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Abstract

The purpose of this paper is twofold: report on the method developed at the Institut de la statistique du Québec (ISQ) to estimate regional GDP; analyse the data to examine recent changes in the geographical distribution of economic activity in Quebec.

The ISQ method for estimating regional GDP is a top-down one, allocating three components of value added by industry (GDP) among regions, using allocators constructed from fiscal data of the Quebec ministry of revenue. The method is applied to the 17 administrative regions and 6 metropolitan areas in Quebec, from 1997 onwards.

The evolution of regional shares of population, GDP and personal income is examined from the core-periphery perspective, reorganizing the data to create analytical regions adequate for that purpose. For all three dimensions, the shares of regions traditionally considered as peripheral are falling. There is also a redistribution from non-metropolitan to metropolitan areas. Finally, there is movement out of Île de Montréal towards the rest of the metropolitan area and its outer ring. The analysis is extended to a shift-share decomposition of GDP growth, but the residual component of differential growth overweighs the structural component in most cases.

Key Words:

Regional economic activity; Regional GDP estimation; National accounting for regions

JEL classification: R12; C82; E01

Résumé

L'objectif de cet article est double: présenter la méthode de l'Institut de la statistique du Québec pour estimer le PIB régional; examiner l'évolution récente de la distribution géographique de l'activité économique au Québec.

La méthode d'estimation du PIB régional de l'ISQ est une une méthode descendante: trois composantes de la valeur ajoutée par industrie (PIB) sont réparties entre les régions au moyen d'allocateurs construits à partir de données fiscales de Revenu Québec. La méthode est appliquée aux 17 régions administratives et aux 6 régions métropolitaines du Québec, à partir de 1997.

L'évolution des parts régionales de la population, du PIB et du revenu personnel est examiné selon la logique centre-périphérie, après que les données aient été réorganisées pour créer des régions analytiques pertinentes à cette fin. À tous égards, les parts des régions traditionnellement considérées comme périphériques diminuent. Il y a aussi une redistribution des régions non métropolitaines vers les régions métropolitaines. Enfin, il y a un déplacement à partir de l'Île de

Montréal vers le reste de la région métropolitaine et sa couronne externe. L'analyse est prolongée par une décomposition structurelle-résiduelle de la croissance du PIB, mais la composante résiduelle domine la composante structurelle dans la plupart des cas.

Mots clés :
Activité économique régionale; estimation du PIB régional; comptabilité économique régionale

INTRODUCTION

The purpose of this paper is twofold. First, we report on a method developed at the Institut de la Statistique du Québec (ISQ) to estimate the GDP of regions within the Province of Quebec. And, second, we analyse the estimates to examine the recent evolution of the geographical pattern of economic activity in Quebec.

There are two families of methods for calculating regional GDP. So-called "bottom-up" methods consist in collecting economic data at the individual production-unit level (establishment), and then adding them up to obtain the corresponding regional data. Various adjustments are then performed in order to make the regional data consistent with national data, so that the sum of regional products is equal to total production over the national territory. So-called "top-down" methods consist in allocating an overall national figure across regions. They do not require knowledge of local establishment data. The national figure is distributed using an indicator which is as close as possible to the variable to be estimated. Practically speaking, most methods are mixed. For, on the one hand, the kind of data required for bottom-up estimation almost always has gaps that must be filled using a top-down method. And, on the other hand, top-down methods also make use of exhaustive data sources similar to those required by bottom-up methods.

A BRIEF SURVEY OF METHODS[1]

There are few examples of regional GDP computed for entities smaller than States or provinces, except in the European Union (see below). In Canada, the Conference Board produces annual estimates of the GDP of metropolitan areas (MAs)[2,3]. The Conference Board first estimates gross value added at basic prices in real terms (at constant prices) for some sixty industries (depending on the information available for each MA), using monthly employment data from Statistics Canada's *Labour Force Survey* (LFS). Metropolitan GDP is then obtained as the sum of gross value added over industries. But the LFS generates data on a place-of-residence basis, rather than on a place-of-work basis, whereas GDP is defined, according to national accounting principles, in terms of where production takes place. So the Conference Board method adjusts its employment figures to take commuting into account, using population census data: employment in a MA is obtained by multiplying the LFS figure by the ratio of the number of workers whose place of employment is in the MA, over the number of workers whose residence is in the MA. Industry gross value added is obtained by multiplying estimated employment in each MA by labour

[1] For a more detailed survey, see Lemelin and Mainguy (2009b).

[2] Technically, Census Metropolitan Areas (CMAs), following the statistical system in Canada. It is understood that, throughout this text, metropolitan areas are Census Metropolitan Areas. We shall use the full expression « Census Metropolitan Areas » when discussing the definition of MA boundaries by Statistics Canada.

[3] Those estimates are published in the spring issue of the Conference Board's quarterly *Metropolitan Outlook/Note de conjoncture métropolitaine*.

productivity at the Provincial level. So the underlying hypothesis is that labour productivity is the same within any industry everywhere in a given Province. This may constitute a weakness in the case of industries encompassing a wide range of activities when the mix of activities varies from one region to another. Finally, the Conference Board method could hardly be applied to all regions, given that LFS data are unreliable for small regions (or, for that matter, for small industries), because of high error margins in small sub-populations, not to mention Statistic Canada's confidentiality rules, which can result in masked data[4].

In the United-States, until recently, the Bureau of Economic Analysis (BEA) did not estimate GDP at a lesser scale than the State level[5]. However, since September 2007, the BEA publishes GDP estimates for metropolitan areas[6]. The BEA methodology (Panek et al., 2007) uses a top-down approach, distributing state-level output by industry to metropolitan areas according to earnings (reported by place of work). Earnings – which consists of wage and salary disbursements, supplements to wages and salaries, and proprietors' income – are estimated on the basis of data from the *Quarterly Census of Employment and Wages* of the Bureau of Labor Statistics (BLS). The BEA also produces statistics on personal income for counties. Now, personal income is the sum of incomes of persons who live in a given area. Since county personal income is computed mostly from data collected on a place-of-work basis, the BEA applies a correction using decennial census data on home-to-work commuting. The adjustment is interpolated or extrapolated to non-census years, following a method described in BEA (2008).

Within the European Union, the rules for distributing so-called "structural" funds (in support of poorer regions) requires knowing regional GDP. Calculations follow common principles laid down by Eurostat, the EU statistical agency. But it must be kept in mind that the regions of Europe are of a much greater demographic and economic weight than most of Quebec's 17 administrative regions. Particular attention was paid to the techniques of the French *Institut National de la Statistique et des Études Économiques* (INSEE), and of the UK Office for National Statistics (ONS).

In France, INSEE applies a method which rests on a complex system of enterprise data, and calls upon the expertise of "regional accountants", whose local presence and knowledge of the environment make it possible to better validate the information (Delisle, 2000)[7]. The INSEE

[4] Statistics Canada defines a minimum threshold below which no information may be disseminated (Statistics Canada, 2011, 71-543-G, p. 31, "Release criteria"). For Quebec, that threshold is 1500. It follows that for small CMAs, some industries "disappear" at times, only to reappear later on, just because the number of employees has temporarily fallen below the confidentiality threshold. This limits the level of detail at which the method is applicable and occasionally forces to make adjustments.

[5] The BEA method for computing *Gross State Products* (GSP), like Statistics Canada's method for provincial GDP, is a mixed, bottom-up/top-down method which makes use of fiscal and administrative data.

[6] Panek et al., 2007. The 2001-2009 estimates of GDP by metropolitan area in current and real (chained) dollars are available from the Regional Economic Accounts page of the BEA Web site at www.bea.gov/regional/index.htm.

[7] A brief description of the INSEE method can be found at www.insee.fr/fr/themes/detail.asp?reg_id=99&ref_id=pib-va-reg

method is mixed, but predominantly bottom-up. It would seem to be more accurate than the ONS's (described below), but also more demanding. That is probably why it is fully applied only for certain benchmark years, on the basis of which other years are estimated by inter- or extrapolation.

In the United Kingdom, the ONS applies a method which is quite similar to that of the US BEA for estimating GSP, and to that of Statistics Canada for provincial GDP. It appears however that the top-down side is more important in the ONS method (Lacey, 2000). The main shortcoming of that method is that wages and salaries are allocated on a place-of-residence basis, rather than on a place-of-work basis, as the concept of gross domestic product implies. On the other hand, the data requirements of the ONS method are moderate, especially when compared to INSEE's.

The method developed for estimating the GDP of Quebec's 17 administrative regions and 6 metropolitan areas is described in greater detail in the next section. It is a mixed method, closely akin to that of the ONS in the UK. Regional GDP at basic prices is computed by industry or group of industries, following the income-based approach, defined in the OECD System of National Accounts as the sum of components of value added (OECD, 2001). Roughly speaking, it consists in allocating total labour income and net income of unincorporated business (NIUB – also called "mixed income") by industry among regions using allocators[8] constructed from fiscal data on wages and salaries and NIUB compiled by Revenu Québec (the Quebec ministry of revenue, responsible for tax collection). For each industry, other components of value added (corporation profits, interest, capital consumption allowances, inventory valuation adjustment, and net indirect taxes on production) are then distributed in proportion to the sum of total labour income and NIUB.

The key ingredients in the method are a compilation of fiscal data on incomes, and reliable home-to-work commuting tables by industry. We believe a similar approach could be used to estimate regional GDP anywhere these are available. Our method has the advantage of being less limited than the Conference Board method by small-region or small-industry sampling errors in labour survey data, and it implicitely takes into account inter-regional productivity differences within industries, since it relies on income, rather than employment data. Compared to the French INSEE method, ours is certainly less demanding. And compared to the British ONS method, it is consistent with the GDP place-of-production definition, and it has the advantage of using all of the detailed fiscal data, rather than the *1% sample of tax records*, compiled by *Inland Revenue*.

We now proceed to give a more complete account of the method. In section 2, we will examine the evolution of regional GDP from the core-periphery perspective.

[8] The word « allocator » is used to designate an indicator variable in proportion of which another variable is allocated among regions.

ISQ REGIONAL GDP ESTIMATION METHOD

BROAD OUTLINE

The process of applying the method can be summarized as follows:

1. The starting point is the Quebec total, to be allocated between the regions: value added (VA) at basic prices, by industry and by component, in current dollars, according to Quebec Economic Accounts. They are the "target data".

2. Data on regional distribution are obtained from Revenu Québec, which extracts them from individual income tax returns:
   - Wages and salaries, by administrative region of residence and by Standard Industrial Classification (SIC) industry;
   - NIUB, by administrative region of residence and by SIC industry until 2000, and by North-American Industry Classification System (NAICS) industry afterwards.

3. Revenu Québec data undergoes two conversions before being used to form allocators:
   - Data by SIC industry are converted to the NAICS.
   - Place-of-residence fiscal data are converted to place-of-work data using home-to-work commuting patterns by industry (special tabulation by Statistics Canada, based on population census data).

4. The table of NIUB by NAICS industry and by region is adjusted, applying the minimum-information-gain method (also known as minimum cross-entropy), so as to exploit all of the information in Revenu Québec's fiscal data, accommodating for the relatively high rate of missing information relating to industry of origin. That procedure makes it possible to use NIUB data for which the region of residence is known, but not the industry.

5. Wages and salaries and adjusted NIUB, by industry and by region, are used as allocators for the other components of VA:
   - supplementary labour income is distributed in proportion to salaries;
   - other components are distributed in proportion to the total of salaries, supplementary labour income, and NIUB.

6. VA by administrative region (that is, regional GDP) is obtained by first summing the components within each industry, and then summing the VA of industries.

In addition, eight industries are treated in a special way: Fishing, hunting and trapping; Metal ore mining; Non-metallic mineral mining and quarrying; Construction; Petroleum and coal products manufacturing; Primary metal manufacturing; Lessors of real estate property; Owner-occupied dwellings. We shall come back to those later. Finally, the top-down approach of the method ensures that estimated regional GDP is consistent with provincial economic accounts.

GEOGRAPHICAL DIVISIONS IN THE ESTIMATION PROCESS

The Province of Quebec is divided into 17 administrative regions (AR). There are also 21 regional conferences of elected officials (*Conférences Régionales des Élus* – CRÉ), where the mayors and prefects of the region meet (since it is an institution unique to Quebec, we shall not attempt a translation, and will henceforth use the acronym CRÉ). Fifteen of the 17 administrative regions coincide with the territory of a single CRÉ, but two of them have three each. Besides the administrative regions, there are six metropolitan areas (MA) in Quebec. Two of the administrative regions are entirely included within the Montreal metropolitan area, while seven others are partly inside, partly outside a metropolitan area. Finally, one metropolitan area, Gatineau, is part of the larger Ottawa-Gatineau metropolitan area which extends into the neighboring Province of Ontario.

The objective in producing regional data was to provide local authorities with information on which to base their development strategies. So it was desirable to estimate GDP for all of the territorial divisions described above. To make that possible, the Quebec territory was subdivided into 30 areas which can be aggregated into administrative regions, CRÉ territories[9], or metropolitan areas. The map in Figure 1 displays the geographical divisions. It was possible to obtain the target data and the Revenu Québec fiscal data for each of the 30 territories. So the GDP estimates are perfectly consistent for any aggregation of the 30 territorial subdivisions. However, for the eight special industries mentioned above, two separate calculations must be made, one for the 17 administrative regions, with one of them divided into three regional conferences, and another for the 6 metropolitan areas and the non-metropolitan territories.

STEPS IN THE ESTIMATION PROCESS

This section examines the estimation process in greater detail[10]. In what follows, we consider successively: source data used (target data on GDP by industry, and Revenu Québec fiscal data); prior processing applied to Revenu Québec data to construct the allocators; and application of the allocators to the target data.

[9] Except for the three regional conferences of the Nord-du-Québec administrative region, whose economic and demographic weight is too small to subdivide the region.

[10] For an even more detailed description, see Lemelin and Mainguy (2009a).

Target data on GDP by industry

Data on GDP by industry and by component for Quebec as a whole are the "target data", which are to be distributed among regions by the estimation process. Indeed, the estimation results must be consistent with other official data. Such consistency is ensured because the totals distributed among regions with allocators correspond to the official figures. However, these target data are not drawn as such from a single source; rather, they are constructed from three main sources:

- GDP at basic prices, in current dollars, by industry and by province, in current dollars (Statistics Canada, *Provincial Gross Domestic Product by Industry*, 15-203-XIE);
- Statistics Canada's Provincial Input-Output tables (IO) for Quebec;
- GDP at basic prices, by component, for 18 industry groups, in current dollars, estimated by the Institut de la statistique du Québec (*Comptes économiques des revenus et dépenses du Québec*).

Industry GDP at basic prices in current dollars is consistent with Economic Accounts. So it is a good starting point for estimating regional GDP by a top-down method. Indeed, the choice of estimating regional GDP in current, rather than constant, dollars was made with the purpose of obtaining a regional GDP which is consistent with Economic Accounts. Moreover, the regional GDP estimation method uses allocators based on Revenu Québec fiscal statistics, which are, obviously, in current dollars.

The level of aggregation chosen for the estimation of regional GDP is 63 NAICS industries. At that level of detail, however, the first source does not disaggregate industry GDP into its components. So if one were to rely on that single source, one would be forced to apply the same regional allocator to all of each industry's value added. For that reason, industry GDP data are used jointly with data from other sources.

In *Comptes économiques des revenus et dépenses du Québec*, the Institut de la statistique du Québec publishes the value of GDP at basic prices for 18 industry groups, with three components: total labour income (wages and salaries, plus supplementary labour income); gross operating surplus and miscellaneous adjustments; and the total of accrued net income of farm operators from farm production and net income of non-farm unincorporated business, including rent (mixed income).

These data are utilized jointly with the input-output tables, to overcome certain classification and Economic Account benchmarking problems, and to obtain the necessary information to distribute the GDP of the 63 industries between the three value added components mentioned earlier. The result of those adjustments constitutes what we call the "Economic Accounts target data".

Target data for recent years

The source data on GDP by industry is published with a certain time-lag, and in several stages: preliminary estimates, revised estimates, etc. The definitive figures are often published only after several years. Consequently, the target data for the estimation of regional GDP in recent years must be projected on the basis of available source data, and the GDP estimates are revised as better and more complete data become available. For example, in May 2011, regional GDP figures on the Institut de la statistique du Québec Web site are those published in late 2010, and it is specified that[11]:

- 2009 (year *t*–1 relative to 2010) values are preliminary estimates;
- 2008 (year *t*–2) values are estimates;
- 2007 (year *t*–3) values are revised estimates;
- 2006 (year *t*–4) values are provisional figures;
- 2005 (year *t*–5) values are revised figures;
- 2004 (year *t*–6) values are definitive figures.

Practically speaking, target data for year *t*–5 (2005), published in late 2010, have been revised since the 2009 release, but they are expected to be definitive; and target data for year *t*–4 (2006) are subject to revisions that are expected to be minor. Therefore, these target data are considered to be quite reliable. To establish the target data for years *t*–3 and *t*–2 (2007 and 2008), neither Statistics Canada's Provincial Input-Output tables, nor its GDP at basic prices, by industry and by province, are available. So the target data are constructed from the ISQ estimates of GDP at basic prices, by component, for 18 industry groups (in *Comptes économiques des revenus et dépenses du Québec*), using a combination of disaggregation and projections based on the evolution of real GDP. These estimates are considered to be reasonably reliable, but somewhat less so than those of years *t*–4. Finally, for year *t*–1, even the 18-industry group GDP estimates are not yet available, and the target data are established by projecting *t*-2 estimates according to the evolution of real GDP. These are indeed preliminary estimates.

[11] Statistics Canada and ISQ are in the process of reviewing their revision policies, so the sequence presented here is subject to change.

Revenu Québec fiscal data

Revenu Québec fiscal data on salaries and individual business income are used to construct the allocators according to which the target values are distributed between regions. So they are the two main allocators utilized. Other allocators are used for special industries.

Salaries

Fiscal data on salaries are compiled by Revenu Québec, and passed on to the Institut de la Statistique du Québec in an aggregated form that complies with the confidentiality rules which protect personal information. The data are extracted from R1 slips[12] (equivalent to Canadian federal T4 slips). By combining the amounts of worker incomes according to the R1 slips, employer economic activity codes, and employees' postal codes, Revenu Québec produces an estimate of the amount of salaries by activity and by territory of employee residence.

