fifties the Bureau undertook a provincial estimation of the income side of the income and expenditure accounts for the year 1957 with the then available data and on a domestic and factor cost basis. The estimates were never released as they were not judged to be of sufficient reliability, however, a paper outlining the methodology was distributed to the provinces. This particular method which was also reviewed in 1967—and found to be still inadequate for any in-depth analytical work—may be summarily described as follows.⁶

Approximately 75 per cent of data, like labour income and net income of unincorporated business are common to both GDP and personal income, and the same estimates as are employed in personal income by provinces can be used to derive Gross Provincial Product (G.P.P.).⁷ Essentially company-based items like corporate profits, other financial returns and depreciation can roughly be estimated provincially in the following manner:

⁵G. J. Garston and D. A. Worton, "Problems in the Estimation of Industry Output in Current and Constant Dollars in Canada," *The Industrial Composition of Income and Product*, N.B.E.R. Studies in Income and Wealth, Vol. 32, New York, 1968, pp. 423-429.

⁶*Provincial Allocation of National Accounts Aggregates*, D.B.S., Ottawa, 1960 (Mimeo. Restricted). While—like with most efforts of a statistical agency—quite a number of people contributed to the above document, it was mainly the work of R. B. Crozier and T. F. Wise (then of D.B.S.). The 1967 working papers were chiefly the work of A. S. Foti, P. S. K. Murty and J. P. Roux.

⁷Although in theory personal income is, of course, on a where cash income received basis, while G.D.P. is on a where accrued income paid basis, fortunately for Canadian statisticians there are not many statistically important instances of interprovincial commuting, and we have never given the cash vs. accrual estimation of labour income a sufficiently high degree of priority to even estimate it on a national basis.

In the commodity-producing industries, profits, etc. can be allocated on provincially available census value added data⁸ after having deducted from these values labour and unincorporated business income which are already available provincially. In the remaining industries a rather arbitrary allocation of profits and financial data of multi-establishment, multi-regional companies on the basis of the ratio which salaries and wages and sales in a province have to their Canadian totals can be employed. The main reason for this procedure is simply its administrative convenience and precedence since the same method is used by the taxing authorities to allocate taxable corporate income. Depreciation in the non-commodity producing industries can be distributed on the basis of capital repair expenditures which are available provincially⁹ on the assumption that capital consumption allowances are roughly proportional in their provincial distribution to actually made repair expenditures. Apart from its statistical weakness and conceptual ambiguity this method also suffers from what one might term administrative and structural drawbacks in that provincial value added data usually do not become available till almost two years after the reference period and many components of this method do not easily lend themselves to further regional disaggregations.

Attempts to structure provincial accounts along the traditional income expenditure accounts have, however, been questioned in a much more fundamental manner. Problems of monetary and fiscal management, the external relation of the currency and the avoidance of the ups and downs of the business cycle have been and are in the main the responsibility of the national government. One of the chief—if not the primary—objective of the income expenditure accounts has been to furnish a meaningful framework within which decisions on these issues could be made. At the sub-national level, on the other hand, “it is clear that the major regional problems are different from those posed at the national level, and it does not necessarily follow that they require a complete set of national income and product accounts as their basic framework of economic information.”¹⁰ Furthermore, “there is no compelling problem that dominated the field of regional analysis to give it focus in the same way that economic stabilization has dominated macro-economics and the monopoly problem has dominated micro-economics.”¹¹

The precise reasons for provincial accounts, the nature of the potential analysis, the specific parameters of the economic problems and the particular or general framework of the accounts which might best serve these ends were therefore—and to some extent still are—very difficult to isolate and specify.

Even if there had been no basic conceptual problems and data for provincial accounts had been more readily available, the immensity of a properly executed

⁸*Survey of Production*, D.B.S., Ottawa, Annual. Since census value added data contain duplications resulting from intermediate purchased services which are not deducted in a census value added concept, even these figures are very rough approximations to a profit or surplus concept.

⁹*Private and Public Investment in Canada, Outlook and Regional Estimates*, D.B.S. and Trade and Commerce, Ottawa, Annual.

¹⁰R. and N. D. Ruggles “Regional Breakdown of National Economic Accounts,” *Design of Regional Accounts*, W. Hochwald, ed. John Hopkins Press, Baltimore, 1961, p. 132.

¹¹J. Burkhead “Public Finance as an Integral Part of Regional Accounts,” *Elements of Regional Accounts*, W. Z. Hirsch ed., John Hopkins Press, Baltimore, 1964, p. 51.

job appeared in the past simply overwhelming. Such an undertaking will involve compiling every year ten provincial aggregates with all their appropriate details, making them consistent with all other provincial data, integrating them with national totals, and analyzing them in terms of national price and volume movement. The possibility of being faced with provincial demands for the latter dimension as well as eventually quarterly data, must also be taken into account before one commits resources to such a project.

It can indeed still be argued that the resources of a central statistical agency would be more efficiently employed in developing a regional potential or data base than to undertake such estimates themselves. Regional analysts could then build up their own macro-economic models from this base. Not only would this give a much greater degree of flexibility to the construction of provincial accounts and they could be much more readily related to regional analytical and policy needs, but the builders and users of accounts would thus be the same people—or at least work in close proximity to each other—and the assumptions which must inevitably be made at the detailed working level could be more clearly recognized. Analysis could thus be based on an intimate knowledge of the limitation of the data and would presumably therefore be more reliable. Furthermore, as this approach would spread statistical expertise more widely over the country and result in more experimental solutions to given problems, it can be argued to have more long run potential benefits than a centralized methodology possesses. As a matter of fact, though it is recognized that a central statistical agency should be ready to set standards and provide technical and coordinating assistance and make available data, it is partly because of the factors outlined above that there has been no really serious demand on D.B.S. to undertake regional input-output studies for specific regions.

There is, however, another aspect which differentiates provincial input-output models from other macro-economic aggregates. In the main such provincial input-output models as exist in Canada (and which are summarized in Section III) have been built for specific analytical purposes and no serious proposals have been made to use them for inter-regional comparisons or to construct them in such a way that a national table can be derived.

Although none of the considerations described so far have lost their validity, development at all levels of government and in the political, economic and statistical areas have illuminated the problems from different angles and involved the D.B.S. in an ongoing process of reassessment which forms the topic of the next section.

