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Occupational skill level: The divide between rural and urban Canada

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Highlights

- In 2001, managerial and professional occupations were more concentrated in predominantly urban regions than in rural regions, while the intensity of unskilled occupations was sizably higher in predominantly rural regions. This polarization was observed even after controlling for regional differences in industrial structure.
- There is a noticeable divide in occupational skill level between the south and west of Canada compared to the north and east of Canada.
- During the 1990s, professional occupations became increasingly concentrated in urban regions, while their intensity declined in rural regions. The opposite trend is recorded for unskilled occupations.
- Regional differences in employment skill intensity are generally smaller for females than for males.
- The rise of the “knowledge economy” has had a regional dimension, appearing to favour urban centres over rural regions.

Introduction

It is generally understood that the occupational structure of rural and urban regions is different. For instance, in 2001, about 19 percent of urban employment was in professional occupations, as opposed to 9 percent in rural regions. In contrast, about 12 percent of urban jobs were classified as unskilled occupations, as opposed to 15 percent in rural regions (see Appendix B, Table 4). To some

extent, this variation is explained by the different composition of the economy in each regional type. As an example, the business services sector typically employs a higher share of professional workers than the manufacturing sector. Since business services are largely concentrated in urban regions, professional occupations also are more commonly found in urban regions. Whether



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regional occupational differences persist after controlling for regional industrial structure remains an unexplored question. An hypothesis that has been put forward, and which has raised policy concerns, is that employment change over time has been characterised by the concentration of low-skill jobs in rural areas and high-skill jobs in urban areas. Recent research shows that changes in the supply of skilled workers are an important force causing variations in trends in relative wages. Rural and remote regions may face specific problems in increasing the level of human capital. Remoteness, low population density and small agglomerations may all be limiting factors (Alasia, forthcoming).

This bulletin investigates the spatial distribution of occupational structure and its change between 1991 and 2001. Three main questions are addressed in this analysis. First, once we control for the different industrial composition of the work force, is there a major difference in occupational structure between regions, and in particular between urban and rural regions? Second, what are the spatial patterns of occupational intensity at the census division level? Third, what are the changes in the regional occupational structure over the last decade?

Occupation and industry structure: some background

Over the 1990s, employment in each industry and each occupation (Box 1) has substantially changed in Canada. These trends are well documented and thus only briefly discussed here (data are reported in Appendix B, Table 1; for more details see Statistics Canada, 2003). Rapid and profound technological and policy changes over the past two decades have produced a new economic environment often referred to with the catchwords “new economy”, “globalization” and “knowledge economy”. This is reflected by the decline in traditional industry and large increases in professional and managerial occupations.

The trend in the 1990s was a decline in employment in agriculture (-13 percent), other primary (minus eight percent), scale-based manufacturing (minus two percent) and construction (minus one percent). In contrast, employment increased in all other industries, with the largest growth occurring in business services (33 percent) and product-differentiated and science-based manufacturing (18 percent). Total employment by skill level has also changed over the same period. Employment change has been positive for all skill levels; however professional and managerial occupations have seen the largest increase, 36 percent and 17 percent, respectively, while the employment growth for the other skill levels has ranged between two and seven percent.

By combining industry and occupational structure data, we can generate an understanding of the occupational structure for each industry of the economy. Figure 1 displays this structure for Canada in 2001. This industry/occupational structure is important because many of the indicators used in this analysis are measured against these national patterns. The figure indicates that the staffing requirement of each industry is remarkably different. For instance, only a very small share of employment in agriculture and related services is classified as managerial or professional occupations. Accordingly, it can be expected that a region dominated by the agricultural sector will have a small share of professional and managerial occupations. The indicator of skill specialization used in this analysis accounts for the different staffing requirement of each industry.

Box 1. Classification of occupational skills groups and industry groups

The data used in this analysis are from the Census of Population 1991 and 2001. All the data used in the analysis are group-level data, meaning that we used averages of individual values computed for the geographic units of analysis. The geographic building blocks of this analysis are the 288 census divisions of Canada.

A major challenge of research in this field is the definition of operational measures that properly represent theoretical constructs. There are various definitions of the concept of skills, none of which is universally accepted.