Those data are quite complete. For instance, in 1997, Revenu Québec was able to determine taxpayer territory of residence and employer industry for 93% of R1 slips, amounting to 95% of the total value of salary income according to Revenu Québec fiscal data. It is interesting to note that the total value of salaries according to Revenu Québec data is very close to the *Wages and salaries* component of GDP according to the Economic Accounts: the total value reported by Revenu Québec in 1997 represents 99.9% of wages and salaries (excluding supplementary labour income) according to the Economic Accounts.

The way Revenu Québec fiscal data are utilized is quite similar to what the United Kingdom's ONS does. But the ONS builds its estimates on the basis of the *1% sample of tax records*, compiled by *Inland Revenue*. In contrast, Revenu Québec fiscal data are based, not on a sample, but on all of the R1 slips.

Net income of unincorporated business (NIUB)

The net income of unincorporated business (NIUB), also called mixed income, corresponds to net individual business income (*revenu net des particuliers en affaires* – RPA) in individual income tax returns. It is taken from taxpayer income declaration form TP1 (equivalent to Canadian federal T1 form). It includes *accrued net income of farm operators from farm production* as well as the net income from other types of unincorporated business. Fiscal data on NIUB are compiled by Revenu Québec, and passed on to the Institut de la Statistique du Québec in an aggregated form that complies with the confidentiality rules which protect personal information.

[12] R1 slips are issued by employers to employees, with a copy forwarded to Revenu Québec. They contain information on the worker's labour income to be entered in his/her income declaration for income tax purposes.

However, the completeness rate of the economic activity code is not entirely satisfactory: for instance, in 2003, the industry of origin could be identified for no more than 71.9% of taxpayers declaring individual business income (70.6% of the total value of individual business income declared). Moreover, when the two criteria, region of residence and activity code, were combined, data were complete for only 71.7% of taxpayers declaring individual business income in 2003 (amounting to 70.6% of the total value of individual business income declared). It should be pointed out that the completeness rate has been improving year after year since 1997; for that year, data was complete for only 41% of taxpayers declaring individual business income.

Let us mention that, for 2003 again, the total value of NIUB according to Revenu Québec fiscal data represents 96.8% of mixed income according to the Economic Accounts (after subtracting net rent imputed to owners occupying their own dwelling). But if one retains only the NIUB for which the taxpayer's region of residence and activity code are known, only 69.3% of the Economic Account NIUB remains.

To try and compensate for the gaps in Revenu Québec NIUB fiscal data, an adjustment procedure, described below, is applied: it allows to use all the available information, including NIUB for which the region of residence is known, but not the economic activity code.

Conversions applied to Revenu Québec fiscal data

Two conversions are applied to Revenu Québec fiscal data:

A. Data by SIC industry are converted to the North-American Industry Classification System (NAICS).

B. Place-of-residence fiscal data are converted to place-of-work data using home-to-work commuting tables by industry (special tabulation by Statistics Canada, based on population census data).

Conversion B uses home-to-work commuting tables based on data from the population census. Now, while the 1996 census was classified according to the SIC, the 2001 census follows the NAICS. Therefore, in the period 1997-2000, conversion B must be performed *before* A, but for 2001 and the following years, A must precede B.

From the SIC to the NAICS

Revenu Québec fiscal data are converted from the 1980 SIC to the North American Industrial Classification System (NAICS), to make them comparable to Economic Accounts target data: that way, Revenu Québec data for 66 SIC industries are converted to 63 NAICS industries[13].

Conversion from one classification system to another is never perfect. In principle, it could be, at a very fine level of detail. However, given the level of aggregation at which Revenu Québec fiscal data are available, the correspondence is necessarily imperfect, particularly for service industries. Although every SIC industry corresponds mostly to one particular industry in the NAICS and vice-versa, parts of any SIC industry are usually distributed into several NAICS industries; conversely, each NAICS industry is generally made up of parts of several SIC industries. Thus, the conversion matrix can be considered a table of average distributions: the value added produced by a given SIC industry is distributed between NAICS industries following its average distribution.

Most of the conversion matrix data come from a Statistics Canada table based on data from the *Survey of Employment, Payrolls and Hours* (SEPH). That table has been constructed from survey data in each province, for two periods of three consecutive months in 1998, and for another three-month period in 1999, and also from information drawn from Statistics Canada's Business Register. Conversion data based on the SEPH were completed thanks to another one of Statistics Canada's conversion tables, concerning only manufacturing industries, and constructed from 1996 manufacturing shipments data.

From place-of-residence data to place-of-production data

The initial data on salaries and NIUB by industry and region of residence must also be converted to data by region of production, using home-to-work commuting tables by industry, for different categories of workers. Those tables are computed by Statistics Canada, from the 20% sample of population filing the long census questionnaire[14]. The industrial classification applied in the 1996 census of population was the 1980 SIC, but it was the NAICS for the 2001 census. Commuting trips by salaried workers correspond to those of *Paid workers*, while commuting trips by unincorporated business operators correspond to those of the *Self-employed (unincorporated)*.

[13] Recall that, since 2001, Revenu Québec classifies NIUB data according to the NAICS, so that this conversion is now only necessary for fiscal data on salaries.

[14] For narrow ideological reasons, the governing Conservative Party of Canada has decided to make the long census questionnaire optional, beginning with the 2011 census. This was done against the advice of Statistics Canada, and in spite of widespread protest from numerous organizations across the country who need reliable data on the Canadian population, including Provincial and local administrations. Statistics Canada will attempt to maintain the validity of the census, by distributing the long questionnaire to 40% of the population, rather than 20%. But it is doubtful that this will be successful in eliminating self-selection biases and ensuring an adequate representation of all categories of persons.

The general principle of the conversion is simple: the home-to-work commuting tables show how the workplaces of the residents of a given territory who work in a given industry are distributed over the territories; the total income earned by those residents, according to Revenu Québec, is therefore distributed between regions of production in the same proportions. The underlying hypothesis is that, within a given industry, the average income per worker (wages and salaries, or NIUB) is the same for all residents of a territory, no matter which territory they work in.

Minimum information-gain adjustment of NIUB allocators

In the case of NIUB, a further adjustment is applied. Recall that, in Revenu Québec's 2003 fiscal data, for example, both territory of residence and activity code are known for only 71.9% of taxpayers with individual business income (70.6% of the total amount declared). If only complete data were used, that would leave aside all the information contained in the 27.8% of tax returns for which territory of residence is known, but not activity code. In order to make full use of all the information contained in Revenu Québec fiscal data on NIUB, the conversions just described are applied, not only to NIUB by industry, but also to total NIUB (including NIUB for which industry is unknown). An adjustment based on information theoretic principles is then performed (Theil, 1967). The first step in the adjustment is to hierarchize information, according to reliability:

1. It is imperative to respect Economic Accounts target data concerning NIUB by industry: they are considered the most reliable figures.

2. In second place comes the distribution among production territories of *total* NIUB compiled by Revenu Québec, and converted following the procedures described above (in 2003, that represented 99.7% of the total amount of individual business income declared).

3. Last come the distributions among production territories of NIUB *by industry*, also compiled by Revenu Québec, and converted (in 2003, that represented 70.6% of the total amount of individual business income declared).

The hierarchy having been established, one proceeds with the adjustment itself, taking into account, however, that the adjustment process excludes values relating to the eight special industries. Second- and third-rank information is first made consistent with first-rank information by proportional adjustments. At that stage, second- and third-rank data have not yet been harmonized with one another. In the next step, first-rank data (industry totals) and previously adjusted second-rank data (regional totals) act as constraints controlling third-rank data adjustment.

That final adjustment is performed following the minimum information-gain principle (also known as minimum cross-entropy), which is an operational form of the rule of scientific neutrality (Jaynes, 1957; Golan, Judge and Miller, 1996; Kapur and Kesavian, 1992). The standard cross-entropy minimization technique considers the structure of the matrix to be adjusted as if it were a probability matrix. Cross-entropy is a measure of distance between the a priori probability distribution, i.e. the unadjusted matrix, and the a posteriori distribution, i.e. the adjusted matrix. The adjustment process then consists in adjusting the matrix to its marginal totals in such a way as to minimize that distance, which is readily interpreted in information theory as minimizing the quantity of extraneous information imposed upon the a priori matrix.

However, NIUB is negative for some industries in some regions, so the standard technique is not applicable. So, following Günlük-Şenesen and Bates (1988), Junius and Oosterhaven (2003), and Lemelin (2009), the minimum information-gain approach is generalized to the case in which there may be negative entries. Essentially, we consider the initial matrix as the term-by-term product of two matrices:

- a matrix of +1 and –1 values, respectively corresponding to positive and negative values in the data;
- the matrix of absolute values of the data.

The first matrix is taken to be intangible (certain) information, while the second plays the part of a priori matrix, to which the minimum cross-entropy principle can be applied directly. The following optimization problem is solved in GAMS (Rosenthal, 2010).

$$MIN \sum_i \sum_j \left| a_{ij} \right| z_{ij} \ln z_{ij} \tag{II.2.1}$$

$$\text{subject to } \sum_j a_{ij} z_{ij} = u_i \text{ and } \sum_i a_{ij} z_{ij} = v_i \tag{II.2.2}$$

where:

$$z_{ij} = \frac{x_{ij}}{a_{ij}};$$

xij is the adjusted (a posteriori) amount of NIUB of industry *i* in region *j*;

aij is the a priori amount of NIUB of industry *i* in region *j*, according to the converted Revenu Québec data;

ui is total NIUB of industry *i* in all regions, according to the Economic Accounts (target data);

vj is the total amount of NIUB of all industries in region *j*, according to Revenu Québec data, after proportional adjustment to the target data total.

Solving the above problem yields the table of NIUB by industry, for the 30 territorial divisions defined above. For details, see Annex 3 in Lemelin and Mainguy (2009a).

Applying the allocators to GDP components

The procedure began with two tables of income by SIC industry and by territory of residence obtained from Revenu Québec, one for salaries, and one for NIUB. The conversions and the adjustment just described yielded tables of salaries and NIUB by NAICS industry and territory of production. The rows of these tables are then used to allocate total labour income (*wages and salaries*, plus *supplementary labour income*), and NIUB among regions, by industry, for all but the eight special industries mentioned earlier.

The remainder of GDP at basic prices is aggregated under the label of "Other operating surplus" (OOS)[15], and is distributed among regions (by industry) using as an allocator the sum of total labour income and NIUB as estimated in the previous step.

Distributing the GDP of special industries

Eight industries are dealt with in a special way. First, the estimation method applied to the other industries is inapplicable to Construction and to Owner-occupied dwellings, for reasons to be given below. As for the six other industries, it was decided to treat them, in part or totally, as special, on account of practical difficulties in applying the method.

Fishing, hunting and trapping (NAICS industry 114). Wages and salaries, and supplementary labour income from this industry are distributed between regions just like those of other industries. But the value of this industry's NIUB in 2003 Revenu Québec fiscal data is only 0.9% of the same industry's NIUB in the Economic Accounts, while it makes up 27.5% of the value added of the industry. Given that the bulk of that industry's value added comes from commercial fishing, its NIUB and OOS are distributed following the value of fish landed in each region (Fisheries and Oceans Canada, *Quebec Marine Fisheries. Annual Statistics Review*).

Metal ore mining (NAICS industry 2122) and ***Non-metallic mineral mining and quarrying***. (NAICS industry 2123). Initial experiments in applying the regional GDP estimation method produced anomalous results for these industries (in particular, a significant presence of mining in

[15] OOS therefore includes (Statistics Canada, 13-213-PPB): Interest and miscellaneous investment income; inventory valuation adjustment; indirect taxes on production, net of subsidies on production (taxes and subsidies on *production* are not to be confused with taxes and subsidies on *products*: the latter are *not* taken into account in the calculation of GDP *at basic prices*); and, finally, capital consumption allowances (or depreciation).

a region that has no mines). Careful examination revealed that there were probably classification errors in Revenu Québec's fiscal data, due to the fact that the activities of large corporations are classified by the reporting entities themselves. Misclassification is all the more likely between closely related industries, such as Metal ore mining and Primary metal manufacturing. So salaries in these two industries are distributed using microdata from the *Census of mines, quarries and sand pits*. These data are collected by the Institut de la statistique du Québec, in collaboration with Natural Resources Canada. In all other respects, these industries are treated like the others.

Construction (NAICS industry 23). By its very nature, that industry has a high percentage of workers without a fixed place of work, so that it would be inappropriate to distribute them proportionally to those whose place of work is known, all the more since, even if the regional distribution of construction workers were known for census years 1996, 2001 and 2006, it would most likely have changed as old construction projects were completed and new ones began, in the years following census years. Thus, it was decided to distribute the value added of the construction industry using a special allocator: capital and repair expenditures, except on machinery and equipment, by administrative region or by metropolitan area[16].

Petroleum and coal products manufacturing (NAICS industry 324). Petroleum refining represents 90-95% of that industry in the Province of Quebec, and refining capacity is located in two regions: Chaudière-Appalaches and Montréal. Initial experiments in applying the regional GDP estimation method led to an underestimation of the share of Chaudière-Appalaches, and to locating a significant share of the industry in a region without refining capacity, namely Mauricie. So this industry is allocated among regions proportionately to value added according to the microdata of the *Annual Survey of Manufactures and Logging*[17].

Primary metal manufacturing (NAICS industry 331). Initial experiments in applying the regional GDP estimation method produced anomalous results for this industry. Careful examination revealed that there were probably classification errors in Revenu Québec's fiscal data. Moreover, the anomalies seemed related to those of the Metal ore mining industry. So this industry was treated in the same way.

Lessors of real estate property (number 5A03 in Statistics Canada's NAICS-based input-output industry classification). In some regions, that industry's NIUB has an ups-and-downs pattern, even jumping from positive to negative values from one year to the next. And because of the peculiar structure of value added in that industry, such instability would result in rather wild

16. *Immobilisations et réparations des secteurs privé et public, par région administrative, Québec,* years 1997 and following, Institut de la statistique du Québec, Direction des statistiques économiques et du développement durable. Source: Statistics Canada, Investment and Capital Stock Division. Compilation: Institut de la statistique du Québec. These data may be downloaded from the *Banque de données des statistiques officielles sur le Québec* (BDSO): www.bdso.gouv.qc.ca/.

17. More information on the *Annual Survey of Manufactures and Logging* at: www.statcan.gc.ca/cgi-bin/imdb/p2SV_f.pl?Function=getSurvey&SDDS=2103&lang=en&db=imdb&adm=8&dis=2

fluctuations. So the wages and salaries of that industry are distributed in the same way as in other industries, but the NIUB and OOS are distributed according to total real estate tax base by administrative region or metropolitan area (the database "Évaluations foncières des municipalités du Québec" is provided to the Institut de la statistique du Québec by the *ministère des Affaires municipales et des Régions*).

Owner-occupied dwellings (number 5A04 in Statistics Canada's NAICS-based input-output industry classification). There is no Revenu Québec fiscal data whatsoever relating to that industry, because the imputed rents of owner-occupied dwellings are just that: imputed. That industry is bound to be a special one. Also, the stock of dwellings changes from year to year, at different rates in different regions. To take these factors into account, the value added of owner-occupied dwellings is divided into two or more components, depending on the number of years since the last population census: (1) the industry's GDP for the census year (1996 or 2001) is distributed in proportion to the value of owner-occupied dwellings in each region, according to the 1996, 2001 or 2006 census of population (the special compilation by Statistics Canada, on the basis of the 20% sample responding to the long form of the census questionnaire, may be consulted on the Institut de la statistique du Québec Web site); (2) the increase of that industry's GDP between the last census (1996, 2001 or 2006) and the current year is distributed, year by year, in proportion to the value of residential building permits for the corresponding year and the preceding one, so as to take into account the time-lag between permit emission and building completion (data published on the Institut de la statistique du Québec Web site). Finally, the regional value added of owner-occupied dwellings is simply the sum of its components.

Final calibration

No final calibration is needed: from the outset, the method ensures that estimated regional GDP are consistent, both with *Gross domestic product by industry in Quebec*, and with Quebec Economic Accounts.

CENTER AND PERIPHERY IN THE PROVINCE OF QUEBEC

Regional economic disparities are a long-standing policy issue in Canada, as in many other countries. Recently, Polèse and Shearmur (2002) have conducted a major project to assess the current situation and future prospects of peripheral regions in Canada[18]. Their analysis is based on 1971-1996 census data; variables include population, employment for 142 industries and for 6 occupational categories, income, and level of education, with a high level of geographical detail. The authors conclude:

"The mega-trends are unambiguous. The peripheral share of total (Canadian) employment and population will continue to fall in the foreseeable future. Employment and population will continue their gradual shift towards central locations, in and around major metropolitan areas. These mega-trends are irreversible, at least as far as we are able to predict" (Polèse and Shearmur, 2002, p. 189).

Somewhat surprisingly, little mention is made of earnings or income in the peripheral regions. The reason for this omission can be found in the statistical overview which is the basis of the study:

"There is – in general – no major income problem in peripheral areas. Perhaps because the unemployed tend to migrate towards metropolitan areas, and because high wages are paid to many of those in work in peripheral areas, earned income per worker (or wages) are actually higher in some peripheral urban areas than in central ones. In addition, there is every indication that the transfer system is redistributing income from the wealthier to the poorer areas, and that this redistributive function has increased between 1971 and 1996" (Shearmur, 2001, p. 3).

Indeed, internal migrations from lower- to higher-income regions in Canada is a well documented phenomenon (Polèse and Shearmur, 2002, chap. 5). Now, as differences in per capita income stimulate out-migration from the poorer regions, in a context of slow or even negative population growth, the implication is concentration in the central regions, and population decline and lower densities in the peripheral regions.

In what follows, we use the 1997-2009 estimates of the GDP of Quebec's administrative regions and metropolitan areas, together with population and personal income data, to further contribute to a better understanding of the evolution of central and peripheral regions in Quebec.

[18] Six of the eleven study regions in Polèse and Shearmur (2002) are in Quebec: Abitibi-Témiscamingue, Côte-Nord, Gaspésie, Saguenay-Lac-Saint-Jean, and two subdivisions of the Bas-Saint-Laurent administrative region.

GEOGRAPHICAL DIVISIONS FOR ANALYSIS

While metropolitan areas are an analytically meaningful category, the administrative regions have been defined for other purposes. So, for the objective of analyzing the changing geography of economic activity, we define 16 regions, which we shall call "analytical regions". The analytical regions are defined in such a way that their GDP can be obtained by summation or subtraction from the estimates published by the ISQ for administrative regions (AR) on one hand, and for metropolitan areas (MA) on the other. We shall also use ISQ population figures and estimates of personal income, published for the same geographical divisions as GDP estimates.