SECTION II

The bilateral discussion with the provinces, previously mentioned, led to a careful review of some of the D.B.S. policies as well as to an evaluation of the plans of D.B.S. on the development of regional data and accounts. It also became evident that some of the problems already outlined in the previous section were not too well defined; for instance, although the demand for provincial economic accounts on the part of the provinces was of long standing, the Bureau had only a very hazy notion as to the exact reasons why these demands existed, the specific

nature of the type of analyses which the provinces wanted to undertake—and hence the exact specification of the data required, the amount of help—financial or otherwise—which the provinces wanted or were able to render, and whether some of the provinces would prefer, in the current American vernacular, to “roll their own” rather than have the central statistical agency estimate these aggregates or provide a coordinating function for their individual, provincial estimation.

A series of bilateral discussions with the provinces were undertaken in the course of which these needs became more clearly defined and the milieu within which such statistics would be employed became more evident. However, whether provincial accounts are the best means to satisfy these needs, can like the proverbial pudding only be determined when they exist and are used.

The needs varied from the relatively unsophisticated desire for one figure—be it production, demand or income—against which the overall economic performance of the province could be compared to detailed information to be incorporated into advanced econometric models built by provincial experts. In terms of people and resources involved, development in the provinces also has progressed unevenly. Some readily admitted that if provincial accounts with any analytical capability were forthcoming in the near future, the staff to make use of them would still have to be hired and trained. By contrast, some provinces already enjoyed a fairly developed statistical service as well as an advisory policy formulation organization.

It is obvious that the different needs of all the regionally-oriented analysts, planners and policymakers as well as variation in available economic expertise prevent the emergence of a consensus on even the broad specifications or purposes of provincial economic accounts. However, it is possible to describe in general terms the types of analyses for which they might be used.

Problems of growth and development are probably the most frequently mentioned areas of concern. The analysis of such problems fractures itself on closer examination in many directions. Under the heading of ongoing growth and development, provincial authorities want to discover not only what has been the past performance of the region as a whole but also its causes. Depending on the type of analysis pursued, the statistics available and the prevailing economic and legal constraints, policies designed to influence such growth can be directed towards either the production or demand side.

Another problem area is that of interregional income disparities. The Economic Council of Canada has been very much concerned here and has suggested “two main, interrelated considerations . . . in moving towards a better regional balance. The first is the importance of reducing the relative disparities in average levels of income as they presently exist among the regions The second consideration is the need to assure that each region contributes to total national output . . . on the basis of the fullest and most efficient use of the human and natural resources available to the region.”¹² While output data are obviously needed to quantify the issues raised in the last half of the quotation, personal provincial income has been found adequate for a quantitative look at

¹²Economic Council of Canada, *Second Annual Review*, Ottawa, 1965, pp. 98, 99.

the first problem.¹³ It has, however, been suggested by F. T. Walton¹⁴ that reduction of regional income inequalities can be approached as a developmental or welfare objective (or both). Obviously the choice of objective lies in the hands of the policymaker. However, if estimates of personal income, whose concepts are influenced by welfare considerations, are used as the best available substitute for estimates of production the shortcomings of such proxy measures have to be carefully spelled out.

While there exists a long history of federal government activities designed to correct regional economic imbalance, these have in the past mainly consisted of *ad hoc* measures with little attempt to design such policies in an integrated manner.¹⁵ The federal government has now established the Department of Regional Economic Expansion, "a department charged with the object of ensuring that people in all areas and regions of our country have as equal access as possible to the opportunities of Canada's economic development."¹⁶ It is not unlikely that the establishment of such a federal department will now give a federal dimension to the demand for provincial economic accounts. Exactly what shape such demand will take and whether it will simply be another pressure to produce something quickly—and by implication roughly—or whether it will aid in a well planned long-run development of regional data remains to be seen.

There exists some possibility that the federal department will require not only value data but regional volume and price data as well. The absence until now of equally strong pressures by the provinces for provincial price analysis is probably caused not only by their realization that such price data might be more difficult to obtain than value data, but also their basic inability to influence the course of prices. Furthermore, while the provinces' interest has in the main been restricted to annual data, it is not too unlikely that demand for timely sub-annual regional data may also emanate from the newly integrated federal approach towards regional problems.

The efforts by the provincial authorities to construct their own provincial accounts, described in the next section, clearly demonstrate that the desire for such provincial accounts is strong enough to have prompted the provinces to invest their own resources into such projects. By now there exists, therefore, in some provinces, an analytical and policy formulation capacity which with the passage of time can only grow and improve. At the same time the federal demand for regional statistics and their increasingly sophisticated use is growing. In this changing climate it has been felt at D.B.S. that while it is still too early to decide to undertake the actual construction of one or more sets of provincial accounts, it has become incumbent on the Bureau to speed up its developments of the regional data base from which reliable and good quality accounts could be

¹³See S. E. Chernick, *Interregional Disparities in Income*, Staff Study No. 14, Economic Council of Canada, Ottawa, 1966.

¹⁴F. T. Walton, *The Formulation of Regional Economic Objectives*, Paper delivered at the meetings of the Canadian Economic Association at Calgary, Alta., June, 1968.

¹⁵For a short review and evaluation of such measures see: Economic Council of Canada, *Fifth Annual Report*, Ottawa, 1968, chapter 7.

¹⁶Speech from the Throne, *House of Commons Debates*, Volume 113, No. 1, Queen's Printer, Ottawa, 1968, p. 7.

constructed either by federal or provincial agencies, and tentative priorities have been set for the course of this development.

It may also be noted that from a strictly statistics management point of view, the development of data within a given framework—even without any definite commitments as to the actual erection of such a framework—permits a smoother, more integrated and more coordinated program than *ad hoc* and piecemeal extensions.

The fact that D.B.S. establishment statistics are now fairly well developed makes it not unlikely that provincial establishment-based data for macro-economic aggregates will be constructed first. Combined with this is the suitability of establishment-based data for the type of analysis which many provinces want to carry on. Furthermore, location specificity of such data give a capability of sub-regional aggregation. The already existing program for the further extension of establishment-type data by D.B.S. briefly dealt with below, reinforces these arguments. The further development of regional establishment data would render feasible the construction of reliable value added as well as input-output type of accounts. It might eventually make it possible to give such accounts a price and volume facet as well.