Occupational skills groups

All occupations recorded on the Census of Population for 1991, 1996 and 2001 are classified according to the Standard Occupational Classification 1991 (SOC91). We follow the Human Resource Development Canada (HRDC) (2001) classification to group these occupations into five skill level categories. These occupational skill levels are: professional workers (skill level A); technical skilled workers (skill level B); intermediate workers (skill level C); and unskilled workers (skill level D). An additional category, managerial occupations, encompasses all types of managerial jobs. Occupations in the SOC are assigned to one of these skill levels based upon the type of education and training required to enter and to perform the duties of the occupation, except for managerial occupations. For managerial occupations, factors other than education are considered a significant determinant for employment. For details on which occupation is classified to each occupation skill level, see Alasia and Magnusson (forthcoming).

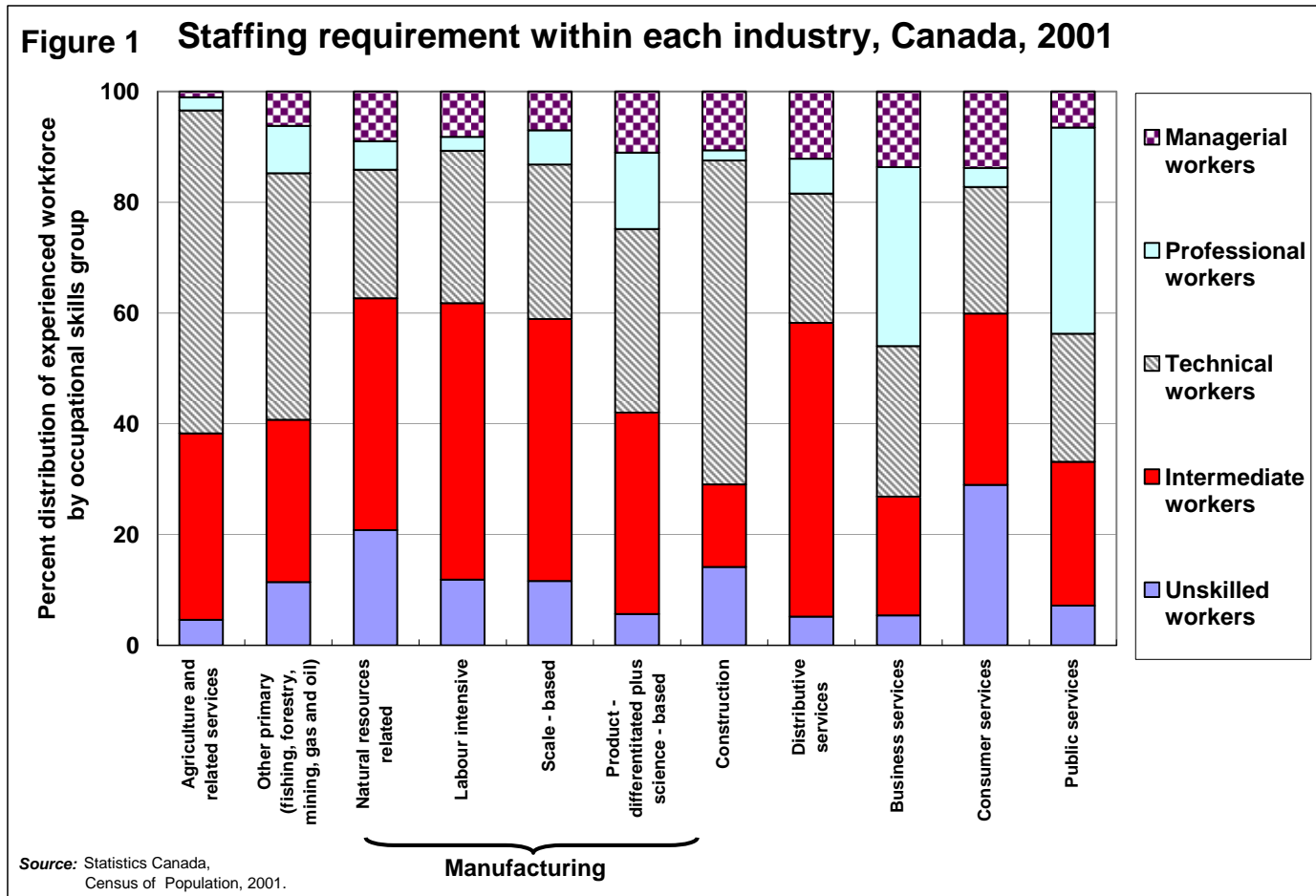
Industry groups

The census also classifies employment data by the industrial sector in which the individual is employed. For this study, individuals are classified into eleven industry groups, which reflect to a large extent, a standard industry typology. For the 2001 Census of Population data, we use the data that has been re-coded to the 1980 Standard Industrial Classification (SIC80). This re-coding ensures complete consistency and comparability across the 1991, 1996 and 2001 census years.