Every MA constitutes an analytical region, except for the Montreal metropolitan area, which is subdivided in three, a refinement made possible by the fact that two administrative regions, Montreal AR and Laval AR, are embedded within the metropolitan area. Next, six analytical regions consist of the non-metropolitan area surrounding a metropolitan area. These are made up of the non-metropolitan parts of one or more administrative regions having common territory with the MA. In some cases, the boundaries of administrative regions extend far away from the MA, and include areas which can hardly be qualified as "surrounding" the MA[19]. While this might be viewed as a shortcoming of the data, it is strongly mitigated by the fact that population density is very low, and economic activity generally weak in the remote parts of the ARs. Finally, we define two peripheral regions, Rest-of-the-North and East. Figure 2 displays the map of our analytical regions, and Appendix 1 gives their definition in terms of summation and subtraction.

It should be recalled that the metropolitan areas are Census Metropolitan Areas, and that their boundaries are adjusted in census years, according to new journey-to-work data. The Sherbrooke MA, in particular, underwent a significant enlargement in 2006. Since the ISQ's GDP and personal income estimates refer to the Census Metropolitan Areas, there are breaks in the series. Fortunately, demographic data is also available on the basis of the 2006 CMA boundaries for the whole 1997-2009 period. So the MA GDP and personal income for all years previous to 2006 were converted to the 2006 geography by multiplying the per capita figures computed from the original data by population according to the 2006 boundaries. The underlying hypothesis is that, in zones closely contiguous to an MA according to the 1996 or 2001 limits, per capita values are the same as inside the MA. This reconstruction of the data ironed out most of the kinks in the series. Remaining wrinkles are possibly due to the substitution of new to old commuting patterns in census years for the estimation of GDP (see above "From place-of-residence data to place-of-production data").

[19] Such is the case, for example, of the non-metropolitan area around the Saguenay MA, most of which could be attributed to the North peripheral region.

CHANGES IN THE DISTRIBUTION OF POPULATION, PRODUCTION AND INCOME, 1997-2009

We want to examine the evolution of the geographic distribution of economic activity and income, that is, the evolution of the share of each region in the GDP or personal income of the Province of Quebec (what is said in the following paragraphs in reference to GDP should be understood to apply to personal income as well).

Let x_{it} be the GDP of region *i* in year *t*. Also let $X_t = \sum_i x_{it}$ be the GDP of the Province of Quebec in year *t*. Similarly, let n_{it} be the population of region *i*, and $N_t = \sum_i n_{it}$ be the population of the Province of Quebec in year *t*. Finally, let $y_{it} = x_{it}/n_{it}$ and $Y_t = X_t/N_t$ be the per capita GDP in region *i* and in the whole of Quebec respectively. Obviously, $x_{it} = y_{it}n_{it}$ and $X_t = Y_t N_t$, and the share of region *i* can be written as

$$\frac{x_{it}}{X_t} = \frac{y_{it}}{Y_t}\frac{n_{it}}{N_t} \tag{II.2.3}$$

The evolution of share (x_{it}/X_t) is summarized as

$$\frac{(x_{it}/X_t)}{(x_{i0}/X_0)} = \frac{(y_{it}/Y_t)}{(y_{i0}/Y_0)}\frac{(n_{it}/N_t)}{(n_{i0}/N_0)} \tag{II.2.4}$$

where

(y_{it}/Y_t) is the *relative* per capita GDP of region *i*, and

(n_{it}/N_t) is the population share of region *i*.

From equation (II.2.4), the percent change between year 0 and year *t* of share (x_{it}/X_t) is

$$100*\left(\frac{(x_{it}/X_t)}{(x_{i0}/X_0)}-1\right) = 100*\left[1+\left(\frac{(y_{it}/Y_t)}{(y_{i0}/Y_0)}-1\right)\right]\left[1+\left(\frac{(n_{it}/N_t)}{(n_{i0}/N_0)}-1\right)\right]-100 \tag{II.2.5}$$

The three percentage changes in this simple decomposition are given in Table 1 for GDP.

Table 1 – GDP at basic prices by analytical region, Quebec, 1997-2009

Analytical region	Relative GDP per cap.			Share of population			Share of GDP		
	1997	2009	1997-2009 proportional change (%)	1997	2009	1997-2009 proportional change (%)	1997	2009	1997-2009 proportional change (%)
	Province = 100			(%)	(%)		(%)	(%)	
Montreal and peri-metro area	106	104	-2.5%	58.5%	60.5%	3.3%	62.2%	62.7%	0.8%
Montreal MA	113	109	-3.6%	47.1%	48.8%	3.7%	53.0%	52.9%	-0.1%
01 Montreal AR	146	137	-5.9%	24.7%	24.6%	-0.6%	36.0%	33.7%	-6.5%
02 Laval AR	78	86	9.5%	4.6%	5.0%	7.7%	3.6%	4.3%	17.9%
03 Rest of Montreal MA	75	78	3.6%	17.7%	19.2%	8.6%	13.3%	14.9%	12.5%
04 Peri-metro. region	81	84	3.6%	11.5%	11.7%	2.0%	9.3%	9.8%	5.7%
Other metropolitan areas	98	104	6.4%	19.6%	19.7%	0.4%	19.2%	20.5%	6.8%
Other non-metro	83	84	0.9%	33.4%	31.6%	-5.4%	27.8%	26.6%	-4.5%
Non-metro away from Montreal	85	85	-0.4%	21.9%	19.9%	-9.2%	18.6%	16.8%	-9.6%
Peripheral regions	89	95	6.3%	10.2%	8.9%	-12.7%	9.1%	8.5%	-7.2%
05 Quebec MA	105	115	9.6%	9.5%	9.5%	0.5%	10.0%	11.0%	10.1%
06 Around Quebec MA	81	78	-4.1%	4.7%	4.4%	-6.9%	3.8%	3.4%	-10.7%
07 Gatineau MA	80	84	5.3%	3.5%	3.8%	9.0%	2.8%	3.2%	14.7%
08 Around Gatineau MA	57	60	5.7%	0.8%	0.7%	-7.4%	0.4%	0.4%	-2.1%
09 Sherbrooke MA	90	88	-2.6%	2.4%	2.5%	3.7%	2.2%	2.2%	0.9%
10 Around Sherbrooke MA	93	71	-24.2%	1.5%	1.4%	-5.1%	1.4%	1.0%	-28.1%
11 Trois-Rivières MA	107	108	1.1%	2.0%	1.9%	-5.1%	2.1%	2.0%	-4.1%
12 Around Trois-Riv. MA	81	79	-2.9%	4.7%	4.4%	-5.8%	3.8%	3.5%	-8.5%
13 Saguenay MA	96	107	11.6%	2.2%	1.9%	-12.6%	2.1%	2.1%	-2.5%
14 Around Saguenay MA	73	75	1.8%	1.8%	1.5%	-12.9%	1.3%	1.1%	-11.3%
15 Rest-of-the-North	113	126	11.2%	4.1%	3.6%	-12.5%	4.6%	4.5%	-2.7%
16 East	73	74	0.8%	4.3%	3.8%	-12.8%	3.2%	2.8%	-12.1%
Province of Quebec	100	100		100.0%	100.0%		100.0%	100.0%	

It is striking that, without exception, the GDP shares of analytical regions (numbered 01-16 in Table 1) rise or fall according to whether their shares of population rise or fall: the correlation coefficient between the 1997-2009 change in the share of population and the change in the share of GDP is 71% (F-statistic = 14.40)[20]. A declining relative GDP per capita is also associated with a falling share of GDP: the correlation coefficient between 1997-2009 changes is 72% (F-statistic=15.45). But the change in relative GDP per capita and in the share of population are unrelated: the correlation coefficient is an insignificant 3.2%.

In terms of geographical distribution, what is the picture that emerges? First, population (+3.3%) and, to a lesser degree, production (+0.8%) are concentrating in the Montreal metropolitan and peri-metropolitan area. But the most impressive feature locally is what is happening to the the Montreal AR relative to the rest of the metropolitan and peri-metropolitan area: its share of population has diminished slightly, while its share of GDP has fallen by a substantial 6.5% over a

[20] It is readily recognized that, to compare the closeness of relationships, given that the correlation coefficient is a measure of linear dependence, it would be mathematically more correct to take the logarithmic transform of equation (II.2.4) and compute correlations between the logarithm of the left-hand side variable and the logarithms of each of the two right-hand side variables. But that would make the exposition unnecessarily technical. Given the Maclaurin series $\ln(1+z)=z-z^2/2+z^3/3-z^4/4+...$, we consider $[(x_t/x_0)-1]$ to be a first order Taylor approximation of $\ln(x_t/x_0)$ when x_t is close to x_0, so the more correct mathematical approach would lead to the same observations.

thirteen-year period. Population and production are being decentralized within the MA and in its vicinity. Outside the Montreal metropolitan and peri-metropolitan area, however, the opposite is happening. All regions but three of the five MAs are losing shares. Of the three MAs gaining shares, two gain heavily in terms of production. Both are administrative cities: Quebec City (+10.1%) is the capital of the Province, and Gatineau (+14.7%) is part of the Ottawa-Gatineau MA, where Canada's federal capital is located. Everywhere else, population and GDP shares are declining, and they are delining faster in non-metropolitan areas.

Table 2 presents the same decomposition as Table 1 for personal income. Population data is repeated for readability.

Table 2 – Personal income by analytical region, Quebec, 1997-2009

Analytical region	Relative pers. inc. per cap.			Share of population			Share of personal income		
	1997	2009	1997-2009 proportional change (%)	1997	2009	1997-2009 proportional change (%)	1997	2009	1997-2009 proportional change (%)
	Province = 100			(%)	(%)		(%)	(%)	
Montreal and peri-metro area	106	103	-2.4%	58.5%	60.5%	3.3%	61.9%	62.4%	0.9%
Montreal MA	113	109	-3.6%	47.1%	48.8%	3.7%	51.5%	51.9%	0.7%
01 Montreal AR	111	104	-6.0%	24.7%	24.6%	-0.6%	27.4%	25.6%	-6.6%
02 Laval AR	107	103	-4.3%	4.6%	5.0%	7.7%	5.0%	5.1%	3.0%
03 Rest of Montreal MA	108	110	1.8%	17.7%	19.2%	8.6%	19.1%	21.1%	10.6%
04 Peri-metro. region	90	90	-0.5%	11.5%	11.7%	2.0%	10.4%	10.5%	1.6%
Other metropolitan areas	100	104	4.5%	19.6%	19.7%	0.4%	19.6%	20.5%	4.8%
Other non-metro	87	87	0.9%	33.4%	31.6%	-5.4%	28.9%	27.6%	-4.5%
Non-metro away from Montreal	85	86	1.4%	21.9%	19.9%	-9.2%	18.6%	17.1%	-7.9%
Peripheral regions	86	90	4.6%	10.2%	8.9%	-12.7%	8.7%	8.0%	-8.6%
05 Quebec MA	105	110	5.0%	9.5%	9.5%	0.5%	10.0%	10.5%	5.4%
06 Around Quebec MA	85	84	-1.3%	4.7%	4.4%	-6.9%	4.0%	3.7%	-8.1%
07 Gatineau MA	97	109	12.5%	3.5%	3.8%	9.0%	3.4%	4.2%	22.6%
08 Around Gatineau MA	68	76	11.8%	0.8%	0.7%	-7.4%	0.5%	0.6%	3.6%
09 Sherbrooke MA	98	93	-5.0%	2.4%	2.5%	3.7%	2.3%	2.3%	-1.5%
10 Around Sherbrooke MA	82	81	-1.6%	1.5%	1.4%	-5.1%	1.2%	1.2%	-6.6%
11 Trois-Rivières MA	94	93	-0.8%	2.0%	1.9%	-5.1%	1.8%	1.7%	-5.8%
12 Around Trois-Riv. MA	86	84	-2.6%	4.7%	4.4%	-5.8%	4.0%	3.7%	-8.2%
13 Saguenay MA	92	94	1.9%	2.2%	1.9%	-12.6%	2.0%	1.8%	-10.9%
14 Around Saguenay MA	83	86	3.7%	1.8%	1.5%	-12.9%	1.5%	1.3%	-9.7%
15 Rest-of-the-North	94	98	4.9%	4.1%	3.6%	-12.5%	3.9%	3.5%	-8.2%
16 East	79	83	4.7%	4.3%	3.8%	-12.8%	3.4%	3.1%	-8.7%
Province of Quebec	100	100		100.0%	100.0%		100.0%	100.0%	

For personal income as for GDP, analytical regions (numbered 01-16 in Table 2) with declining shares of population also have declining shares of personal income: the correlation coefficient between the 1997-2009 change in the share of population and the change in the share of personal income is 80% (F-statistic = 25.42). But there are a few exceptions (analytical regions 08 and 09). Not surprisingly, the same relationship is observed between the change in GDP and personal income shares: the correlation coefficient between the last column of Table 1 and the last column

of Table 2 is 74% (F-statistic = 17.07). A declining relative personal income per capita is also associated with a falling share of personal income: the correlation coefficient between 1997-2009 changes is 48% (F-statistic = 4.19). But the change in relative personal income per capita and in the share of population are unrelated: the correlation coefficient is a non-significant –14%.

Let us now compare relative personal income per capita in Table 2 with relative GDP per capita in Table 1. The comparison illustrates the conceptual difference between personal income and domestic product. Indeed, personal income is the income that residents of a given territory receive, no matter where production took place; on the other hand, domestic product is the total value of what has been produced in a given territory, no matter where those who receive the income live. Therefore, per capita GDP is strongly influenced by home-to-work commuting. The high per capita GDP of the Montreal AR and, to a lesser degree, of most other MAs is explained by the large number of residents of the surrounding area who come to work there. Conversely, per capita GDP is systematically weaker in the areas around MAs than in the MAs themselves. Two exceptions among the MAs are Gatineau and Sherbrooke. In the case of Gatineau, the somewhat low relative GDP per capita is explained by the fact that Gatineau belongs to the Ottawa-Gatineau MA, and that large numbers of civil servants live in Gatineau and work in Ottawa; indeed, per capita GDP is even lower in the surrounding area. Finally, the high per capita GDP of the Rest-of-the-North region reflects the presence of capital intensive industries (such as mining and hydroelectric power), whose shareholders do not necessarily live there. There is much less variation in relative personal income per capita than in relative GDP per capita, and this results in a less contrasted picture. Nonetheless, it appears that personal income per capita is higher in the Montreal MA, and in the two administrative MAs of Quebec and Gatineau. It should be kept in mind that at least part of that greater personal income is swallowed up by a higher cost of living. Changes in the geographical distribution of personal income reflect both changes in population and changes in per capita personal income, and they are consistent with changes in the distribution of production. There is a slight movement of concentration towards the Montreal metropolitan and peri-metropolitan area, and decentralization within the Montreal MA, with the core Montreal AR losing share. Both administrative capital regions of Quebec and Gatineau increase their shares, and, in the latter case, the increase seems to be spilling over to the surrounding region. All other regions lose share.

Table 3 presents the same decomposition as Table 1 for disposable personal income. Again, population data is repeated for readability.

Table 3 – Personal disposable income, by analytical region, Quebec, 1997-2009

Analytical region	Rel. pers. disp. inc. per cap.			Share of population			Share of personal disp. income		
	1997	2009	1997-2009 proportional change (%)	1997	2009	1997-2009 proportional change (%)	1997	2009	1997-2009 proportional change (%)
	Province = 100			(%)	(%)		(%)	(%)	
Montreal and peri-metro area	105	103	-2.4%	58.5%	60.5%	3.3%	61.6%	62.2%	0.9%
Montreal MA	113	109	-3.6%	47.1%	48.8%	3.7%	51.1%	51.5%	0.8%
01 Montreal AR	112	105	-6.4%	24.7%	24.6%	-0.6%	27.6%	25.7%	-7.0%
02 Laval AR	106	102	-3.5%	4.6%	5.0%	7.7%	4.9%	5.1%	3.8%
03 Rest of Montreal MA	105	108	2.8%	17.7%	19.2%	8.6%	18.6%	20.7%	11.6%
04 Peri-metro. region	92	91	-0.9%	11.5%	11.7%	2.0%	10.6%	10.7%	1.1%
Other metropolitan areas	98	103	4.8%	19.6%	19.7%	0.4%	19.3%	20.3%	5.2%
Other non-metro	89	89	0.6%	33.4%	31.6%	-5.4%	29.7%	28.2%	-4.8%
Non-metro away from Montreal	87	88	1.3%	21.9%	19.9%	-9.2%	19.1%	17.6%	-8.0%
Peripheral regions	87	92	5.5%	10.2%	8.9%	-12.7%	8.9%	8.2%	-7.9%
05 Quebec MA	103	109	5.2%	9.5%	9.5%	0.5%	9.8%	10.3%	5.7%
06 Around Quebec MA	89	87	-2.4%	4.7%	4.4%	-6.9%	4.2%	3.8%	-9.1%
07 Gatineau MA	92	105	13.5%	3.5%	3.8%	9.0%	3.3%	4.0%	23.7%
08 Around Gatineau MA	71	78	10.8%	0.8%	0.7%	-7.4%	0.6%	0.6%	2.6%
09 Sherbrooke MA	99	94	-5.0%	2.4%	2.5%	3.7%	2.4%	2.3%	-1.5%
10 Around Sherbrooke MA	86	83	-2.8%	1.5%	1.4%	-5.1%	1.3%	1.2%	-7.7%
11 Trois-Rivières MA	94	93	-0.7%	2.0%	1.9%	-5.1%	1.8%	1.7%	-5.8%
12 Around Trois-Riv. MA	89	86	-3.2%	4.7%	4.4%	-5.8%	4.2%	3.8%	-8.8%
13 Saguenay MA	90	94	3.5%	2.2%	1.9%	-12.6%	2.0%	1.8%	-9.6%
14 Around Saguenay MA	84	88	4.6%	1.8%	1.5%	-12.9%	1.5%	1.4%	-8.8%
15 Rest-of-the-North	94	101	7.4%	4.1%	3.6%	-12.5%	3.9%	3.6%	-6.0%
16 East	82	85	3.7%	4.3%	3.8%	-12.8%	3.5%	3.2%	-9.6%
Province of Quebec	100	100		100.0%	100.0%		100.0%	100.0%	

Naturally, changes in shares of personal disposable income and of personal income are highly correlated (between the last columns of Tables 2 and 3, the correlation coefficient is 99% (F-statistic = 1279). Likewise, the correlation coefficient between changes in the relative personal disposable income per capita and the relative personal income per capita is 98% (F-statistic = 400). With few exceptions, regions with declining shares of population also have declining shares of personal disposable income: the correlation coefficient between the 1997-2009 change in the share of population and the change in the share of personal disposable income is 79% (F-statistic = 23.31). The same relationship is observed with changes in shares of GDP (the correlation coefficient between the last column of Table 1 and the last column of Table 2 is 78%; F-statistic 21.23). A declining relative personal disposable income per capita is also associated, but less strongly, with a falling share of personal disposable income: the correlation coefficient between 1997-2009 changes is 51% (F-statistic = 4.94). But the change in relative personal disposable income per capita and in the share of population are unrelated: the correlation coefficient is not significant, at –12%. Changes in the geographical distribution of personal disposable income are very similar to those observed above concerning the distribution of personal income, and the same comments apply.