Economic analysis of a region which omits the demand side is not fully adequate. The fact remains, however, that sub-national governments are in many cases not able to have too significant an influence on the demand side, either in terms of their own goods demanded by outsiders or the goods demanded by their own residents from outside. Furthermore, as the openness of an economy often increases inversely with its size, this becomes even more evident in the small area type of analysis. Also one sometimes has the feeling that while it has become quite acceptable for local governments at various levels to try and attract industries and create conditions which result in greater employment and exploitation of resources, policies designed to influence the demand side such as campaigns to foster purchase of local product at the local level are somehow not considered “fair” by competing regions. Nevertheless, a reasonably strong desire for data on the demand side is also present in Canada. One of the main reasons for this stems from the fact that taxes at the sub-national level are quite often aimed at final demand and provincial taxing authorities are therefore understandably interested in viewing their tax base and potential within an integrated macro-economic framework. Provincial planners, furthermore, are interested in the export-import aspect of the demand side. The difficulties of constructing a framework and filling its cells for a sub-national balance of payments are too well-known to require elaboration. It is, however, worthwhile mentioning that to contemplate a further reasonably reliable disaggregation of such a scheme (as well as many other final demand categories) into small area data, constitutes a statistical monster which one cannot face with equanimity.

Since there exist institutional and constitutional constraints which seem to circumscribe the potential economic impact of regional demand oriented policies, and since it is statistically more difficult to construct a base for a provincial gross expenditure framework, its development has under present circumstances been given a lower priority than that of the establishment type data base.

These conclusions are reinforced by the existing plans for the development of

statistics which now exist in the D.B.S. and which have been drawn up after a very careful process of weighting and considering all the demands made on the Bureau. The realization of these plans will constitute a significant strengthening of the Bureau's data base. If the regional dimension is given proper attention—and although this will involve some new data collection it appears to be primarily a question of appropriate coding and tabulation—the present data short-falls, outlined later on will, largely disappear. The development plans of the D.B.S. over the next few years are perhaps quickly perceived by quoting from a recent official submission of D.B.S. to the Canadian Senate.¹⁷

D.B.S. is embarking on programs designed to accelerate its capacity for meeting the contemporary demands for information with more speed and flexibility.

A substantial extension of the coverage of price statistics is underway. Together with information that will be secured from national surveys of family expenditures and incomes, which are being planned, the extended program of price statistics will also make possible realistic analysis of regional income and living cost differentials and more effective appraisal of the real income position of lower income groups. Information of this sort is badly needed in connection with policy formulation in costly welfare, income maintenance and area development programs.

A dominant feature of the Canadian economy since the end of the war has been the growing importance of the service industries. Since 1946 more than 80 per cent of Canada's employment growth has occurred in this sector of the economy. It is planned during the next five years to enlarge and improve substantially the coverage of statistics in these areas and it is expected that this information will facilitate insights into the implications of the changing structure of these industries. Similar strengthening is required in transportation and public utilities statistics.

The construction industry is a large and highly volatile sector of the economy whose frequent fluctuation is a major source of instability with far-reaching repercussions. Only general and incomplete information is available on this important industry. A program is being developed to improve substantially the coverage and quality of the statistics on the construction industry.

Like many other statistical agencies in the world, D.B.S. is of course making increasing use of more and more complex electronic data processing installation and as such installations make possible the progressive automation of the entire data collection activity, one can expect that in the future more easily retrievable regional characteristics can be incorporated into the data base.

It is also felt that the systematic development of the regional aspect of data will benefit from the initiation of a systematic planning function within D.B.S.

It is evident from the foregoing that while the D.B.S. is planning to broaden

¹⁷Dominion Bureau of Statistics, *Brief to the Special Committee on Science Policy*, Senate of Canada, Ottawa, 1968, pp. 80, 81.

and deepen its regional data base, it is not in a position to undertake the construction of provincial accounts. D.B.S. has also not reached any firm conclusions as to the type of provincial accounts which would be most useful analytically, although there exist preferences, prompted by feasibility, towards an establishment based data system.

Appearances perhaps to the contrary such a course has at this juncture of time several very significant advantages:

1. It permits further exploration by the provinces into the kind of system which they would eventually like to see and from which they will in the long run derive the most analytical and policy formulation benefits.
2. It provides time both to the provinces and D.B.S. to build a competent statistical and analytical staff in this area and there are also some indications—as will be shown in the next section—that the application particularly of econometric methodology may have some significant pay-offs.
3. The development of a broad regional data base without marriage to any specific provincial accounting system prevents such development from being locked into a precise format at too early a stage. On the other hand, the expansion of regional statistics will benefit from the coherence and integrative influence of the system of national accounts.
4. In due time it may also be possible to remove the obstacles to the development of a provincial system of factor incomes. As more data become known and articulated, establishment and legal entity type may become reconcilable one with the other. At that point, a rational allocation of company type forms of income to establishment—and hence regions—could be attempted.
5. In the meantime, some guidelines might be developed on the question whether the central statistical agency should assume responsibility for the production on a regular basis of provincial accounts or whether it should exercise a co-ordinating function for accounts produced by the provinces.

A description of the work carried on by provinces given in the next section, will throw further light on the last point.

SECTION III

Contemporaneously with the issue to the provincial authorities of the restricted D.B.S. document¹⁸ outlining a possible methodology, some of the provincial authorities themselves began to estimate provincial aggregates. This part of the paper gives a brief summary of such estimates in so far as literature describing the methodology is available. Tempting as it might be to evaluate such methodology it would, in the author's opinion, be inappropriate to do so since the D.B.S. has so far been reluctant to undertake such estimates. Furthermore, some of the descriptions are in parts so concise that it is difficult to reach a balanced judgement either on the validity of the method or the quality of the results. Once the accounts have been constructed, it is also difficult in many

¹⁸See page 187.

instances to judge whether they will continue to be built and published on a regular basis. This section is, therefore, descriptive only. The description is summary and not exhaustive since the main purpose is to indicate the prevailing types of methodology. One should also bear in mind that provincial accounts produced by provincial bodies for specific objectives may be more than adequate for such purposes, while similar estimates of a general purpose nature, prepared by a central statistical agency, might well be lacking the necessary degree of reliability.

Most of the estimates of gross provincial product which have been publicly described are on a national rather than domestic basis. The reason for this choice of concept was due in most cases to the fact that the problem of allocating company profits and like statistics could be managed by making certain explicit or implicit relational assumptions about ownership based either on shareholders' residence or the location of companies' headquarters.

One of the earliest estimates of provincial product was made in 1959 by the Atlantic Provinces Economic Council in connection with an historical analysis of *The Economy of the Atlantic Provinces 1940-1957*.¹⁹ The historical gross provincial products for the four atlantic provinces were estimated by deriving from provincial personal income net provincial income at factor cost and then adding estimates of provincial capital consumption allowances and indirect taxes less subsidies thereto. The last two items were derived by respectively applying a ten year average ratio of capital formation in the province to that of Canada to the total Canadian capital consumption allowances and applying the national relationship in any given year of GNP at market prices to GNP at factor cost to the provincial product at factor cost so derived. The provincial net income had been derived by deducting published personal transfer payments to the provinces from personal provincial income as well as deducting a provincial portion of the Canadian public debt interest and adding a provincial portion of earnings not paid out to persons. Both the latter items were estimated by applying the relationship of the provincial portion of interest, dividends and net rental income of persons to the corresponding Canadian total to the published total public debt interest and earnings not paid out to persons.

A later study by the Atlantic Provinces Economic Council²⁰ employs the same methodology to derive gross provincial product and supports the above ratio used to allocate earnings not paid out to persons by a simple correlation study of the movement of corporation profits and miscellaneous investment income and interest, dividends and net rental income received by persons.

In addition to estimating gross provincial product, the later study also contains estimates of gross provincial expenditures. In this estimate, personal and current government expenditures are added together, while all gross fixed capital formation—both public and private—is shown as one total. No estimate of change in inventories is made, nor is there a residual error of estimates between the expenditure and income side but on the expenditures side “an adjusting item

¹⁹A. C. Parks, Atlantic Provinces Economic Council, Halifax, N.S., and Fredericton, N.B., 1959.

²⁰D. B. DasGupta, *An Approach to a Social Accounting System for the Atlantic Provinces*, Atlantic Provinces Economic Council, Fredericton, 1966.

has been added to allow for any inadequacy of data which may have existed in the derivation of components."²¹ Capital formation by provinces is available from published D.B.S. sources, while government expenditures were derived from provincial public accounts and information made available by D.B.S. Government expenditures were then added to personal expenditures which were estimated on a simple Keynesian model of the propensity to consume based on detailed published Canadian consumer expenditure data, Canadian personal disposable income and provincial personal disposable income.

"The most 'sticky' part of all—estimation of exports and imports"²² was for the exports based on a study by I. Earl²³ "adjusted in relation to the volume of investments."²⁴ This estimate of exports only refers to exports abroad and does not include exports to the rest of Canada. Imports were estimated "in a crude way"²⁵ by assuming similar relationships to exist as pertain on the national level between exports and imports, imports and GNP and imports and the relationship of machinery and equipment expenditure to GNP.

The method which New Brunswick²⁶ chose for estimating GPP follows the two previously described income side estimates with the exception that earnings not paid out to individuals were estimated on the basis of the ratio of corporation profits in New Brunswick to those of Canada and that the ratio for deriving capital consumption allowances was based on a five year average. The New Brunswick estimates are distinguished from other estimates by three factors:

1. All methods and data are clearly spelled out and shown,
2. the assumptions underlying the ratios employed in the estimation were tested by correlation analyses and found to be reasonably reliable and
3. several other ways of estimating GPP were tried. The other methods were discarded because they were felt to result in data which were not considered as reliable and/or because the results could not be applied to other provinces—and it was felt that this should be one of the criteria of selection—or because the assumptions were of an *a priori* kind which could not be empirically tested and in many instances had to remain fixed from year to year. On these grounds the attempts to measure the expenditure side were completely discarded.

On the GPP side the method of projecting GPP on the basis of provincial personal income to Canadian personal income—and a second slightly more elaborate method—were discarded because the relationship had no stability. New Brunswick also endeavoured to estimate GPP by components and although they found this method not too inaccurate, they preferred the straight income estimation described previously, because it contained fewer assumptions and was

²¹Ibid., p. 32.

²²Ibid., p. 30.

²³*A Report on the Exports of the Atlantic Region*, Atlantic Provinces Research Board, Fredericton, 1964.

²⁴Op. cit., p. 30.

²⁵Ibid., p. 31.

²⁶N. G. Mulder and R. C. Simpsons "Gross Provincial Product: Methods and Estimates, New Brunswick 1956–1964", *New Brunswick Economic Statistics No. 7*: Office of the Economic Adviser, June, 1966.

universally applicable. Most of the ratios used in the component method were the same as the ones described in the income method. However, corporation profits in N.B. were adopted straight from the accounts of the tax authority. It was recognized by the authors that such profits are not strictly comparable to national accounts concepts because the steps to convert these data to the national accounts requirements were not made.²⁷ The component method makes no attempt to estimate an inventory valuation adjustment, but simply omits it in the provincial gross product and uses the provincially available component interest, dividends and net rental income of persons instead of a provincially estimated rent, interest and miscellaneous investment income component.

The province of Quebec²⁸ made GPP estimates by following the Canadian factor shares approach and making its own estimates for those components which were not provincially available from published sources. The data which were available provincially both for this study and the N.B. study outlined in the preceding paragraph are: Labour Income, Military Pay and Allowances (on a confidential basis), Net Income of Unincorporated Business and Net Income of Farm Operators. Corporation Profits after dividends paid to non-residents, the inventory valuation adjustment and capital consumption allowances were estimated on the ratio of dividends received by resident persons in the province to total dividends on the theory that all these items related to capital and on a national concepts basis it is the residence of the owners of capital which is the determining factor. The miscellaneous investment income component was allocated on the ratio of provincial personal investment income to national personal investment income and excluding dividends paid to persons from both the numerator and denominator. Indirect taxes less subsidies were estimated by obtaining the local and provincial taxes for the province separately and allocating the federal taxes on the basis of the relationship which pertained between the local and provincial indirect taxes less subsidies of the province and those of all the provinces. An estimate for a residual error proportional to the national residual error was also included.

Provincial accounts of a more articulated nature were published by the Institute of Public Affairs of Dalhousie University for the province of Nova Scotia.²⁹ Furthermore, these accounts explored another dimension because they also contained estimates for sub-provincial regions. The methodology for deriving sub-provincial estimates did not depart in most instances too significantly from that employed for obtaining the provincial estimates and the following summary will restrict itself to the provincial estimates. The Nova Scotia estimates are built up from a set of sector accounts which follow the Canadian

²⁷Although for reasons already stated, criticism of all these estimates has been purposely avoided, the fact that the authors of this method do not mention that the taxing authority's estimate of provincial profits is a purely administratively derived one—based on provincial salaries and wages and sales—is a rather serious omission in an otherwise very careful and detailed exposition.

²⁸*Tableaux Types Des Comptes Economiques du Québec 1946-1968*, Gouvernement du Québec, Ministère de l'Industrie et du Commerce, Bureau de Recherches Economiques, Québec, 1969.