TIME-PATHS

In the previous section, an examination of the first and last years of the time-series produced a relatively clear picture, which we synthesized as: stability in the dominant share of the Montreal metropolitan and peri-metropolitan area, accompanied by a movement of decentralization within the area, together with a rise in the shares of the administrative and political cities of Quebec and Gatineau MAs, and a concomitant fall in the shares of other regions, especially non-metropolitan and peripheral areas. In this section, we briefly look at the evolution in-between, to verify whether the picture remains clear or becomes murky. Our approach is graphical, since 13 years is too short a time-series for serious econometric analyses.

Figure 3 presents the evolution of population shares in index form (1997 = 100). An index above 100 means that the region's share of population is higher than it was in base year 1997, and vice-versa for values below 100. Figure 3 shows that the curves of population shares are mostly monotonous (i.e. without ups-and-downs), although there are exceptions. The general impression is one of smooth evolution. From this point on, we shall distinguish four groups of analytical regions:

- regions with increasing population shares: Gatineau MA, Rest of Montreal MA, Laval AR and Sherbrooke MA;
- regions with stable population shares: Quebec MA and Montreal AR;
- regions with falling population shares: non-metropolitan area around Sherbrooke MA, Trois-Rivières MA, non-metro area around Trois-Rivières MA, non-metro areas around Quebec and Gatineau MAs;
- regions with collapsing population shares: Rest of the North, Saguenay MA, the East and non-metro area around Saguenay MA.

Figures 4-7 display the evolution of an index of GDP shares for each of the four groups. Roughly speaking, regions with increasing or decreasing population shares also have increasing or decreasing GDP shares, but the evolution is not monotonous as it is for population shares. Now look at Figures 8-11, which show the evolution of *relative* GDP per capita in index form (1997 = 100). Relative GDP per capita for 1997 and 2009 is given in the first two columns of Table 1. The index for 2009 is obtained by dividing the 2009 relative GDP per capita by the corresponding 1997 value. For example, the 2009 index of relative GDP per capita for the Montreal AR is $100 \times 137 / 146 = 94$ (after rounding). It is quite apparent that the shape of the relative GDP per capita index curves in Figures 8-11 mirrors that of GDP share index curves in Figures 4-7.

In the previous section, we have detailed the mathematical relationship between GDP shares, population shares and GDP per capita. Visually, it would seem that the relationship could be characterized by saying that population shares represent the trend, and GDP per capita the fluctuations around the trend. Changes in GDP per capita may reinforce the trend, as in the case of the Laval AR, or they may dampen or even reverse the trend, as in the case of the Saguenay MA. Not surprisingly, the relationship between the variables is supported by the correlations between them: the panel correlation coefficient[21] of year-to-year changes in GDP shares with year-to-year changes in population shares is 72% (F-statistic = 199); with year-to-year changes in relative GDP per capita, it is 75% (F-statistic = 246). Finally, the panel correlation coefficient of year-to-year changes in population shares with year-to-year changes in relative GDP per capita is not so strong, at 29% (F-statistic = 17.8).

Figures 12-15 show the evolution of personal income shares. As was observed in Table 2, personal income shares vary somewhat less than GDP shares. Compared with GDP shares, personal income shares nonetheless display a similar relationship with population shares and with relative personal income per capita. The panel correlation coefficients of year-to-year changes in personal income shares are 29% (F-statistic = 16.9) with year-to-year changes in population shares, and 92% (F-statistic = 1016) with year-to-year changes in relative personal income per capita.

REGIONAL GROSS VALUE ADDED BY INDUSTRY

Regional GDP is the sum over all industries of regional gross value added by industry. So we shall now use the estimates of gross value added by industry and by region to examine the evolution of regional GDP shares in more detail. The percent change between year 0 and year *t* of the share $\left(x_{it}/X_t\right)$ of region *i* can be written as

$$100*\left(\frac{\left(x_{it}/X_t\right)}{\left(x_{i0}/X_0\right)}-1\right)=100*\left(\frac{\left(x_{it}/x_{i0}\right)}{\left(X_t/X_0\right)}-1\right)=100*\left(\frac{\left(x_{it}/x_{i0}\right)-\left(X_t/X_0\right)}{\left(X_t/X_0\right)}\right) \qquad \text{(II.2.6)}$$

The numerator of the ratio on the extreme right is the differential growth rate of the region:

$$\left(x_{it}/x_{i0}\right)-\left(X_t/X_0\right)=\left[\left(x_{it}/x_{i0}\right)-1\right]-\left[\left(X_t/X_0\right)-1\right] \qquad \text{(II.2.7)}$$

[21] What we call the panel correlation coefficient here is calculated for the panel of 16 regions and 12 year-to-year changes (from 1997-1998 to 2008-2009).

We shall apply shift-share analysis to gross value added by industry in order to decompose differential GDP growth into two components, conventionally labelled "structural growth" and "residual growth". Structural growth is defined as the additional (possibly negative) growth that the region would have experienced if each of its industries had grown at the same rate as the industry has grown at the national level (in the present context, at the provincial level).

It must be recognized at the outset that shift-share analysis has many shortcomings. Its principal limitation is that the amount of structural growth depends on the industry classification, and that the bias from using a less, rather than a more detailed classification is of unknown sign. Another point to keep in mind is that calculation of the structural component of growth depends on the choice of the base year, in much the same way as a Laspeyres price index; if, for any reason, the industry mix in the base year is not representative of a region's long-term economic structure, then the effect of that structure on regional growth is misrepresented. In addition, the shift-share decomposition of growth over a given period is not the sum of shift-share decompositions of growth over its sub-periods, since every sub-period has a different base year industry mix. In view of these limitations, there is no validity whatsoever in the interpretation of the residual effect as an indicator of the region's competitiveness.

So, with all due caution, we apply shift-share analysis to answer the following question: at the available level of industrial detail, is it possible to identify industries or groups of industries whose relatively high or low provincial growth rates may have influenced regional growth?

Before tackling this task, two methodological challenges had to be solved. The first concerns changes in the metropolitan area boundaries, mentioned above (section 2.1). At the aggregate level, we estimated constant-boundary MA GDP and personal income as the product of the corresponding per capita values by the appropriate population numbers. It would not be adequate to make this kind of adjustment at the individual industry level. So the solution adopted was to estimate the effect of boundary changes on overall regional GDP as the ratio in 2005 of GDP according to the 2006 MA boundaries to GDP according to the 2001 MA boundaries. In the analysis, this "boundary change effect" was simply subtracted from the residual component of growth. No adjustment was made in year 2000 for boundary changes that have taken place in census year 2001, because the changes were minor.

The other challenge that had to be met is the effect of disclosure rules. The ISQ applies Statistics Canada's so-called "Duffett rules"[22] of data dissemination. These are designed to prevent the disclosure of information obtained under the authority of the Statistics Act that pertains to individual persons or organizations. Undisclosed data is represented by "X" in Tables A2.2 and

[22] Named after Walter Duffett, who was Chief Statistician in the early 1970s when these rules were adopted.

A2.3 of Appendix 2: except for aggregates such as Manufacturing as a whole, almost every industry is undisclosed for at least one region. Consequently, if all industries that are undisclosed for some region were aggregated for all regions, analysis could be performed only at a highly aggregated level.

In order to make full use of all the available information, four residual industries were created for each analytical region:

- Other Agriculture etc. (confidential data)
- Other Mining, Util. & Construc. (confidential)
- Other Manufacturing (confidential data)
- Other Services (confidential data)

The gross value added of these residual industries was obtained by subtracting known data from the aggregates. Now, as we already mentioned, the pattern of disclosure is not the same for all regions, which implies that the composition of the residual industries differs from one region to another. So, to calculate the structural component of growth of a residual industry, the growth rate of the corresponding aggregate at the provincial level was computed separately for each analytical region.

Table 4 synthesizes the results of the shift-share analysis. The growth decomposition is for the 1997-2008 period, rather than 1997-2009, because the regional gross value added data for 2009 are not available by industry yet.

Table 4 – Shift-share analysis of regional growth, 1997-2008

	Analytical region	Total growth = Provincial + differential			Components of differential growth			... in % of differential growth*		
		Total growth	Provincial growth	Differen-tial growth	Structural component	MA Boundary change effect	Residual component	Structural component	MA Boundary change effect	Residual component
01	Montreal AR	52.0%	62.3%	-10.3%	-0.3%	0.0%	-10.1%	-2.6%	0.0%	-97.4%
02	Laval AR	90.2%	62.3%	27.8%	6.0%	0.0%	21.9%	21.4%	0.0%	78.6%
03	Rest of Montreal MA	87.8%	62.3%	25.5%	1.8%	3.2%	20.5%	7.1%	12.4%	80.5%
04	Peri-metro. region	65.1%	62.3%	2.8%	-2.7%	-4.2%	9.7%	-95.0%	-149.7%	344.7%
05	Quebec MA	86.4%	62.3%	24.0%	4.4%	1.6%	18.0%	18.4%	6.9%	74.7%
06	Around Quebec MA	39.5%	62.3%	-22.8%	-4.3%	-9.0%	-9.5%	-19.1%	-39.5%	-41.5%
07	Gatineau MA	77.2%	62.3%	14.9%	4.4%	0.7%	9.7%	29.8%	4.8%	65.4%
08	Around Gatineau MA	44.9%	62.3%	-17.5%	-7.2%	-1.8%	-8.4%	-41.5%	-10.6%	-47.9%
09	Sherbrooke MA	86.6%	62.3%	24.2%	-1.3%	20.4%	5.1%	-5.3%	84.3%	21.0%
10	Around Sherbrooke MA	1.5%	62.3%	-60.8%	-13.7%	-23.1%	-24.0%	-22.5%	-37.9%	-39.5%
11	Trois-Rivières MA	58.1%	62.3%	-4.2%	-2.2%	0.1%	-2.1%	-53.3%	2.8%	-49.4%
12	Around Trois-Riv. MA	49.8%	62.3%	-12.5%	-5.7%	-0.1%	-6.8%	-45.2%	-0.5%	-54.2%
13	Saguenay MA	60.2%	62.3%	-2.1%	-3.5%	0.4%	1.0%	-167.1%	18.9%	48.3%
14	Around Saguenay MA	48.7%	62.3%	-13.6%	-5.0%	-0.7%	-8.0%	-36.5%	-4.8%	-58.7%
15	Rest-of-the-North	58.3%	62.3%	-4.0%	3.7%	0.0%	-7.7%	91.2%	0.0%	-191.2%
16	East	41.8%	62.3%	-20.5%	-1.0%	0.0%	-19.5%	-4.8%	0.0%	-95.2%
	Province of Quebec	62.3%	62.3%	0.0%	0.0%	0.0%	0.0%			

* The component shares are multiplied by –1 when differential growth is negative.

In Table 4, the sum of the components in columns 4-6 is equal to the differential growth rate in column 3. In columns 7-9, the components from columns 4-6 are expressed in percentage shares of total differential growth (the sum of shares is 100% or –100%, depending on whether differential growth is positive or negative).

First, we note that the effect of MA boundary changes (col. 5) has indeed been quite substantial for the Sherbrooke MA and the surrounding area. Otherwise, it has mostly had a negative effect on regions around metropolitan areas due to the transfer to the metropolitan area of territory with a high density of economic activity.

But we are mostly concerned with the structural component (col. 4). It is interesting to note that the structural component is negative for most regions except for the part of the Montreal MA which doesn't belong to the core Montreal AR, and the two administrative and political centers of Gatineau (part of the Ottawa-Gatineau MA, where the federal capital of Canada is located) and Québec (capital city of the Province of Quebec). The structural component is also positive for the Rest-of-the-North peripheral region; Table 5 reveals that this is mostly associated to Mining etc., Utilities and Construction.

Table 5 gives the sectoral composition of structural growth. The sum of the sectoral components in columns 2-5 is equal to the structural component of regional GDP growth in column 1, which is identical to the fourth of Table 4. Each of the sectoral components is the sum of industry components computed at the level of detail displayed in Table A2.4.

Table 5 – Sectoral detail of the structural component of differential regional growth, 1997-2008 (variation of gross value added, in thousands of current Canadian dollars)

	Analytical region	Total structural component	Agriculture, Forestry, Fishing and Hunting	Mining etc., Utilities & Construc.	Manufac-turing	Services-producing industries
01	Montreal AR	-0.3%	0.0%	1.7%	-8.8%	6.9%
02	Laval AR	6.0%	-0.1%	3.5%	-5.0%	7.6%
03	Rest of Montreal MA	1.8%	-0.2%	3.6%	-7.3%	5.6%
04	Peri-metro. region	-2.7%	-0.9%	3.2%	-9.8%	4.9%
05	Quebec MA	4.4%	-0.1%	2.1%	-3.5%	6.1%
06	Around Quebec MA	-7.2%	-1.1%	2.0%	-11.4%	3.3%
07	Gatineau MA	4.4%	-0.3%	2.2%	-2.8%	5.3%
08	Around Gatineau MA	-4.3%	-4.4%	3.5%	-6.2%	2.7%
09	Sherbrooke MA	-1.3%	-0.2%	1.6%	-7.5%	4.7%
10	Around Sherbrooke MA	-13.7%	-1.1%	2.4%	-17.4%	2.3%
11	Trois-Rivières MA	-2.2%	-0.2%	5.1%	-10.8%	3.7%
12	Around Trois-Riv. MA	-5.7%	-1.1%	2.5%	-10.9%	3.9%
13	Saguenay MA	-3.5%	-0.4%	2.7%	-11.1%	5.4%
14	Around Saguenay MA	-5.0%	-2.2%	2.2%	-10.0%	4.9%
15	Rest-of-the-North	3.7%	-1.1%	8.6%	-7.2%	3.4%
16	East	-1.0%	-1.4%	2.9%	-6.3%	3.9%
	Province of Quebec	0.0%	-0.4%	2.6%	-8.1%	5.9%

By its very definition, the provincewide structural component is zero, because the weighted average growth rate of industries is equal to the overall growth rate of provincial GDP. But individual industries or groups of industries do not grow equally. It can be seen that, in Quebec like in all mature economies, the manufacturing sector has grown less than services. Accordingly, the contribution of manufacturing to the structural component of growth is negative everywhere, and larger (in absolute value) in regions where manufacturing is concentrated. Conversely, the service sector has grown faster than the overall economy, so its contribution is positive everywhere, and greater in metropolitan areas, where the service economy tends to concentrate. Interestingly, it can be seen from the detailed results in Table A2.4 that the contribution of Services to the structural component of growth in the Gatineau and Quebec administrative MAs is not primarily associated with growth in Public Administration. Regarding Mining etc., Utilities and Construction, as far as can be seen from the non-disclosed data in Table A2.4, its more rapid growth is mostly due to the construction boom that Quebec has experienced in recent years.

Returning to our initial question, we conclude that yes, is it possible to identify industries or groups of industries whose relatively high or low provincial growth rates may have influenced regional growth. However, Table 4 shows that the residual, unexplained, component of differential growth overweighs the structural component in most cases, even after subtracting the effect of MA boundary changes in 2006.

SUMMARY AND CONCLUSION

This article presents the method developed for the Institut de la Statistique du Québec to estimate regional GDP in the Province of Quebec. Roughly speaking, the method applied to the Quebec regions consists in allocating total labour income and net income of unincorporated business (NIUB, also called "mixed income") by industry among regions using allocators constructed from fiscal data on wages and salaries and NIUB obtained from the Quebec ministry of revenue (responsible for tax collection). For each industry, other components of value added (corporation profits, interest, capital consumption allowances, inventory valuation adjustment, and net indirect taxes on production) are then distributed in proportion to the sum of total labour income and NIUB. The method has been applied to the 17 administrative regions of the Province of Quebec, and to its 6 metropolitan areas, from 1997 onwards. The key ingredients in the method are a compilation of fiscal data on incomes, and reliable home-to-work commuting tables by industry. We believe our approach could be used anywhere these are available.

In order to examine the changing distribution of population, production and income in the Province of Quebec, we have reorganized the data to construct analytical regions according to the center-periphery view. This was achieved by summation and subtraction of data pertaining to the administrative regions and the metropolitan areas. A relatively clear picture emerged from our examination of the data, both through a comparison of the first- and last-year data, and through a graphical inspection of the evolution in-between.

Almost half of the population resides in the Montreal metropolitan area, and around 60% reside in the combined Montreal metropolitan and peri-metropolitan area. Corresponding GDP and personal income shares are slightly higher. Population, GDP and income shares are quite stable throughout the period. Within the Montreal MA, however, there is a movement of deconcentration, as the Montreal administrative region, which constitutes the core of the metropolitan area, loses about 6% of its share in production and income, while more or less maintaining its share of population. In other parts of the Province, only the Quebec and Gatineau MAs increase their shares of GDP and income. Both metropolitan areas include administrative and political centers: Quebec City is the capital of the Province, and Gatineau is part of the Ottawa-Gatineau MA where Canada's federal capital is located. The two are different, however, in that Gatineau's share of population is increasing, while Quebec City's is stable. Almost all other analytical regions show falling shares of population, production and income. Exceptions are the Sherbrooke MA, whose share of population increases, while its share of GDP increases only slightly, and its share of personal income falls; and the non-metropolitan area around Gatineau, whose shares of population and production fall, while its share of income increases, probably due

to commuters working in the Ottawa-Gatineau MA. Peripheral regions' shares of population dropped by 12-13% over the 1997-2009 period; their shares of GDP and personal income have fallen also, albeit less dramatically.

So it appears that, not only are the population, production and income shares of regions traditionally considered as peripheral falling, but within the Quebec heartland, there is a redistribution from non-metropolitan to metropolitan areas. At the same time, there is movement from the center to the outer ring of the dominant Montreal MA.