²⁹Stanislaw Czamanski, *Regional Income and Product Accounts of North Eastern Nova Scotia*, Institute of Public Affairs, Dalhousie University, Halifax, 1968.

sectoring system³⁰ except that the government sector has been split into a local government and local operations of non-local governments sector. Rather than follow the outline of the document and proceed to a sector by sector description of items the main details which had to be estimated separately for the provinces are described.

Provincial salaries and wages have been broken down by sectors on the basis of data contained mainly in public accounts and the 1961 population census. An estimate of unilateral transfer payments to person in the province from outside the province on the basis of special listings supplied by the D.B.S. from its income size distribution studies was also undertaken. Direct personal taxes were estimated from information in various public accounts and related source documents. Provincial personal expenditure was calculated for 1961 on the basis of the D.B.S. *Market Research Handbook*, which contained census information, the D.B.S. *Urban Family Expenditure 1959*, other D.B.S. publications and adjusted for time differences and imputed items. "Income elasticity for all expenditure groups were calculated on the basis of the 1961 data. In addition, a marginal distribution co-efficient analysis was carried out"³¹ and personal expenditures for other years were then estimated on this basis and the increases in personal disposable income.

Although apparently no easy task, both the local and non-local government sectors were mainly derived from published statistics. Special listings, however, were obtained from the Department of National Defence to calculate defence expenditures in Nova Scotia, and these refer only to prime and not sub-contractors. Federal corporation income tax revenues for Nova Scotia were deemed to be equal to the tax paid by companies with headquarters in Nova Scotia. Taxes earned on operations outside Nova Scotia for N.S. headquartered companies are thus included, while taxes earned on business carried out in Nova Scotia by companies headquartered elsewhere are not. Dividends paid by corporations were, of course, estimated in connection with personal income and a study of the industrial structure and dividend payment by corporations headquartered in Nova Scotia led to the conclusions that these corporations had no retained earnings in Nova Scotia, so that the allocation of corporation profits posed no further problems. Capital consumption allowances were estimated by applying a three year average ratio of Canadian capital consumption allowances to Canadian gross capital formation to the Nova Scotia capital formation. The last remaining major items, and again the most difficult to allocate provincially were exports and imports. These were estimated by the use of "Locational Quotients." Industries were divided into those producing final goods for households, those producing intermediate goods for specified industries and those producing intermediate goods for many industries. When, for instance, in the case of consumer goods the relationship of output of a final commodity in the region to personal income in the region exceeded the total Canadian domestic consumption

³⁰The Canadian system consists of the following accounts: Personal Income and Expenditure Account, Government Revenue and Expenditure Account, Business Operating Account, Non-Residents' Revenue and Expenditure Account, Investment Income Appropriation Account and National Saving Account.

³¹*Ibid.*, p. 47.

of that final commodity to Canadian personal income "the excess was considered to represent Nova Scotia exports"³² and vice versa for imports. Similar quotients with different denominators were established for the intermediate goods-producing industries. "The assumption implied in this approach is that inter-industry flows within the region are so unimportant that they can be disregarded."³³

While reference has been made to GPP value estimates in budget speeches of Ontario and British Columbia,³⁴ no description of the methodology underlying these estimates has come to the attention of the author.

In a methodological study for the Province of Quebec another approach to the possible estimation of GPP, i.e. the value added on a domestic basis approach has been described, but no data have so far to our knowledge been calculated.³⁵ The project is primarily oriented to the derivation of domestic product for the ten administrative regions of Quebec, which upon aggregation are designed to yield gross domestic product for the province. The method consists in allocating to the regions provincial estimates of the gross value of output and of intermediate expenses by industry or, where this is not feasible, by allocating estimates of factor incomes, in order to derive value added for each industry and administrative region. In effect, two distinct processes are involved: the estimation of the provincial series necessary for the calculation of value added and the allocation of these series to the administrative regions. Since our interest in this paper is confined to the provincial aggregates of production, we shall not discuss the second operation, which is more complex and involves many more assumptions.

A distinguishing feature of this methodology is that it measures production on a domestic basis. The choice of the value added method was in large part governed by the desire for a sub-regional dimension. The other two methods, aggregate expenditure and aggregate income were rejected on account of the insuperable difficulties involved in measuring inter-regional flows for the former and gross profits for the latter. (However, a methodology for income measurements limited to personal and personal disposable income has also been developed as a complement to the sub-regional value added methodology.)

The basic concepts and classification systems, underlying the methodology are those described in various D.B.S. publications such as *National Accounts, Income and Expenditure, Indexes of Real Domestic Product*, etc. Statistical expediency also to some degree determined the method recommended for calculating value added. For the goods-producing industries, this consists of constructing production accounts showing on one side sales, value of the change in inventories and, including in agriculture, consumption on the farm and on the other side the cost of intermediate inputs and the residually obtained value added.

³²Ibid., p. 56.

³³Loc. cit.

³⁴E.g. *Budget Speech, Feb. 9, 1968*, British Columbia, p. 26, Budget 1968, Queen's Printer, Toronto, p. 37.

³⁵Roland Jouandet-Bernadat and Annie Bloch, *Projet d'établissement d'un système de comptes pour les régions du Québec*, Conseil d'orientation économique du Québec, 1968. (Mimeo, Restricted). The Section on Québec was written by J. P. Roux, whose assistance is gratefully acknowledged.

The latter is intended to be further broken down into its respective income components whenever possible.

For the service-producing industries, value added is derived by adding estimates of factor incomes, or by allocating provincially the national estimates using census data on gross value of production as indicators.

By its very nature the method is intended to rely on numerous and varied data sources. The major source for agriculture is the D.B.S. *Farm Net Income*; for manufacturing and construction, the D.B.S. annual census of manufacturing and *Construction in Canada*. For other industries recourse would be had to a great many sources: D.B.S. publications on particular industries, for example for the estimation of revenues, costs and wage bill in the industries comprising the transport, storage and communication group; publications containing labour data to allocate provincially the national estimate of value added in retail and wholesale trade, finance and insurance, and also for the estimate of value added in public administration and defence; census data on sales and revenues, among other things, to allocate provincially the national value added for most of the components of the service group; as well as unpublished data made available from various government departments including D.B.S., the Federal Departments of Mines, Forestry, the Quebec Department of Education and the Quebec Bureau of Statistics.

Only one province—Ontario—has constructed indexes of real domestic product. W. G. R. Cameron of the provincial government made such estimates both for Ontario and the rest of Canada in 1964.³⁶ In contradistinction to most of the other efforts described previously, the emphasis in this work is on the analytical content, and the methodological explanation is contained in a very concise appendix. Basically the method consists of taking the D.B.S. indexes incorporated in the Canadian index of industrial production—with the exception of the mining indexes—and apportioning these to an Ontario-other Canada split on the basis of provincial value added data published in the D.B.S. *Survey of Production*. For the other commodity producing industries, the provincial index of real agricultural output—albeit on a gross output basis—is taken from *Index of Farm Production*, a D.B.S. publication and the forestry industry index is based on published D.B.S. volume forestry data.