How much of that spatial redistribution can be related to changes in the industry mix of the economy? In an attempt to throw some light in the issue, shift-share analysis was applied to gross value added by industry in order to decompose differential GDP growth into its two conventional components, "structural growth" and "residual growth". We found that it is possible to identify industries or groups of industries whose differential growth rates may have influenced regional growth. However, the residual, unexplained, component of differential growth outweighs the structural component in most cases, even after subtracting the effect of MA boundary changes.

These results show, not too surprisingly, that the center-periphery logic underlying the changing geography of production cannot be reduced to a mere reflection of changes in the industry mix of the economy. Space matters.

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APPENDIX 1: DEFINITION OF ANALYTICAL REGIONS

Montreal AR ..... = Montreal AR
Laval AR ..... = Laval AR
Rest-of-Montreal MA ..... = Montreal MA – [Montreal AR + Laval AR]
Perimetropolitan area ..... = [Laurentides AR + Lanaudière AR + Montérégie AR] – Rest-of-Montreal MA
Québec MA ..... = Québec MA
Non-metro around Québec MA ..... = [Chaudière-Appalaches AR + Capitale-Nationale AR] – Québec MA
Gatineau MA ..... = part of the Ottawa-Gatineau MA located in the Province of Quebec
Non-metro around Gatineau MA ..... = Outaouais AR – Gatineau MA
Sherbrooke MA ..... = Sherbrooke MA
Non-metro around Sherbrooke MA ..... = Estrie AR – Sherbrooke MA
Trois-Rivières MA ..... = Trois-Rivières MA
Non-metro around Trois-Rivières MA ..... = [Mauricie AR + Centre-du-Québec AR] – Trois-Rivières MA
Saguenay MA ..... = Saguenay MA
Non-metro around Saguenay MA ..... = Saguenay—Lac-Saint-Jean AR – Saguenay MA
Rest-of-the-North ..... = Abitibi-Témiscamingue AR + Nord-du-Québec AR + Côte-Nord AR
East ..... = Bas-Saint-Laurent AR + Gaspésie—Îles-de-la-Madeleine AR

APPENDIX 2: DATA AND DETAILED SHIFT-SHARE RESULTS

Note: All data in the following tables are the result of the authors' calculations, on the basis of data published by the Institut de la statistique du Québec. The original sources of data published by the ISQ are identified in ISQ publications and on its Web site.

Legend:

X: confidential or otherwise unavailable data

ep: preliminary estimates

e: estimates

er: revised estimates

p: provisional figures

r: revised figures

Table A2.1 – GDP at basic prices, personal income and population by analytical region, 1997-2009

GDP at basic prices by analytical region, Quebec, 1997-2009 (thousands of current Canadian dollars)

	Analytical region	1997	1998	1999	2000	2001	2002	2003	2004	2005r	2006p	2007er	2008e	2009ep
01	Montreal AR	63 106 448	66 743 932	71 967 144	77 494 746	79 795 660	81 718 445	83 306 883	88 269 286	90 518 770	93 169 704	97 287 056	95 907 615	95 363 912
02	Laval AR	6 376 520	6 645 796	7 066 927	7 575 062	8 050 341	8 455 011	8 879 907	9 471 761	9 900 567	10 795 959	11 443 701	12 125 043	12 150 924
03	Rest of Montreal MA	23 277 138	24 208 521	26 476 905	28 107 645	29 434 739	31 177 456	32 862 562	34 119 773	35 343 186	38 138 239	40 951 934	42 280 357	42 322 401
04	Peri-metro. region	16 200 593	16 499 127	17 958 015	19 021 961	19 638 245	20 665 474	21 929 892	23 208 463	24 085 912	25 033 182	26 422 827	28 012 234	27 689 877
05	Quebec MA	17 501 633	17 946 882	19 008 470	20 193 761	21 295 802	22 279 782	24 066 598	24 739 117	25 935 548	27 427 373	29 504 917	30 855 898	31 143 788
06	Around Quebec MA	6 690 017	7 050 589	7 697 881	8 152 763	8 281 312	8 552 015	8 840 817	9 120 127	9 406 488	9 236 636	9 622 172	9 820 160	9 660 605
07	Gatineau MA	4 935 836	5 116 007	5 398 429	5 924 311	6 257 765	6 794 205	7 093 192	7 294 126	7 698 588	8 028 835	8 676 398	9 008 484	9 153 832
08	Around Gatineau MA	779 259	843 136	878 109	931 023	949 828	963 916	1 007 154	1 052 225	1 092 473	1 032 904	1 055 461	1 227 167	1 233 349
09	Sherbrooke MA	3 789 039	3 852 587	4 081 315	4 410 968	4 564 915	4 780 364	5 111 839	5 237 435	5 413 729	5 737 294	6 025 613	6 192 078	6 182 672
10	Around Sherbrooke MA	2 467 034	2 624 063	2 866 144	3 077 905	3 125 008	3 198 575	3 267 821	3 276 396	3 309 582	3 027 984	3 040 664	2 979 834	2 869 538
11	Trois-Rivières MA	3 659 415	3 757 760	3 934 424	4 212 709	4 266 979	4 501 419	4 618 439	4 648 872	4 983 996	5 367 023	5 580 406	5 768 171	5 675 842
12	Around Trois-Riv. MA	6 673 553	6 895 104	7 521 581	8 043 138	8 143 128	8 257 707	8 610 781	8 877 422	9 128 816	9 407 021	9 731 980	10 015 527	9 866 678
13	Saguenay MA	3 714 107	3 819 941	4 052 932	4 362 259	4 143 430	4 258 877	4 323 948	4 610 724	4 807 384	5 107 262	5 460 208	5 983 756	5 853 208
14	Around Saguenay MA	2 264 747	2 463 637	2 583 578	2 725 004	2 895 237	2 856 876	2 970 213	3 123 402	3 376 704	3 350 083	3 568 948	3 337 554	3 247 203
15	Rest-of-the-North	8 135 959	8 061 243	8 227 775	8 823 585	8 618 542	8 913 772	9 279 050	9 982 826	10 626 020	11 421 715	12 619 956	12 878 466	12 802 016
16	East	5 546 519	5 723 701	6 045 567	6 243 784	6 250 334	6 475 584	6 810 834	6 956 605	7 081 823	7 151 845	7 776 127	7 864 934	7 885 156
	Province of Quebec	175 117 816	182 252 025	195 765 197	209 300 623	215 711 266	223 849 476	232 979 930	243 988 561	252 709 585	263 433 059	278 768 371	284 257 279	283 101 000

Personal income by analytical region, Quebec, 1997-2009 (thousands of current Canadian dollars)

	Analytical region	1997	1998	1999	2000	2001	2002	2003	2004	2005r	2006r	2007r	2008r	2009p
01	Montreal AR	44 220 106	45 934 951	47 805 183	51 017 423	53 559 345	53 556 196	55 035 473	56 972 941	58 128 450	60 814 329	65 250 523	66 588 245	67 377 108
02	Laval AR	8 043 383	8 362 036	8 739 816	9 452 924	9 870 227	10 153 993	10 613 252	11 096 258	11 570 968	12 106 385	12 785 580	13 408 977	13 507 929
03	Rest of Montreal MA	30 846 627	32 395 450	34 083 980	36 733 549	38 483 016	39 388 065	41 816 215	44 073 982	46 474 245	49 202 390	52 252 798	54 187 563	55 612 270
04	Peri-metro. region	16 729 832	17 461 979	18 102 502	19 253 954	20 009 000	20 994 410	22 141 297	23 430 523	24 576 090	25 531 099	26 728 072	27 662 007	27 708 759
05	Quebec MA	16 073 127	16 518 475	17 122 929	18 369 106	19 286 472	20 066 067	20 941 408	22 076 719	22 912 377	24 136 790	25 281 134	26 548 540	27 636 749
06	Around Quebec MA	6 485 908	6 685 800	7 010 780	7 367 555	7 600 055	7 825 807	8 171 734	8 556 083	8 813 594	9 128 446	9 410 744	9 819 782	9 716 432
07	Gatineau MA	5 498 362	5 703 879	6 107 854	7 085 912	7 125 135	7 575 977	7 922 442	8 319 464	8 768 841	9 223 581	9 888 496	10 321 251	10 990 661
08	Around Gatineau MA	863 584	936 159	973 856	1 027 889	1 062 353	1 132 286	1 182 107	1 277 957	1 323 421	1 305 395	1 345 028	1 386 122	1 458 969
09	Sherbrooke MA	3 790 840	3 882 173	4 009 194	4 313 895	4 520 716	4 655 755	4 866 181	5 091 625	5 243 007	5 576 938	5 793 655	6 022 595	6 090 348
10	Around Sherbrooke MA	2 007 048	2 111 110	2 255 152	2 361 572	2 452 476	2 618 623	2 734 145	2 832 416	2 878 193	2 919 527	2 978 806	3 110 975	3 057 814
11	Trois-Rivières MA	2 970 062	3 023 511	3 114 994	3 344 787	3 424 221	3 522 103	3 652 178	3 591 953	3 974 264	4 146 786	4 331 591	4 526 793	4 561 948
12	Around Trois-Riv. MA	6 509 021	6 717 929	7 005 877	7 386 204	7 646 892	7 837 729	8 105 329	8 502 700	8 827 793	9 253 903	9 400 458	9 783 023	9 741 218
13	Saguenay MA	3 288 201	3 359 293	3 487 186	3 734 756	3 745 760	3 802 030	3 909 114	4 076 510	4 215 010	4 374 383	4 570 988	4 722 966	4 775 159
14	Around Saguenay MA	2 357 096	2 434 392	2 575 895	2 736 744	2 752 498	2 789 677	2 897 483	3 052 147	3 138 955	3 260 442	3 371 108	3 470 609	3 472 485
15	Rest-of-the-North	6 231 919	6 324 638	6 432 398	6 755 520	6 729 687	7 080 011	7 438 281	7 844 409	7 999 892	8 233 659	8 790 112	9 321 112	9 331 673
16	East	5 490 882	5 580 225	5 841 404	6 147 211	6 231 150	6 483 273	6 776 360	7 129 313	7 294 901	7 427 947	7 703 906	8 078 440	8 173 477
	Province of Quebec	161 406 000	167 432 000	174 669 000	187 089 000	194 499 000	199 482 000	208 203 000	217 925 000	226 140 000	236 642 000	249 883 000	258 959 000	263 213 000

Population by analytical region, Quebec, 1997-2009

	Analytical region	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
01	Montreal AR	1 799 305	1 801 463	1 814 649	1 832 859	1 850 493	1 866 946	1 873 087	1 874 608	1 873 585	1 873 589	1 882 343	1 897 183	1 923 785
02	Laval AR	337 617	339 826	342 605	346 324	350 286	354 849	359 198	363 405	367 935	372 410	378 351	384 489	391 141
03	Rest of Montreal MA	1 286 674	1 298 768	1 309 453	1 321 066	1 333 286	1 349 505	1 369 248	1 391 677	1 414 314	1 439 046	1 462 269	1 483 758	1 503 773
04	Peri-metro. region	834 276	838 365	841 143	844 607	849 215	855 765	864 695	875 682	886 493	896 155	902 732	909 658	916 058
05	Quebec MA	689 763	691 482	693 953	697 027	701 291	705 894	709 608	715 073	718 478	724 303	730 895	738 328	745 641
06	Around Quebec MA	341 940	341 868	341 974	341 712	341 106	340 572	340 809	341 043	341 254	341 382	341 326	341 464	342 651
07	Gatineau MA	256 748	258 649	260 213	263 268	267 258	271 373	275 758	279 847	284 038	287 053	291 396	296 025	301 124
08	Around Gatineau MA	57 039	56 896	56 532	55 824	55 676	55 808	56 396	57 004	57 398	57 812	57 163	56 951	56 861
09	Sherbrooke MA	174 709	175 728	176 326	177 830	180 030	181 729	183 629	185 372	187 190	188 710	190 586	192 419	194 892
10	Around Sherbrooke MA	110 000	110 489	110 695	110 896	111 351	111 582	111 874	112 025	112 375	112 304	112 025	112 467	112 360
11	Trois-Rivières MA	142 397	142 089	141 876	141 481	140 944	140 702	140 756	141 350	141 746	142 493	143 346	144 514	145 435
12	Around Trois-Riv. MA	341 230	342 257	342 501	342 034	341 846	341 319	341 364	342 412	343 157	343 749	344 648	345 275	346 002
13	Saguenay MA	161 188	160 902	160 061	158 641	157 247	155 950	154 927	154 021	152 996	152 456	151 845	151 696	151 572
14	Around Saguenay MA	128 483	128 093	127 586	126 870	126 038	124 791	123 550	122 756	122 031	121 662	121 120	120 720	120 487
15	Rest-of-the-North	299 401	297 535	294 808	291 097	287 363	284 473	282 869	282 236	281 806	281 701	281 542	281 502	282 063
16	East	313 841	311 525	308 875	305 415	302 901	299 818	298 070	297 418	297 115	296 727	295 836	294 883	294 512
	Province of Quebec	7 274 611	7 295 935	7 323 250	7 356 951	7 396 331	7 441 076	7 485 838	7 535 929	7 581 911	7 631 552	7 687 423	7 751 332	7 828 357

Table A2.2 – Gross value added by industry and analytical region, 1997, in thousands of current Canadian dollars (part 1)

NAICS code	Industry	Montreal AR	Laval AR	Rest of Montreal MA	Peri-metro. region	Quebec MA	Around Quebec MA	Gatineau MA	Around Gatineau MA
T001	**All industries**	**63 106 448**	**6 376 520**	**22 506 195**	**16 971 535**	**17 407 244**	**6 784 406**	**4 829 851**	**885 243**
T008	**Goods-producing industries**	**18 299 612**	**1 645 883**	**7 554 189**	**6 948 931**	**3 268 118**	**3 306 701**	**851 763**	**380 581**
11	**Agriculture, Forestry, Fishing and Hunting**	**86 349**	**39 633**	**236 756**	**758 294**	**133 443**	**435 693**	**35 113**	**100 391**
111-112	Crop and Animal Production	41 820	30 868	177 636	X	81 458	356 265	3 543	20 906
113	Forestry and Logging	19 430	X	X	X	26 487	59 769	28 145	73 998
114	Fishing, Hunting and Trapping	X	X	X	X	X	X	X	X
115	Support Activities for Agriculture and Forestry	X	5 261	X	X	X	X	X	X
	Other Agriculture etc. (confidential data)	25 099	3 505	59 120	758 294	25 498	19 660	3 425	5 487
21	**Mining, quarrying, and Oil and Gaz Extraction**	X	X	X	X	15 744	X	3 621	1 719
22	**Utilities**	X	X	X	X	546 665	X	X	X
23	**Construction**	2 037 906	362 890	1 386 542	919 731	709 274	X	X	X
	Other Mining, Util. & Construc. (confidential)	3 105 333	167 215	993 785	610 914	0	514 193	449 127	131 332
31-33	**Manufacturing**	**13 070 024**	**1 076 144**	**4 937 105**	**4 659 992**	**1 862 993**	**2 356 815**	**363 903**	**147 139**
311	Food Manufacturing	990 588	121 179	317 683	566 710	226 606	280 540	X	X
312	Beverage and Tobacco Product Manufacturing	1 055 880	X	X	X	X	X	X	X
313-314	Textile Mills	505 492	14 941	51 311	287 064	13 188	76 742	X	X
315	Clothing Manufacturing	1 254 014	X	X	X	X	X	X	X
316	Leather and Allied Product Manufacturing	X	X	X	X	X	X	X	X
321	Wood Product Manufacturing	X	X	X	X	X	X	X	X
322	Paper Manufacturing	605 389	34 862	182 462	X	108 172	X	X	X
323	Printing and Related Support Activities	597 848	60 128	148 781	84 677	101 568	30 977	18 332	1 023
324	Petroleum and Coal Products Manufacturing	X	X	X	X	X	X	X	X
325	Chemical Manufacturing	1 340 807	X	X	X	99 784	X	X	X
326	Plastics and Rubber Products Manufacturing	505 915	75 275	275 931	324 648	57 879	146 213	X	X
327	Non-Metallic Mineral Product Manufacturing	X	X	X	X	63 961	X	X	X
331	Primary Metal Manufacturing	415 596	X	X	X	X	X	X	X
332	Fabricated Metal Products Manufacturing	685 774	101 584	301 524	226 029	129 685	149 988	X	X
333	Machinery Manufacturing	663 262	140 897	280 263	246 354	X	X	X	X
334	Computer and Electronic Product Manufacturing	1 242 052	57 632	262 355	X	99 633	X	X	X
335	Electric. Equipmt, Appliance and Component Mfg	477 683	X	X	X	30 944	X	X	X
336	Transportation Equipment Manufacturing	X	X	X	X	X	X	X	X
337	Furniture and Related Product Manufacturing	X	35 515	X	X	45 865	168 122	X	X
339	Miscellaneous Manufacturing	407 556	37 900	158 086	X	66 158	X	X	X
	Other Manufacturing (confidential data)	2 322 168	396 231	2 958 710	2 924 510	819 551	1 504 234	345 570	146 116
T009	**Services-producing industries**	**44 806 836**	**4 730 638**	**14 952 006**	**10 022 605**	**14 139 125**	**3 477 705**	**3 978 088**	**504 662**
41	Wholesale Trade	4 045 936	465 866	1 177 874	907 612	737 515	198 760	85 834	14 331
44-45	Retail Trade	2 788 738	537 926	1 674 181	1 039 417	1 076 442	409 598	273 719	53 131
48-49	Transportation and Warehousing	4 059 587	157 499	979 899	537 290	607 835	218 137	136 352	33 804
51	Information and Culture Industries	4 074 353	204 120	628 068	X	575 051	111 921	144 284	6 934
52, 53, 55	Finance and Insurance, etc.2	10 805 138	1 465 038	4 626 391	2 945 255	3 479 795	1 014 028	921 479	193 130
54	Professional, Scientific and Technical Services	3 138 607	251 114	630 901	302 534	626 243	62 741	157 244	2 414
56	Administration and Support, etc.3	X	140 834	X	X	325 298	69 578	111 771	7 247
61	Education Services	2 841 549	X	X	X	1 300 765	409 030	X	X
62	Health Care and Social Assistance	4 632 598	419 769	1 298 202	1 079 627	1 510 270	370 707	394 007	59 612
71	Arts, Entertainment and Recreation	782 076	60 242	212 074	180 203	134 570	41 381	39 130	5 894
72	Accommodation and Food Services	1 072 351	126 739	456 865	440 456	567 142	240 871	108 387	35 821
81	Other Services (Except Public Administration)	1 691 876	X	X	X	430 838	121 565	X	X
91	Public Admiinistration	X	X	X	X	2 767 361	209 387	X	X
	Other Services (confidential data)	4 874 028	901 491	3 267 550	2 590 211	0	0	1 605 881	92 344

Table A2.2 – Gross value added by industry and analytical region, 1997, in thousands of current Canadian dollars (part 2)

NAICS code	Industry	Sherbrooke MA	Around Sherbrooke MA	Trois-Rivières MA	Around Trois-Riv. MA	Saguenay MA	Around Saguenay MA	Rest-of-the-North	East	Province of Quebec
T001	**All industries**	**3 316 767**	**2 939 306**	**3 638 240**	**6 694 729**	**3 735 007**	**2 243 848**	**8 135 959**	**5 546 519**	**175 117 816**
T008	**Goods-producing industries**	**943 160**	**1 699 582**	**1 691 069**	**3 146 397**	**1 546 902**	**963 379**	**4 489 148**	**1 882 277**	**58 617 693**
11	**Agriculture, Forestry, Fishing and Hunting**	**33 233**	**163 660**	**36 143**	**390 831**	**46 988**	**160 473**	**243 619**	**339 529**	**3 240 150**
111-112	Crop and Animal Production	24 028	131 027	25 440	289 896	17 494	53 726	X	182 771	2 132 250
113	Forestry and Logging	5 728	26 745	7 109	X	22 374	86 085	160 611	95 271	798 000
114	Fishing, Hunting and Trapping	X	X	X	X	X	X	X	41 912	64 300
115	Support Activities for Agriculture and Forestry	X	X	X	X	X	X	X	19 575	245 600
	Other Agriculture etc. (confidential data)	3 477	5 888	3 595	100 935	7 120	20 663	83 008	0	0
21	**Mining, quarrying, and Oil and Gaz Extraction**	1 958	58 666	X	X	23 946	8 196	X	73 362	1 413 439
22	**Utilities**	X	X	X	X	X	X	X	X	7 935 207
23	**Construction**	X	X	X	X	X	X	X	X	8 248 900
	Other Mining, Util. & Construc. (confidential)	229 636	153 479	704 118	644 866	366 667	196 949	2 675 833	503 880	0
31-33	**Manufacturing**	**678 333**	**1 323 777**	**950 808**	**2 110 700**	**1 109 301**	**597 761**	**1 569 696**	**965 507**	**37 779 997**
311	Food Manufacturing	X	X	35 112	216 139	X	X	X	125 360	3 084 559
312	Beverage and Tobacco Product Manufacturing	X	X	X	X	X	X	X	X	1 637 515
313-314	Textile Mills	49 623	99 266	X	X	X	X	X	6 243	1 226 277
315	Clothing Manufacturing	X	X	X	X	X	X	X	X	1 892 798
316	Leather and Allied Product Manufacturing	X	X	X	X	X	X	X	X	212 984
321	Wood Product Manufacturing	X	X	X	X	X	X	X	X	2 414 665
322	Paper Manufacturing	X	X	X	X	X	X	X	X	3 912 015
323	Printing and Related Support Activities	21 209	16 170	X	X	X	X	X	X	1 168 371
324	Petroleum and Coal Products Manufacturing	X	X	X	X	X	X	X	X	398 105
325	Chemical Manufacturing	X	X	55 433	72 541	X	X	X	X	2 767 089
326	Plastics and Rubber Products Manufacturing	119 734	104 524	X	X	X	X	X	X	1 712 592
327	Non-Metallic Mineral Product Manufacturing	X	X	20 363	X	X	X	X	X	819 945
331	Primary Metal Manufacturing	X	X	X	X	X	X	X	X	3 391 267
332	Fabricated Metal Products Manufacturing	43 810	35 802	39 817	100 710	X	X	X	X	1 903 522
333	Machinery Manufacturing	58 145	41 716	26 021	172 152	X	X	X	X	2 033 098
334	Computer and Electronic Product Manufacturing	X	X	X	X	X	X	X	X	2 128 602
335	Electric. Equipmt, Appliance and Component Mfg	X	X	X	X	X	X	X	X	757 479
336	Transportation Equipment Manufacturing	X	X	X	X	X	X	X	X	4 360 320
337	Furniture and Related Product Manufacturing	X	X	10 531	126 242	X	X	X	X	950 166
339	Miscellaneous Manufacturing	X	X	X	X	X	X	X	X	1 008 628
	Other Manufacturing (confidential data)	385 811	1 026 298	763 531	1 422 915	1 109 301	597 761	1 569 696	833 903	0
T009	**Services-producing industries**	**2 373 607**	**1 239 723**	**1 947 171**	**3 548 332**	**2 188 104**	**1 280 469**	**3 646 811**	**3 664 241**	**116 500 123**
41	Wholesale Trade	116 360	58 878	106 955	303 257	110 956	71 585	218 946	145 535	8 766 200
44-45	Retail Trade	201 425	124 309	195 786	392 499	216 418	156 978	344 302	391 630	9 876 500
48-49	Transportation and Warehousing	70 258	72 726	125 704	195 688	90 773	85 018	347 961	235 970	7 954 500
51	Information and Culture Industries	107 731	35 637	102 024	101 537	83 946	24 067	117 513	X	6 845 081
52, 53, 55	Finance and Insurance, etc.2	546 051	413 083	471 913	969 461	499 990	323 424	856 664	867 090	30 397 930
54	Professional, Scientific and Technical Services	87 960	19 389	67 305	83 174	100 695	32 068	105 343	79 286	5 747 017
56	Administration and Support, etc.3	X	X	40 908	64 007	X	X	X	47 745	3 270 547
61	Education Services	407 384	141 220	240 997	366 071	X	X	X	396 479	9 970 248
62	Health Care and Social Assistance	402 969	134 842	270 947	477 472	286 600	201 590	445 402	555 325	12 539 940
71	Arts, Entertainment and Recreation	20 079	21 523	16 830	33 836	17 014	17 549	22 919	36 608	1 641 929
72	Accommodation and Food Services	79 000	62 785	59 460	140 555	74 418	50 512	150 058	212 903	3 878 322
81	Other Services (Except Public Administration)	X	X	70 369	132 916	71 982	57 043	109 620	121 435	4 102 609
91	Public Admiinistration	X	X	177 972	287 857	X	X	X	X	11 509 300
	Other Services (confidential data)	334 390	155 332	0	0	635 312	260 634	928 083	574 234	0

Table A2.3 – Gross value added by industry and analytical region, 2008, in thousands of current Canadian dollars (part 1)

NAICS code	Industry	Montreal AR	Laval AR	Rest of Montreal MA	Peri-metro. region	Quebec MA	Around Quebec MA	Gatineau MA	Around Gatineau MA
T001	**All industries**	**95 907 615**	**12 125 043**	**42 268 261**	**28 024 330**	**30 847 749**	**9 828 310**	**9 000 480**	**1 235 171**
T008	**Goods-producing industries**	**21 757 300**	**3 117 995**	**12 863 751**	**10 552 108**	**6 395 464**	**4 353 998**	**1 549 518**	**538 180**
11	**Agriculture, Forestry, Fishing and Hunting**	**103 659**	**58 323**	**386 282**	**1 155 895**	**167 955**	**616 278**	**42 196**	**103 546**
111-112	Crop and Animal Production	53 205	48 050	312 679	X	116 982	522 679	6 173	15 403
113	Forestry and Logging	19 584	X	X	X	14 990	55 090	28 865	80 522
114	Fishing, Hunting and Trapping	X	X	X	X	X	X	X	X
115	Support Activities for Agriculture and Forestry	X	7 946	X	X	X	X	X	X
	Other Agriculture etc. (confidential data)	30 870	2 327	73 603	1 155 895	35 983	38 509	7 157	7 621
21	**Mining, quarrying, and Oil and Gaz Extraction**	X	X	X	X	28 401	X	8 255	1 956
22	**Utilities**	X	X	X	X	776 851	X	X	X
23	**Construction**	3 052 170	1 147 522	3 627 809	2 497 521	1 908 626	X	X	X
	Other Mining, Util. & Construc. (confidential)	4 380 766	260 110	1 501 858	928 654	0	851 359	1 050 945	279 309
31-33	**Manufacturing**	**14 220 704**	**1 652 040**	**7 347 801**	**5 970 038**	**3 513 631**	**2 886 362**	**448 122**	**153 370**
311	Food Manufacturing	1 161 831	205 280	705 336	967 525	391 334	371 761	X	X
312	Beverage and Tobacco Product Manufacturing	1 378 181	X	X	X	X	X	X	X
313-314	Textile Mills	325 272	14 458	40 839	X	X	X	X	X
315	Clothing Manufacturing	729 341	26 694	52 735	X	X	X	X	X
316	Leather and Allied Product Manufacturing	31 068	1 604	X	X	X	X	X	X
321	Wood Product Manufacturing	95 134	42 196	X	X	X	X	X	X
322	Paper Manufacturing	701 382	41 310	218 568	X	90 603	X	X	X
323	Printing and Related Support Activities	780 381	87 622	261 363	X	139 980	X	16 536	X
324	Petroleum and Coal Products Manufacturing	X	X	X	X	X	X	X	X
325	Chemical Manufacturing	1 675 265	X	X	X	213 427	X	X	X
326	Plastics and Rubber Products Manufacturing	584 185	155 946	387 628	485 800	150 047	239 384	X	X
327	Non-Metallic Mineral Product Manufacturing	319 350	46 646	349 827	X	147 874	X	X	X
331	Primary Metal Manufacturing	517 876	46 894	228 350	X	X	X	X	X
332	Fabricated Metal Products Manufacturing	838 145	158 965	725 309	428 757	278 098	335 114	X	X
333	Machinery Manufacturing	791 207	109 200	430 654	299 567	X	X	X	X
334	Computer and Electronic Product Manufacturing	663 670	23 400	180 739	X	108 320	X	X	X
335	Electric. Equipmt, Appliance and Component Mfg	617 404	X	X	X	96 849	X	X	X
336	Transportation Equipment Manufacturing	X	206 295	X	X	X	X	X	X
337	Furniture and Related Product Manufacturing	289 551	83 406	227 243	224 225	116 288	242 843	X	X
339	Miscellaneous Manufacturing	401 880	57 059	163 157	X	127 290	X	X	X
	Other Manufacturing (confidential data)	2 319 580	345 065	3 376 053	3 564 163	1 653 522	1 697 261	431 586	153 370
T009	**Services-producing industries**	**74 150 315**	**9 007 049**	**29 404 510**	**17 472 222**	**24 452 285**	**5 474 311**	**7 450 962**	**696 991**
41	Wholesale Trade	7 288 779	1 017 905	2 543 239	1 416 696	1 338 883	339 280	161 371	28 826
44-45	Retail Trade	4 747 249	1 028 272	3 453 648	1 916 591	2 134 773	673 952	501 661	89 666
48-49	Transportation and Warehousing	5 646 656	335 533	1 490 068	961 176	1 152 013	402 503	259 757	44 710
51	Information and Culture Industries	7 226 878	300 949	767 382	X	858 381	155 420	166 466	16 685
52, 53, 55	Finance and Insurance, etc.2	15 796 968	2 607 251	8 890 340	5 456 344	6 076 837	1 378 703	1 536 910	211 762
54	Professional, Scientific and Technical Services	6 912 920	584 019	1 493 343	639 863	1 440 364	192 797	297 520	8 450
56	Administration and Support, etc.3	X	401 346	X	X	821 677	157 242	242 389	15 930
61	Education Services	4 190 867	X	X	X	1 815 213	505 562	X	X
62	Health Care and Social Assistance	7 175 374	834 993	2 963 781	1 966 370	2 555 072	692 623	685 737	71 325
71	Arts, Entertainment and Recreation	1 458 570	106 581	462 266	292 089	257 630	62 716	91 172	12 280
72	Accommodation and Food Services	1 897 973	276 531	880 857	785 919	1 056 074	340 052	166 174	52 128
81	Other Services (Except Public Administration)	3 065 294	X	X	X	708 608	241 965	X	X
91	Public Admiinistration	X	X	X	X	4 236 760	331 497	X	X
	Other Services (confidential data)	8 742 787	1 513 669	6 459 587	4 037 174	0	0	3 341 805	145 228

Table A2.3 – Gross value added by industry and analytical region, 2008, in thousands of current Canadian dollars (part 2)

NAICS code	Industry	Sherbrooke MA	Around Sherbrooke MA	Trois-Rivières MA	Around Trois-Riv. MA	Saguenay MA	Around Saguenay MA	Rest-of-the-North	East	Province of Quebec
T001	**All industries**	**6 187 991**	**2 983 921**	**5 752 964**	**10 030 734**	**5 985 097**	**3 336 213**	**12 878 466**	**7 864 934**	**284 257 278**
T008	**Goods-producing industries**	**1 570 278**	**1 469 138**	**2 457 609**	**4 185 488**	**2 620 295**	**1 374 797**	**7 712 036**	**2 377 174**	**84 895 130**
11	**Agriculture, Forestry, Fishing and Hunting**	**47 563**	**220 069**	**53 485**	**545 827**	**50 670**	**221 610**	**350 998**	**457 129**	**4 581 485**
111-112	Crop and Animal Production	39 342	159 526	43 304	438 853	27 677	94 040	X	248 228	3 167 339
113	Forestry and Logging	1 638	49 125	4 025	X	13 399	82 599	243 433	122 746	906 693
114	Fishing, Hunting and Trapping	X	X	X	X	X	X	X	60 177	88 559
115	Support Activities for Agriculture and Forestry	X	X	X	X	X	X	X	25 978	418 893
	Other Agriculture etc. (confidential data)	6 583	11 418	6 156	106 974	9 593	44 972	107 564	0	0
21	**Mining, quarrying, and Oil and Gaz Extraction**	7 713	22 465	X	X	104 533	14 239	X	69 331	3 146 989
22	**Utilities**	X	X	X	X	X	X	X	X	11 331 521
23	**Construction**	X	X	X	X	X	X	X	X	18 679 334
	Other Mining, Util. & Construc. (confidential)	515 157	168 804	1 091 013	1 132 536	830 962	206 871	5 749 888	942 217	0
31-33	**Manufacturing**	**999 845**	**1 057 800**	**1 313 111**	**2 507 125**	**1 634 130**	**932 076**	**1 611 151**	**908 496**	**47 155 802**
311	Food Manufacturing	X	X	46 245	321 729	X	X	X	190 807	4 577 224
312	Beverage and Tobacco Product Manufacturing	X	X	X	X	X	X	X	X	2 365 978
313-314	Textile Mills	30 905	X	X	X	X	X	X	X	713 838
315	Clothing Manufacturing	X	X	X	X	X	X	X	X	996 901
316	Leather and Allied Product Manufacturing	X	X	X	X	X	X	X	X	81 520
321	Wood Product Manufacturing	X	X	40 737	207 274	X	X	143 721	215 505	2 115 727
322	Paper Manufacturing	X	X	X	X	X	X	X	X	3 712 284
323	Printing and Related Support Activities	47 710	X	X	X	X	X	X	X	1 667 069
324	Petroleum and Coal Products Manufacturing	X	X	X	X	X	X	X	X	997 245
325	Chemical Manufacturing	X	X	42 403	X	X	X	X	X	3 520 984
326	Plastics and Rubber Products Manufacturing	188 590	74 327	X	X	X	X	X	X	2 379 206
327	Non-Metallic Mineral Product Manufacturing	X	X	44 156	X	X	X	X	X	1 608 655
331	Primary Metal Manufacturing	X	X	X	X	X	X	X	X	5 190 794
332	Fabricated Metal Products Manufacturing	77 164	45 711	135 229	212 653	X	X	X	X	3 454 225
333	Machinery Manufacturing	83 532	63 321	79 414	252 738	X	X	X	X	2 754 528
334	Computer and Electronic Product Manufacturing	X	X	X	X	X	X	X	X	1 252 505
335	Electric. Equipmt, Appliance and Component Mfg	X	X	X	X	X	X	X	X	1 295 157
336	Transportation Equipment Manufacturing	X	X	X	X	X	X	X	X	5 789 706
337	Furniture and Related Product Manufacturing	X	X	28 991	157 395	X	X	X	X	1 601 205
339	Miscellaneous Manufacturing	X	X	X	X	X	X	X	X	1 081 051
	Other Manufacturing (confidential data)	571 943	874 441	895 934	1 355 338	1 634 130	932 076	1 467 430	502 184	0
T009	**Services-producing industries**	**4 617 713**	**1 514 783**	**3 295 355**	**5 845 246**	**3 364 802**	**1 961 416**	**5 166 430**	**5 487 760**	**199 362 149**
41	Wholesale Trade	253 860	126 663	167 759	645 919	205 966	103 689	279 403	230 709	16 148 948
44-45	Retail Trade	451 376	148 953	384 192	676 355	366 994	312 550	545 887	649 580	18 081 698
48-49	Transportation and Warehousing	161 979	136 754	241 229	380 113	170 374	150 915	514 586	371 701	12 420 067
51	Information and Culture Industries	169 017	21 387	165 576	120 724	114 564	35 508	164 056	X	10 857 085
52, 53, 55	Finance and Insurance, etc.2	1 054 865	439 212	740 442	1 362 494	654 444	424 014	831 353	1 078 633	48 540 573
54	Professional, Scientific and Technical Services	197 323	43 851	133 032	183 506	194 337	57 846	236 503	163 208	12 778 881
56	Administration and Support, etc.3	X	X	107 821	179 356	X	X	X	130 156	8 090 448
61	Education Services	675 280	150 448	357 684	520 587	X	X	X	560 109	14 594 251
62	Health Care and Social Assistance	797 665	166 711	479 085	805 308	492 959	311 944	793 683	891 126	21 683 757
71	Arts, Entertainment and Recreation	37 517	19 295	27 355	48 332	30 361	23 483	29 536	46 075	3 005 257
72	Accommodation and Food Services	132 876	62 222	107 135	252 528	102 948	76 202	222 141	330 574	6 742 335
81	Other Services (Except Public Administration)	X	X	117 293	228 780	107 248	84 155	171 167	207 114	7 670 649
91	Public Admiinistration	X	X	266 753	441 241	X	X	X	X	18 748 200
	Other Services (confidential data)	685 955	199 287	0	0	924 606	381 112	1 378 114	828 775	0

Table A2.4 – Structural component of 1997-2008 growth, by industry and analytical region, 2008, k$ CAD (part 1)