The remaining industries are projected essentially on the basis of available Ontario indexes of employment, crudely adjusted for productivity. Weights for these indexes are derived in a parallel manner, i.e. the 1955 weights in the goods-producing industries are based on the Ontario portion of Canada's value of production, while the remaining industries are again adjusted by Ontario-Canada employment ratios applied to Canada's real gross domestic product³⁷ in constant 1949 dollars to obtain amounts for Ontario which are then used as Ontario weights.

The mining indexes are annual relatives of physical volume of output data applied to 1949 weights calculated from the value of production figures contained

³⁶W. G. R. Cameron, "Preliminary Indexes of Production in Ontario," *Ontario Economic Review*, Vol. 2, No. 6.

³⁷*Indexes of Real Domestic Product by Industry of Origin 1935-1961*, D.B.S. 61-505, Ottawa, 1963.

(together with the data on physical volume of output) in the D.B.S. publications *General Review of the Mining Industry*. It may be noted that one of the major and basic underlying assumptions of these calculations is that price movements in Ontario are similar to those of Canada as a whole.

Consumer expenditures for all provinces and for Ontario subregions have also been calculated by Ontario government officials.³⁸ The basic methodology employed is that of econometrically estimating a consumption function for each of the areas on the basis of national disposable income, national population and national consumer expenditure and disposable income and population at the provincial and regional level. The methodology and various tests which the authors have run are well articulated, and all functions and parameters are given. The article also contains quarterly estimates of consumer expenditure for Ontario estimated primarily on the basis of retail sales as well as a forecasting model of consumer expenditure constructed along similar lines. It may be of interest to note that in certain of the detailed estimations of provincial consumer expenditures a special function for farm income to accommodate the volatile Saskatchewan income—which is predominantly a wheat economy—was included.

Input-output studies have also been of concern to the provinces and a brief summary of these efforts is given below.³⁹

Input-output tables have now been produced for almost all provinces in Canada at some time or other and though they differ substantially in quality and complexity they provide a framework for the systematic examination of the structure of provincial economics and the components of their gross domestic product. The first such provincial tables were published in 1961 for the provinces of British Columbia⁴⁰ and Quebec.⁴¹ These tables, based on data from the 1949 Canadian input-output table, proved not to be fully satisfactory as the aggregate industrial coefficients of the national table were used rather than the more appropriate provincial coefficients.

Commencing in the early 1960's more attention was given to the construction of provincial input-output tables than previously. An ambitious project was undertaken by Professor Kari Levitt of McGill University involving the construction of individual input-output tables for each of the four Canadian Atlantic provinces⁴² and one for the region as a whole. This project involved the compilation of the most detailed data available from D.B.S. questionnaires and the taking of extensive special surveys. These five tables were assembled for the base year 1960 and are currently being updated to the year 1965. For the base year 1961 there were tables constructed by the Quebec Bureau of Statistics⁴³ and by the

³⁸R. H. Frank and I. M. Rush, "The Pattern of Consumer Expenditures at Provincial and Regional Level," *Ontario Economic Review*, Vol. 6, No. 5, 1968, Queen's Park, Toronto, pp. 4-11.

³⁹The co-operation of I. H. Midgley for contributing the section on Input-Output is gratefully acknowledged.

⁴⁰R. E. Boston, "A Simulation of the Economy of British Columbia—A guide to Industrial Development," *Engineering Journal*, November 1961.

⁴¹André Raynauld, *Croissance et Structure Economiques de la province de Québec*, Ministère de l'Industrie et du Commerce, Province de Québec, Québec, 1961.

⁴²Kari Levitt, Atlantic Provinces Input-Output Tables 1960, unpublished.

⁴³*Modèle Interindustriel du Québec*. Ministère de l'industrie et du Commerce, *Statistiques*, Bureau de la Statistique du Québec, Juin 1969.

Manitoba Economic Consultative Board⁴⁴ for their respective provinces. The 1961 Quebec table distinguished 85 sectors and is the most detailed provincial table available so far in Canada; subsequent to its completion, the Quebec government has commenced work on a new 1966 table. The Manitoba table and similar 1961 tables for the province of Alberta⁴⁵ reflected a desire to construct input-output tables but the resources devoted to the job were limited. More recently the Province of Ontario has commenced construction of an input-output table with 1965 as the base year.

SECTION IV

Having as it were, viewed the positive side of provincial accounts by the preceding survey of provincial accomplishments in this area, this section gives an overview of the kind of data which still have to be created to construct provincial accounts anchored in factual knowledge rather than in the methodological heroism of the statistician.

The Canadian gross domestic product in constant dollars and the input-output tables, which are the macro-economic systems mainly based on establishment statistics are in the main not structured along regional lines and such establishment data as exist on a regional basis have therefore not been assembled in such a framework on a regular basis. In addition, many less data, both inputs and outputs, than one might assume to be available in view of the existence of the above overall systems of economic statistics are indeed collected. The fundamental reason for this state of affairs can be traced to the fact that with respect to real output data once a value added base period has been established, both sub-annual and annual data can be reasonably safely projected on either deflated census value added data (which contain certain duplications) or quantity data themselves, or even when the worst comes to the worst on gross output or productivity adjusted labour input data. The value added base which is projected in this manner as well as the input-output table are usually derived for very few, selected years by time and resource consuming processes. The construction of such bases for one year involves special surveys as well as "detective" work on the part of the statistician which the availability of more regular information would obviate. The usefulness of such data rests on the fact that they still portray fairly accurately movements in constant prices and that base years prove analytically valuable for some time in the future on the general assumption of the constancy of technological co-efficients. The data development previously outlined is designed to greatly improve the content of present frameworks.

Since the following description of the available data and the recognized data gaps touch on a great proportion of the D.B.S.'s output of establishment statistics, it is not designed to be exhaustive but is intended as a very broad summary only.

⁴⁴Manitoba Input-Output Table 1961, Appendix to *Fifth Annual Report Manitoba Economic Consultative Board*, Winnipeg, June 1968.

⁴⁵R. W. Wright, *Alberta Input-Output Table 1961*, University of Alberta, Calgary (mimeograph).