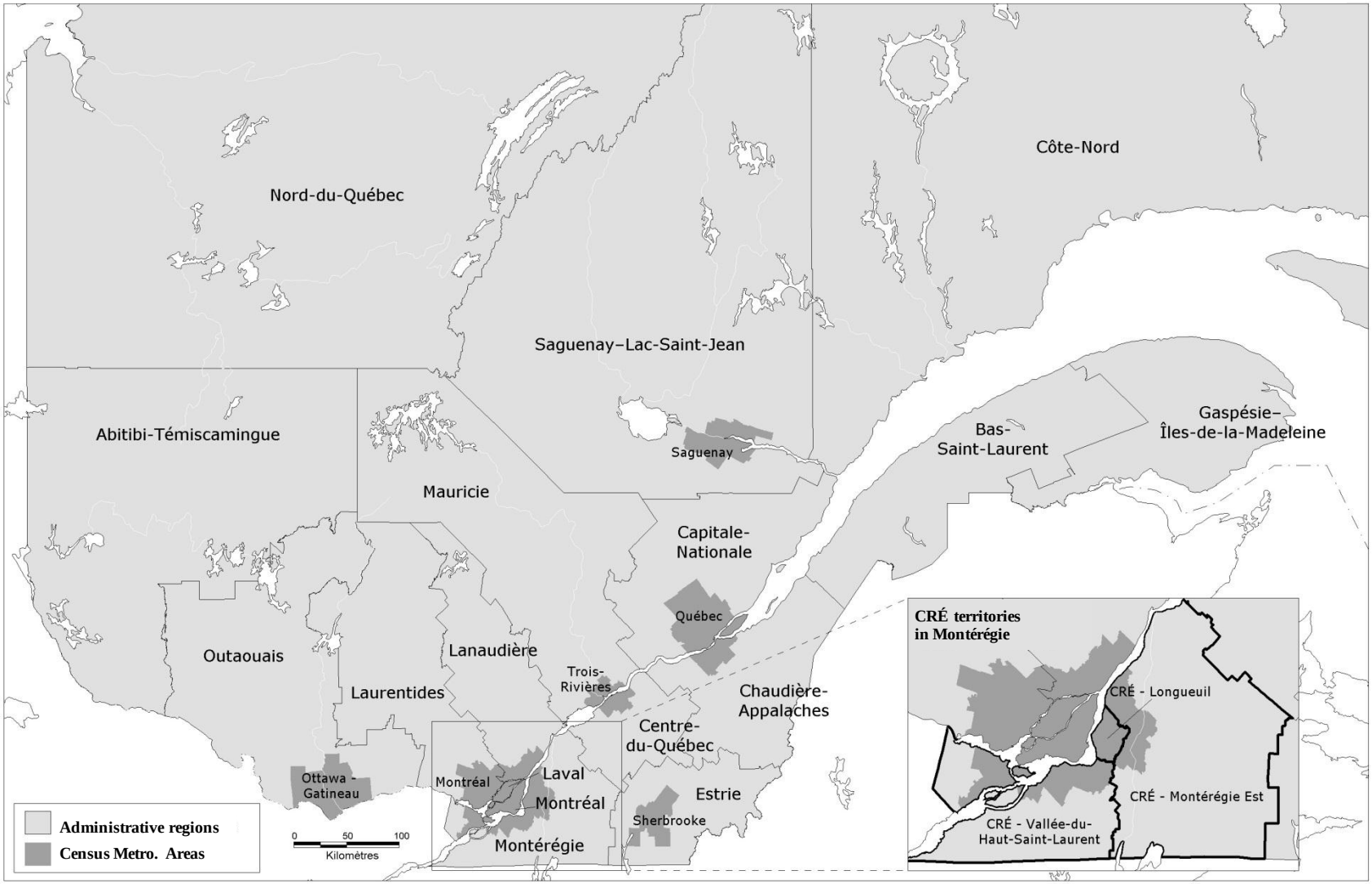
NAICS code	Industry	Montreal AR	Laval AR	Rest of Montreal MA	Peri-metro. region	Quebec MA	Around Quebec MA	Gatineau MA	Around Gatineau MA
T001	**All industries**	**-171 669**	**380 233**	**404 365**	**-451 712**	**771 834**	**-491 719**	**213 748**	**-38 495**
T008	**Goods-producing industries**	**-4 512 233**	**-101 436**	**-864 754**	**-1 285 446**	**-282 724**	**-714 215**	**-43 349**	**-62 640**
11	**Agriculture, Forestry, Fishing and Hunting**	**-14 868**	**-5 464**	**-44 980**	**-158 682**	**-23 761**	**-77 919**	**-14 147**	**-38 842**
111-112	Crop and Animal Production	-5 762	-4 253	-24 477	X	-11 224	-49 090	-488	-2 881
113	Forestry and Logging	-9 463	X	X	X	-12 900	-29 109	-13 707	-36 039
114	Fishing, Hunting and Trapping	X	X	X	X	X	X	X	X
115	Support Activities for Agriculture and Forestry	X	433	X	X	X	X	X	X
	Other Agriculture etc. (confidential data)	357	-1 644	-20 504	-158 682	363	280	49	78
21	**Mining, quarrying, and Oil and Gaz Extraction**	X	X	X	X	9 497	X	2 184	1 037
22	**Utilities**	X	X	X	X	-106 725	X	X	X
23	**Construction**	1 306 765	232 696	889 091	589 758	454 807	X	X	X
	Other Mining, Util. & Construc. (confidential)	-231 367	-12 459	-74 043	-45 517	0	134 203	103 796	30 352
31-33	**Manufacturing**	**-5 572 762**	**-316 209**	**-1 634 822**	**-1 671 006**	**-616 542**	**-770 499**	**-135 183**	**-55 187**
311	Food Manufacturing	-138 008	-16 883	-44 259	-78 953	-31 571	-39 085	X	X
312	Beverage and Tobacco Product Manufacturing	-188 343	X	X	X	X	X	X	X
313-314	Textile Mills	-526 276	-15 555	-53 421	X	X	X	X	X
315	Clothing Manufacturing	-1 375 094	X	X	X	X	X	X	X
316	Leather and Allied Product Manufacturing	X	X	X	X	X	X	X	X
321	Wood Product Manufacturing	X	X	X	X	X	X	X	X
322	Paper Manufacturing	-408 208	-23 507	-123 032	X	-72 939	X	X	X
323	Printing and Related Support Activities	-117 419	-11 809	-29 221	X	-19 948	X	-3 601	X
324	Petroleum and Coal Products Manufacturing	X	X	X	X	X	X	X	X
325	Chemical Manufacturing	-470 334	X	X	X	-35 002	X	X	X
326	Plastics and Rubber Products Manufacturing	-118 380	-17 614	-64 566	-75 965	-13 543	-34 213	X	X
327	Non-Metallic Mineral Product Manufacturing	X	X	X	X	21 662	X	X	X
331	Primary Metal Manufacturing	-38 484	X	X	X	X	X	X	X
332	Fabricated Metal Products Manufacturing	131 267	19 445	57 716	43 265	24 824	28 710	X	X
333	Machinery Manufacturing	-178 014	-37 816	-75 220	-66 119	X	X	X	X
334	Computer and Electronic Product Manufacturing	-1 285 297	-59 639	-271 490	X	-103 102	X	X	X
335	Electric. Equipmt, Appliance and Component Mfg	41 363	X	X	X	2 679	X	X	X
336	Transportation Equipment Manufacturing	X	X	X	X	X	X	X	X
337	Furniture and Related Product Manufacturing	X	2 200	X	X	2 841	10 415	X	X
339	Miscellaneous Manufacturing	-224 739	-20 899	-87 174	X	-36 482	X	X	X
	Other Manufacturing (confidential data)	-676 798	-134 133	-944 155	-1 493 233	-355 961	-736 327	-131 582	-55 187
T009	**Services-producing industries**	**4 340 564**	**481 669**	**1 269 119**	**833 734**	**1 054 557**	**222 495**	**257 097**	**24 145**
41	Wholesale Trade	885 853	102 001	257 894	198 721	161 478	43 518	18 793	3 138
44-45	Retail Trade	578 790	111 644	347 469	215 726	223 411	85 010	56 809	11 027
48-49	Transportation and Warehousing	-251 068	-9 741	-60 603	-33 229	-37 592	-13 491	-8 433	-2 091
51	Information and Culture Industries	-151 238	-7 577	-23 314	X	-21 346	-4 154	-5 356	-257
52, 53, 55	Finance and Insurance, etc.2	-285 217	-38 672	-122 120	-77 744	-91 854	-26 767	-24 324	-5 098
54	Professional, Scientific and Technical Services	1 884 210	150 752	378 751	181 621	375 954	37 665	94 399	1 449
56	Administration and Support, etc.3	X	119 779	X	X	276 664	59 176	95 060	6 164
61	Education Services	-453 097	X	X	X	-207 413	-65 222	X	X
62	Health Care and Social Assistance	490 782	44 471	137 533	114 377	160 000	39 273	41 741	6 315
71	Arts, Entertainment and Recreation	161 958	12 475	43 918	37 318	27 868	8 569	8 103	1 221
72	Accommodation and Food Services	123 570	14 604	52 646	50 755	65 353	27 756	12 490	4 128
81	Other Services (Except Public Administration)	416 989	X	X	X	106 187	29 962	X	X
91	Public Admiinistration	X	X	X	X	15 847	1 199	X	X
	Other Services (confidential data)	939 032	-18 068	256 945	146 190	0	0	-32 186	-1 851

Table A2.4 – Structural component of 1997-2008 growth, by industry and analytical region, 2008, k$ CAD (part 2)

NAICS code	Industry	Sherbrooke MA	Around Sherbrooke MA	Trois-Rivières MA	Around Trois-Riv. MA	Saguenay MA	Around Saguenay MA	Rest-of-the-North	East	Province of Quebec
T001	**All industries**	**-42 965**	**-402 964**	**-81 438**	**-378 456**	**-129 863**	**-111 842**	**299 131**	**-54 122**	**1**
T008	**Goods-producing industries**	**-199 620**	**-471 771**	**-215 645**	**-639 046**	**-330 083**	**-222 774**	**21 585**	**-269 759**	**-10 255 131**
11	**Agriculture, Forestry, Fishing and Hunting**	**-6 051**	**-30 996**	**-6 916**	**-74 951**	**-13 206**	**-49 034**	**-88 058**	**-80 280**	**-678 038**
111-112	Crop and Animal Production	-3 311	-18 054	-3 505	-39 945	-2 410	-7 403	X	-25 184	-293 803
113	Forestry and Logging	-2 790	-13 026	-3 462	X	-10 897	-41 926	-78 222	-46 400	-388 648
114	Fishing, Hunting and Trapping	X	X	X	X	X	X	X	-10 308	-15 815
115	Support Activities for Agriculture and Forestry	X	X	X	X	X	X	X	1 612	20 227
	Other Agriculture etc. (confidential data)	50	84	51	-35 006	101	294	-9 836	0	0
21	**Mining, quarrying, and Oil and Gaz Extraction**	1 181	35 390	X	X	14 445	4 944	X	44 255	852 646
22	**Utilities**	X	X	X	X	X	X	X	X	-1 549 180
23	**Construction**	X	X	X	X	X	X	X	X	5 289 435
	Other Mining, Util. & Construc. (confidential)	53 070	35 470	183 772	168 308	84 739	45 516	698 383	116 450	0
31-33	**Manufacturing**	**-247 820**	**-511 635**	**-392 501**	**-732 404**	**-416 061**	**-224 200**	**-588 740**	**-350 184**	**-14 169 992**
311	Food Manufacturing	X	X	-4 892	-30 112	X	X	X	-17 465	-429 738
312	Beverage and Tobacco Product Manufacturing	X	X	X	X	X	X	X	X	-292 092
313-314	Textile Mills	-51 663	X	X	X	X	X	X	X	-1 276 698
315	Clothing Manufacturing	X	X	X	X	X	X	X	X	-2 075 554
316	Leather and Allied Product Manufacturing	X	X	X	X	X	X	X	X	-264 202
321	Wood Product Manufacturing	X	X	X	X	X	X	X	X	-1 803 841
322	Paper Manufacturing	X	X	X	X	X	X	X	X	-2 637 834
323	Printing and Related Support Activities	-4 165	X	X	X	X	X	X	X	-229 471
324	Petroleum and Coal Products Manufacturing	X	X	X	X	X	X	X	X	351 028
325	Chemical Manufacturing	X	X	-19 445	X	X	X	X	X	-970 650
326	Plastics and Rubber Products Manufacturing	-28 017	-24 458	X	X	X	X	X	X	-400 732
327	Non-Metallic Mineral Product Manufacturing	X	X	6 896	X	X	X	X	X	277 692
331	Primary Metal Manufacturing	X	X	X	X	X	X	X	X	-314 027
332	Fabricated Metal Products Manufacturing	8 386	6 853	7 622	19 277	X	X	X	X	364 362
333	Machinery Manufacturing	-15 606	-11 196	-6 984	-46 204	X	X	X	X	-545 667
334	Computer and Electronic Product Manufacturing	X	X	X	X	X	X	X	X	-2 202 715
335	Electric. Equipmt, Appliance and Component Mfg	X	X	X	X	X	X	X	X	65 591
336	Transportation Equipment Manufacturing	X	X	X	X	X	X	X	X	-1 288 116
337	Furniture and Related Product Manufacturing	X	X	652	7 821	X	X	X	X	58 863
339	Miscellaneous Manufacturing	X	X	X	X	X	X	X	X	-556 189
	Other Manufacturing (confidential data)	-156 755	-482 834	-376 351	-683 185	-416 061	-224 200	-588 740	-332 719	0
T009	**Services-producing industries**	**156 656**	**68 807**	**134 208**	**260 591**	**200 219**	**110 932**	**277 545**	**215 637**	**10 255 132**
41	Wholesale Trade	25 477	12 891	23 418	66 398	24 294	15 673	47 938	31 865	1 919 350
44-45	Retail Trade	41 805	25 800	40 634	81 461	44 917	32 580	71 458	81 281	2 049 822
48-49	Transportation and Warehousing	-4 345	-4 498	-7 774	-12 102	-5 614	-5 258	-21 520	-14 594	-491 952
51	Information and Culture Industries	-3 999	-1 323	-3 787	-3 769	-3 116	-893	-4 362	X	-254 086
52, 53, 55	Finance and Insurance, etc.2	-14 414	-10 904	-12 457	-25 590	-13 198	-8 537	-22 613	-22 888	-802 396
54	Professional, Scientific and Technical Services	52 805	11 640	40 406	49 932	60 450	19 252	63 241	47 598	3 450 125
56	Administration and Support, etc.3	X	X	34 792	54 438	X	X	X	40 607	2 781 583
61	Education Services	-64 959	-22 518	-38 428	-58 372	X	X	X	-63 220	-1 589 799
62	Health Care and Social Assistance	42 691	14 285	28 704	50 584	30 363	21 357	47 186	58 832	1 328 494
71	Arts, Entertainment and Recreation	4 158	4 457	3 485	7 007	3 523	3 634	4 746	7 581	340 022
72	Accommodation and Food Services	9 103	7 235	6 852	16 196	8 575	5 821	17 291	24 533	446 908
81	Other Services (Except Public Administration)	X	X	17 344	32 759	17 741	14 059	27 018	29 930	1 011 153
91	Public Admiinistration	X	X	1 019	1 648	X	X	X	X	65 907
	Other Services (confidential data)	68 333	31 742	0	0	32 284	13 244	47 161	-5 887	0

APPENDIX 3: FIGURES

Figure 1. Administrative regions (AR), Census metropolitan areas (CMA), and regional conference of elected officials (CRÉ) territories in the Montérégie region, Province of Quebec, 2006



Map: Valérie Barrette, Institut de la statistique du Québec
Sources: Government of the Province of Quebec, Ministère des Ressources naturelles et de la Faune
Statistics Canada

Figure 2: Map of analytical regions

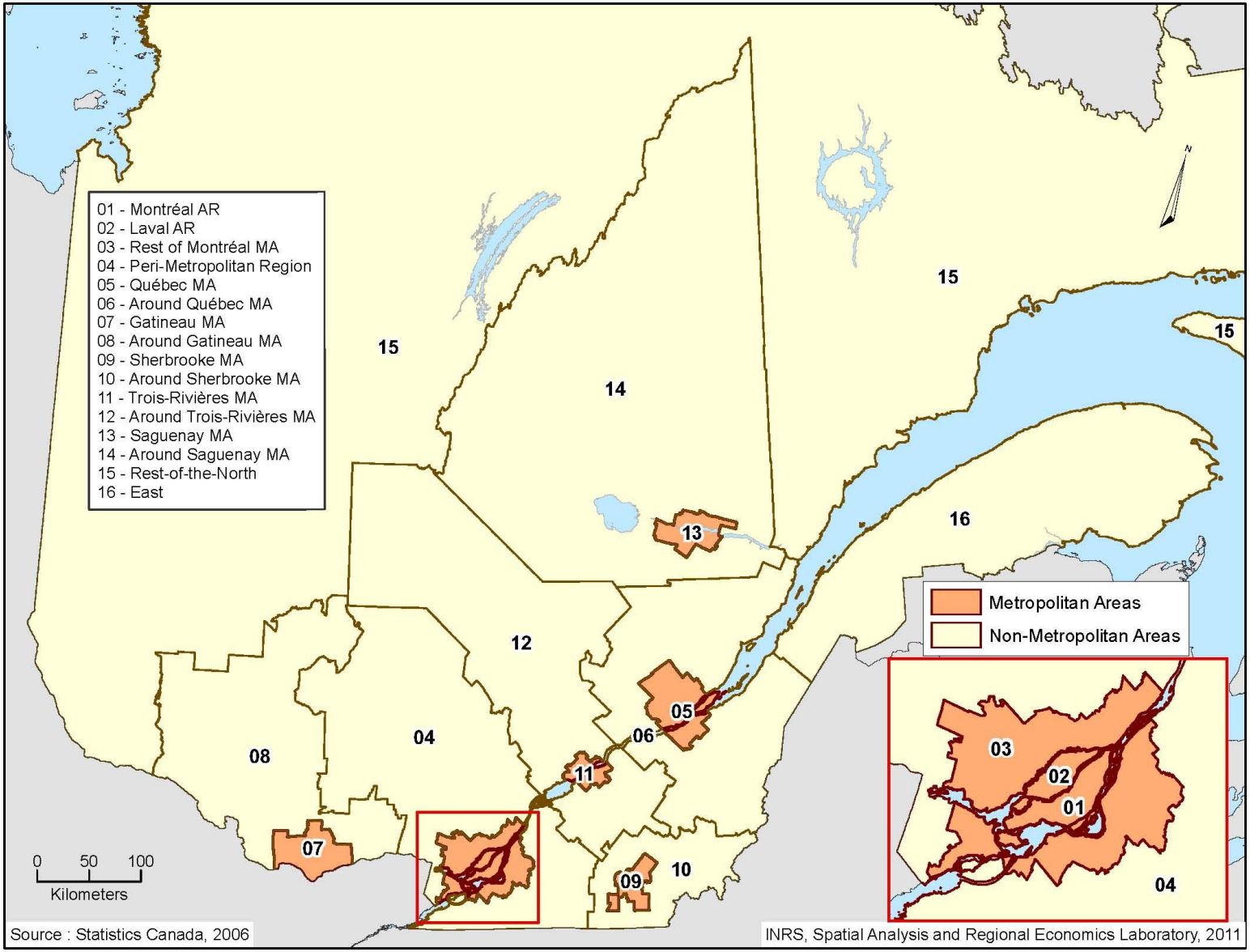


Figure 3: Evolution of population shares, analytical regions, 1997-2009 (1997=100)