For the goods-producing industries, which on a 1961 base accounted for 44 per cent of total GDP, annual data—albeit of varying quality—from which some elements of provincial accounts can be estimated are available.

In manufacturing, mining and forestry and most of their important sub-industries, provincial details on the output of establishments as well as commodity and energy inputs are contained in an annual census. Missing from these as well as from almost all other subsequently described industries is information on purchased non-factor service inputs.

For the sea-fishing industry similar information is available on a quinquennial basis starting in 1965, while for inland fishing and the non-census years data on the gross value of fish landed only can be obtained.

In agriculture the statistics which exist are plentiful but lack some conceptual neatness for provincial accounts purposes since they are structured mainly on a commodity rather than an establishment basis and hence—among other weaknesses—do not include revenue from non-farm operations. The resultant impurities, however, will probably not cause too many analytical headaches. Data on trapping are likewise not on an establishment basis and an estimated gross value of output only is known.

Data on outputs in the public utilities industries are available, but not all material inputs are known and revenue from some subsidiary activity is also missing.

The last and statistically weakest of the goods-producing industries is construction where information on the value of output is for the most part obtained from a survey of purchasers with missing elements estimated in a variety of ways. Some rather weak, provincial estimates of material inputs—but not of energy inputs—are made on the basis of a limited national survey of construction contractors. There exists a possibility for data improvement in this area, since the D.B.S. has already started with some success to undertake censuses or near-censuses in selected groups of this industry.

Regional data at the provincial and local government level in the administration and defence industry are adequate, while at the central government level some data gap exists. Data at all these levels of government (the output of which amounted to 8 per cent of GDP in 1961) are not on an establishment basis, but as long as no substructuring of the industry is demanded this should not pose too serious a difficulty, since, particularly on the income originating side, the data can be identified regionally without too much difficulty.

The retail trade in contradistinction to the wholesale trade industry also suffers from a lack of establishment data with the exception of data from the quinquennial census and no information on inputs is available for either wholesale or retail trade. For the latter, however, triennial operating results surveys at the national level are undertaken by the D.B.S. For both industries sales by provinces from either annual or monthly surveys are known.

The quality of information in the transportation, communication and storage industry, which had a ten per cent weight in 1961 is varied. National data on gross outputs on an establishment basis are available in the communication industry, but the regional information is only partially available and this is aggravated by certain conceptual difficulties which are also encountered in the

transportation industry. From a data point of view, the latter industry is a very "mixed bag". Establishment information on the output of the air and urban and interurban transport systems and rail industries are available, while only partial information on input exists and regional data are to say the least spotty.

While partial information on a regional basis on outputs and material inputs on an establishment basis is available for the "other storage" industry, no regional or other establishment data exist in the statistically much more important grain elevator industry. There are certain administrative records which permit some rough approximation to the national totals involved, but good regional data are scarce.

Statistics pertaining to the fourteen per cent weighted service industry range all the way from provincially available output and material input data on an establishment basis in such groups as laundries, funeral parlours and motion picture theatres, to partial but reasonably adequate information in the public education and health industries to the absence of virtually any information in such industries as recreation, accounting, engineering, and legal services. No regional data are available about beauty parlours and repair shops, religious and eleemosynary institutions.

Since many of the data in the finance industry come from non-D.B.S. sources, are on a company rather than establishment basis and suffers from serious conceptual ambiguity, there has not yet been sufficient time to explore the statistical implications of structuring such data along regional lines. While some of the sub-industries in this field may prove difficult to estimate regionally, others may turn out to present no great data problems since the regulatory supervision of quite a number of these industries falls within the provincial jurisdiction.

It can be readily seen from the above description that in many instances where no regional data are available, no national data exist either. More surveys both in the service industries proper and in many service-producing industries will have to be taken and much more knowledge about non-factor service inputs over the whole spectrum of industries will have to be acquired. The previously described plans for the statistics in these areas will contribute greatly to the creation of a regional data base while the desire for regional economic accounts in turn adds another dimension to already existing demands.

While the demands for subprovincial macro-economic aggregates are not too wellknown and indeed the analytical value of a full and formal set of accounts at a small regional level can be questioned—the further development and extension of an establishment-based data system with a regional dimension will no doubt contribute to economic research and analysis at the smaller area level.

At this stage it is not easy to make any prediction as to what will be the likely sequence in which the missing data will be gathered. Since many of the outputs of service-producing industries are equally as unknown as the non-factor-service inputs, but since it is probably somewhat easier, both administratively and conceptually to survey outputs, data on outputs will in all likelihood be forthcoming much sooner than statistics on non-factor service inputs. This course of events is reinforced by the fact that in certain cases it may be possible to employ some outputs as inputs into selected industries.

Partly because of historical development, partly because of the greater

difficulty of accomplishing the stated objective and partly as a result of giving it a lower priority (which in turn may have been prompted by the first two reasons) data gaps on the expenditure side of any provincial accounting framework have not been explored with the same degree of thoroughness as those relating to the establishment based production side. In this area, data on gross capital formation, and local and regional government expenditure exist, while consumer expenditure on goods could probably be estimated reasonably well on the basis of regionally known retail trade data and investment in inventories, issuing largely from establishment sources, could conceivably be provincially structured. It would be difficult however, if not impossible, to make provincial estimates for consumer expenditure on services and no systematic information of central government expenditures by provinces exists at the moment. Good regional coding of existing data in the latter area might overcome the last problem, while it can no doubt be posited that extension of surveys in the service industries will alleviate the data situation in the consumer expenditure component. It is unlikely, however, that good provincial expenditure accounts can be constructed in the absence of provincial balance of payments data. It must be admitted that the need and cost for the construction of these—or the conceptual difficulties which would have to be overcome—have not yet been thoroughly investigated. In addition to the potential conceptual difficulties in the provincial balance of payment area and the conceptual obstacles relating to company based data previously described, there exist also some conceptual problems in an establishment-based system.

Although in practical statistical work it is at times hard to differentiate between data problems and conceptual issues, this is much more easily accomplished in a general description. The remainder of the present section examines some conceptual difficulties which stem inherently from the regionalization process itself. It is assumed that the recognized conventions of national accounting such as those—to name only a few—which fix the output of government and some other institutions as equal to the factor incomes, and define the limits of economic production as that flowing through actual or quasi markets will apply *mutatis mutandis* to provincial accounts.

Since areas of conceptual difficulty usually also suffer from a paucity of data, it is difficult to judge how quantitatively important these issues are and it is not possible to rank them in any precise order of significance. The so-called head-office problem, the allocation of some company-wide expenses and certain difficulties in the finance and transportation industries, are felt to be of sufficiently wide applicability to warrant brief mention. The solutions offered are the best compromises which have occurred to us. They are, however, highly pragmatic rather than theoretical and we would certainly welcome any improvements of methodology which can be offered in this area.

The distribution of non-factor inputs for the head office of multi-establishment companies across industries or areas is difficult and can in many cases only be solved conventionally. Assuming the most extreme case of a company with operations spaced among many regions and a separate head office with no output or sales located in a completely different region from the producing establishments, the calculation of value added or income originating for the head

office in the normal way, i.e. output minus non-factor inputs, results in a negative figure. The explanation of this particular phenomenon is of course not hard to find and is simply evidence of the fact that the value added in the operations of the company taking place elsewhere have been overstated in total by the amount of services rendered to these operating parts by the head office. Since the model described above is in many cases applicable to large companies with sophisticated accounting systems, it may be possible in a number of important cases to obtain directly from the company a reasonable allocation of head office expenses across its operating parts. After having deducted total head office costs from the previously estimated values added in order to avoid double counting, labour income and such returns to capital as the company deems to belong to the head office region itself are then counted in the head office region on the principle that the locus of product originating is where work is performed. Where no information is coming from the company itself, the statistician in the absence of any other known facts or applicable theory is forced to arbitrarily distribute head office costs against the previously overestimated values added flowing from the operational parts of the system. The projectors which suggest themselves for this exercise are sales, value added, labour income, the existing regional distribution of like expenses to those to be allocated or the distribution of similar expenses by those companies which can furnish this information (provided companies have reasonably comparable characteristics). However, all these projections are based on assumptions of similarity of behaviour, industrial structure, operations, or proportionality which one hopes bear some semblance to reality, a fact of which, however, one can never be sure. Because of this uncertainty and because profits are in any event residually derived and difficult to relate to other factors, one might suggest that in these cases only the known returns to labour be left in the head office region itself and no attempt to estimate head office profits be made.

Since most direct input expenses will in the main have been incurred and reported by the operating parts, the chief defence of the above convention lies in the hope that the head office expenses will be proportionally small enough not to invalidate the desired analysis in a significant manner. When the assumptions of a head office as a separate establishment and with no output are relaxed, the problem becomes somewhat more complex but neither it nor the possible conventional solutions are fundamentally altered.

Another variation of basically the same problem is the case where a multi-establishment company has no separately identifiable head office as such but where certain expenses such as for instance advertising, legal and accounting costs are recorded and known for the company as a whole only. The expenses will have to be distributed among the constituent parts of the company in a similar manner as described above.

Although as a national accountant, one is used to encounter difficulties in the government and finance industries, there are no special conceptual problems caused by regionalization in these industries. Since much of the information in these fields is, however, essentially of a company rather than establishment type, there exist data problems which go somewhat beyond those in other industries since they pertain to the structure of the available information rather than its

absence or scarcity. The estimation of the regional value added of insurance companies is simply an exaggerated case of the previously described head office problem. The regional output of insurance companies which can be identified as the local inflow of premiums less local outflow of claims, will not have the major portion of expenses—which may be assumed to be incurred in the head office—offset against it in the first round of estimation. Again some convention along the lines of those previously described will have to be supplied. On the other hand, in the case of the central government, the national capital region of a country will show the greatest proportion of output. Even though from a welfare point of view such results may be arguable, the regional measurement of production thus derived is quite valid.

In the transportation and communication industry where the point of sale—or place of payment or payment due—or point of delivery or acceptance are frequently quite different from where production is taking place the problem is that income should be apportioned over the territory over which the goods are carried, the message communicated or the pictures or words televised or broadcast. Since one is in any one instance and at any one point faced, however, with innumerable flows of a multi-directional nature, the problem of allocation will in many cases constitute a nightmare even for some of the more advanced computer oriented transportation and communication systems. Unless the industry has a very sophisticated cost accounting system which will permit it to carry out such an allocation the statistician approaching this issue from the outside is faced with an almost insuperable task. In this instance, therefore, it seems that even a rough direct estimate of the regional factor inputs rather than an output minus input approach would be better. In an establishment-oriented system, labour income could be regionally derived and returns to capital could *pis aller* be projected on the basis of returns to labour, the proportion of capital invested in each region, or, if known, the geographical distribution of depreciation.

CONCLUSION

This paper has tried to show that even though there is neither a well-developed theory of regional economic development or growth, nor an overriding problem to which the statistician must furnish a numerical answer, there exists a widespread demand for aggregate measures of economic development which can be used to quantify provincial problems both over time and space. It is also possible that demands for provincial analysis and understanding will at some stage encompass needs for small area data. Once a provincial data base has been developed it may not be too difficult to give it a subprovincial capacity as well.

There exist at this time no insuperable conceptual problems for some types of provincial accounts or at least none which are not amenable to any worse conventional circumventions than are practised in other areas of the national accounts. The fact, however, that at the moment a great deal of the information inputs of such systems are still missing is the most serious impediment to their development. Nevertheless, in view of the improvements which are planned for

the national data system, this situation in Canada is bound to improve very much over the next few years.

The long-run marginal costs of giving a regional aspect to this information are probably reasonable. Some overall guidance in the regional structure of the data, some control on its proper collection, and some special computer programs to give the collected data the regional dimension are the resources that appear, at the moment, to be required.

Emphasis is being placed in the D.B.S. on the development of a regional data base rather than on the advocacy of any particular provincial accounts system. The reasons for this particular approach have been suggested in the paper and the advantages which are deemed to derive from this stance are in conclusion briefly summarized.

Since at the moment neither the demands for provincial accounts nor the underlying theory of regional economic development can point unambiguously to any one set of provincial accounts which will have a clear advantage over any other, and since it is likely that different sets suited to the different policy requirements and analytical capabilities of provincial authorities will be eventually desired, a data system which is flexible and suitable for different combinations—spatially, industrially and structurally is probably the basic answer. On the other hand, the development of such a data base within the framework of national accounting will ensure its planned and progressively phased development and will permit the framework of national accounting to exert its integrating influence into another dimension.

Lastly, the flexibility of such a system would not only permit adaptations to the policy needs and resource capabilities of provinces—and possible smaller units—but might also enable the Bureau to avoid the vexatious question of doing all provincial estimates itself. It is not difficult to anticipate a system where the Bureau might, for instance, undertake estimation of provincial accounts for the small provinces while providing coordinating and advisory assistance to the large ones. The systems would then be cemented to the same data base, uniform development could be ensured and consistency in diversity could be accomplished.