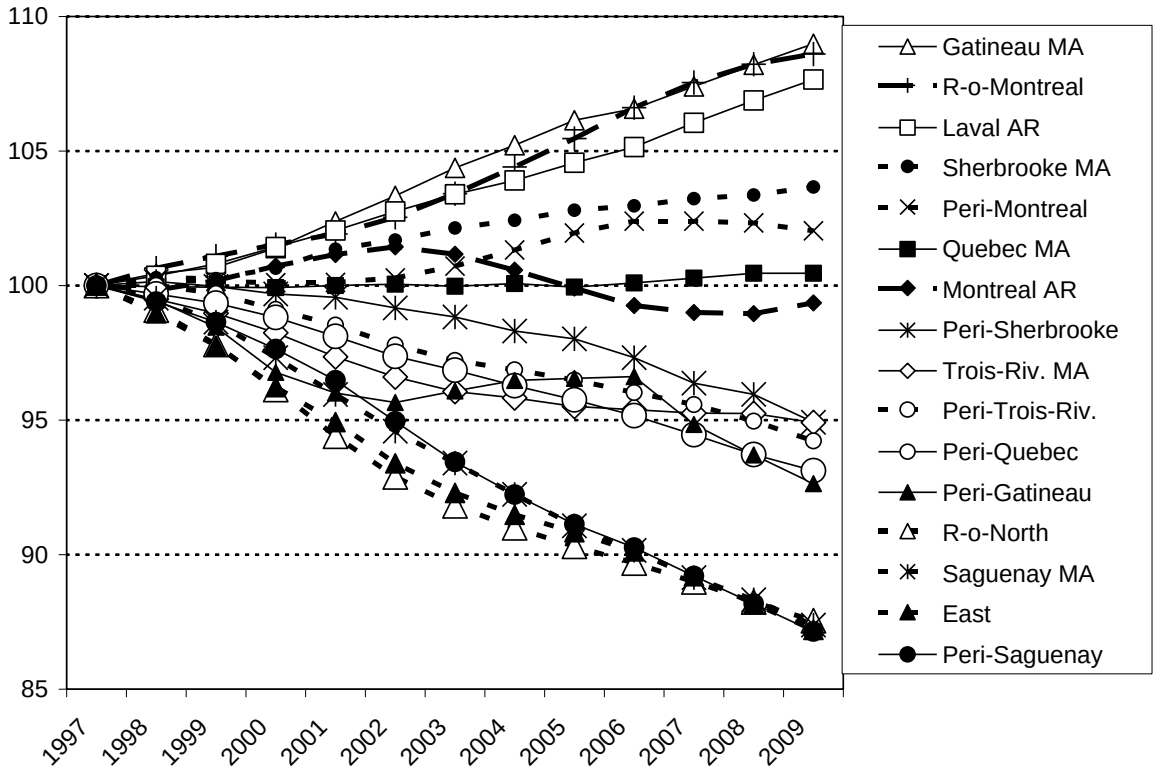


Figure 4: Evolution of GDP shares (1997=100), analytical regions with rising population shares, 1997-2009

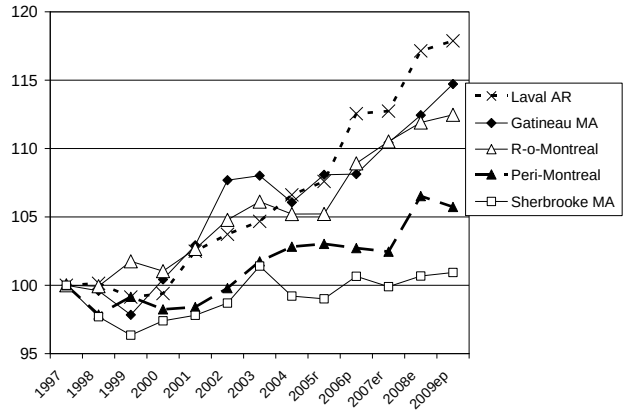


Figure 5: Evolution of GDP shares (1997=100), analytical regions with stable population shares, 1997-2009

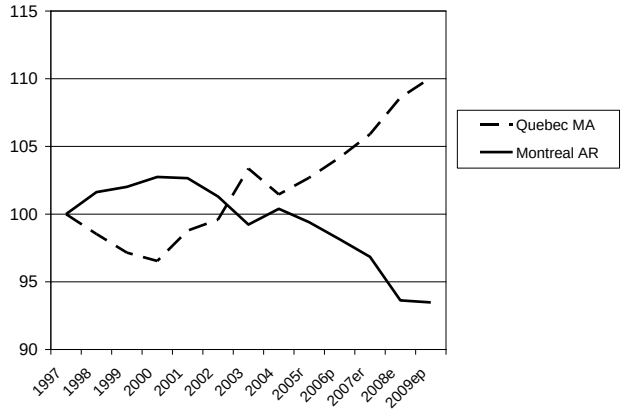


Figure 6: Evolution of GDP shares (1997=100), analytical regions with falling population shares, 1997-2009

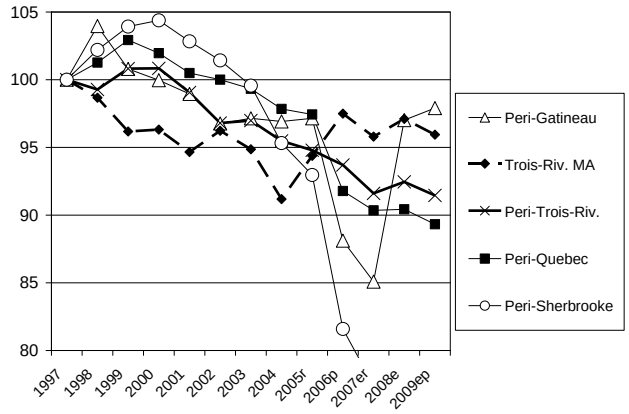


Figure 7: Evolution of GDP shares (1997=100), analytical regions with collapsing population shares, 1997-2009

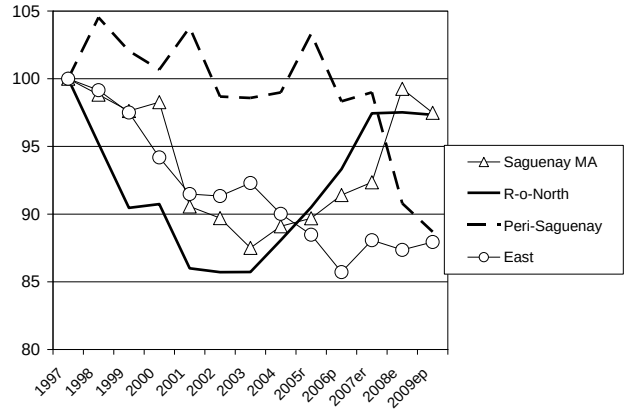


Figure 8: Evolution of relative GDP per capita (1997=100), analytical regions with rising population shares, 1997-2009

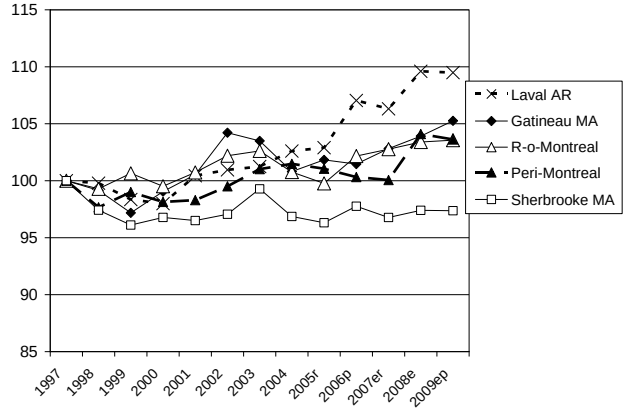


Figure 9: Evolution of relative GDP per capita (1997=100), analytical regions with stable population shares, 1997-2009

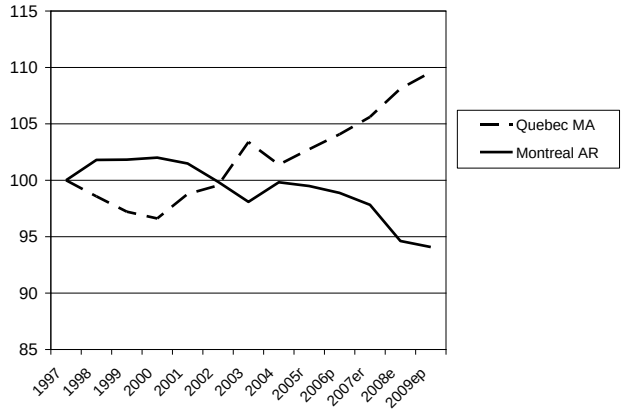


Figure 10: Evolution of relative GDP per capita (1997=100), analytical regions with falling population shares, 1997-2009

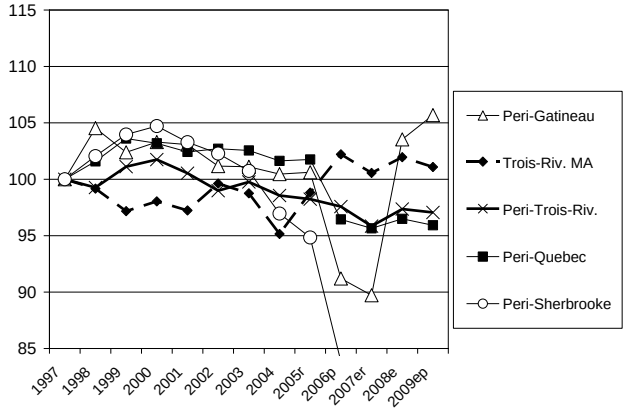


Figure 11: Evolution of relative GDP per capita (1997=100), analytical regions with collapsing population shares, 1997-2009

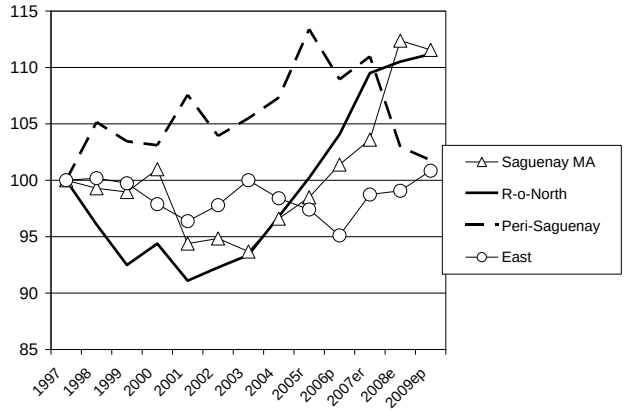


Figure 12: Evolution of personal income shares (1997=100), analytical regions with rising population shares, 1997-2009

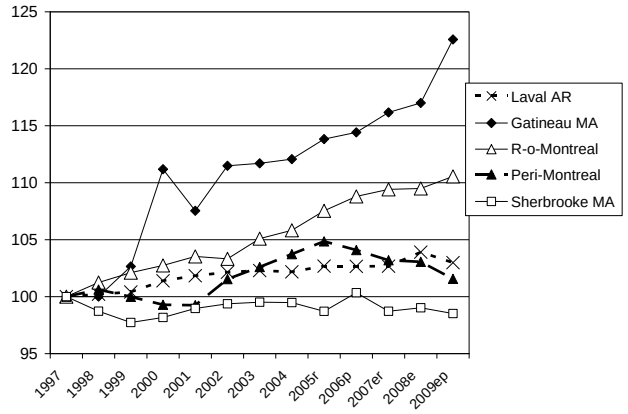


Figure 13: Evolution of personal income shares (1997=100), analytical regions with stable population shares, 1997-2009

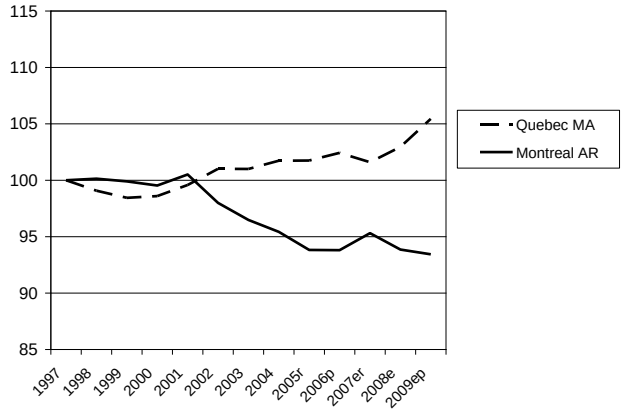


Figure 14: Evolution of personal income shares (1997=100), analytical regions with falling population shares, 1997-2009

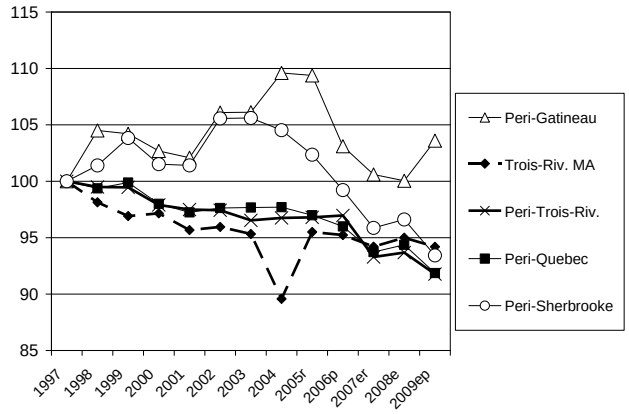


Figure 15: Evolution of personal income shares (1997=100), analytical regions with collapsing population shares, 1997-2009

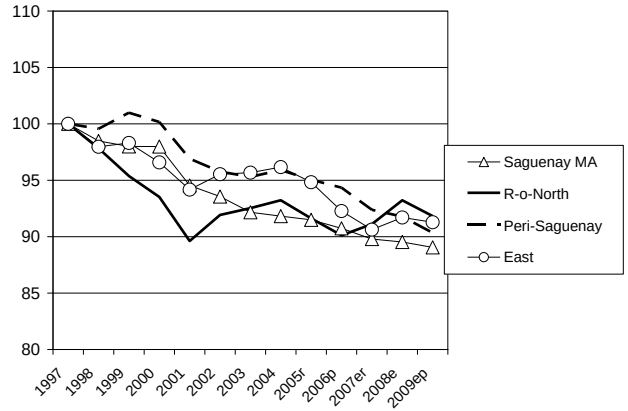


Figure 16: Evolution of relative pers. inc. per capita (1997=100), analytical regions with rising population shares, 1997-2009

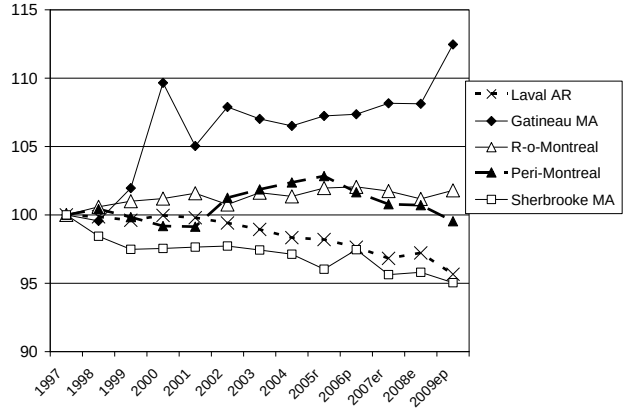


Figure 17: Evolution of relative pers. inc. per capita (1997=100), analytical regions with stable population shares, 1997-2009

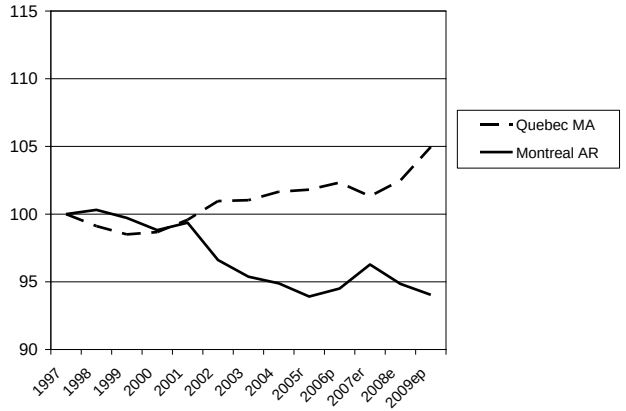


Figure 18: Evolution of relative pers. inc. per capita (1997=100), analytical regions with falling population shares, 1997-2009

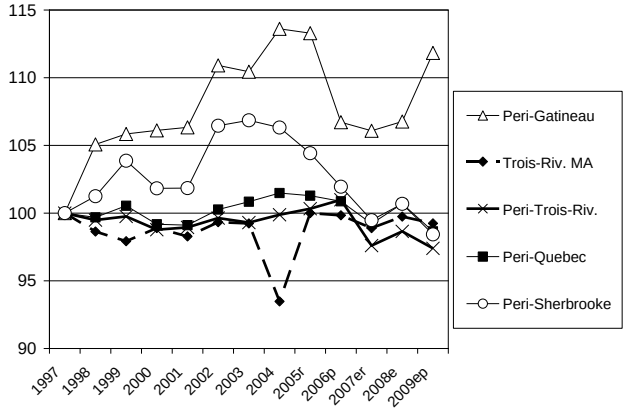


Figure 19: Evolution of relative pers. inc. per capita (1997=100), analytical regions with collapsing population shares, 1997-2009