The 11 industry groups used in this analysis are as follows: agriculture and related services; other primary (fishing, hunting, forestry, mining, gas and oil); manufacturing - natural resources related; manufacturing - labour intensive; manufacturing - scale-based; manufacturing - product-differentiated plus science-based; construction; distributive services; business services; consumer services; and public services.

The disaggregation of the manufacturing sector into four groups is based in the classification developed by Baldwin and Rafiqzaman (1994). As explained by the authors, these groups are defined on the basis of the principal factors affecting the competitive process in each activity. For the resource-based sector, the main factor is access to abundant natural resources and for the labour-intensive sector, it is labour costs. The scale-based industries are differentiated on the basis of the length and scale of their production runs. Product differentiated manufacturing relies on tailoring production to specific demand characteristics. Science-based industries focus on continuous application of new technologies.

For details on which industry is classified to each industry group, see Alasia and Magnusson (forthcoming).



Higher skill occupations are concentrated in urban areas

Figure 2 uses both location quotients (LQ) and skill specialization quotients (SSQ) (Box 2) to show the skill intensity by regional type (Box 3) and occupational skill level in 2001. Figure 2

reveals three major patterns. First, the different industrial composition of regions does not explain all differences in skill intensity. Secondly, there is evidence of polarization at the urban-rural geographic extremes. Third, technical and intermediate occupations present a more uniform distribution across regional types.

Box 2. Occupational skill intensity

Location Quotient

The location quotient (LQ) is the ratio of the percentage of the total regional employment in a given occupational skill level to the percentage of the total employment in that occupational skill level at the national level. The LQ provides a measure of the intensity of employment in a given occupational skill level in a region relative to the level of employment in that occupational skill level at the national level. A LQ is calculated for each locality and each occupational class.

Example:

$$LQ = \frac{[(\text{managerial employment in rural regions}) / (\text{total employment in rural regions})]}{[(\text{managerial employment in Canada}) / (\text{total employment in Canada})]}$$

If eight percent of the workforce in rural regions is employed in managerial occupations and ten percent of the workforce in Canada is employed in managerial occupations then the LQ for managerial occupations in rural regions is: $LQ = (8/10) = 0.8$. The critical values of the LQ are:

- $LQ > 1$ indicates that the region has a higher intensity of employment relative to the nation.
- $LQ = 1$ indicates that the region has the same intensity of employment relative to the nation.
- $LQ < 1$ indicates that the region has a lower intensity of employment relative to the nation

Skill Specialization Quotient

The skill specialization quotient (SSQ), as used in this analysis, is a modified version of the LQ (Wojan, 2000). For each skill class, the skill specialization quotient (SSQ) compares the employment that *should* be found if the staffing requirement of the local industries was the same as an identical set of national industries, to the *actual* employment in that given skill level reported in the region. A SSQ is also computed for each locality and each occupational class. The data used to calculate the SSQ comprises the workforce only.

As an example, consider a locality with 100 employed people, 40 in manufacturing (which has 30 percent of its employees in the professional category) and 60 in consumer services (which has 40 percent of its employees in the professional category). Given the staffing requirement that prevails for Canada, we would expect to observe 36 employed in professional occupations. This expected value is computed as the employment in each sector multiplied by the share of workers in professional occupations in the sector at the national level ($40 \times 0.3 + 60 \times 0.4$). If in fact there are only 20 employed in professional occupations for that locality, then the $SSQ = 20/36 = 0.55$. This indicates that the region has a lower intensity of professional workers than an identical set of industries at the national level. Hence, after accounting for industry composition:

- $SSQ > 1$ indicates that the region has a higher intensity of employment relative to the nation.
- $SSQ = 1$ indicates that the region has the same intensity of employment relative to the nation.
- $SSQ < 1$ indicates that the region has a lower intensity of employment relative to the nation.

A similar approach is used to compute an SSQ by gender. Mapping of the Skill Specialisation Quotients (SSQ) at the CD level is used to evaluate the spatial patterns of skill intensity across Canada.

For further details on the analytical methods see Alasia and Magnusson (forthcoming).

Box 3. Geographic level of analysis

In this bulletin three types of geographies are used, census division, regional types and macro-regions. The Census Division (CD) is the basic geographical building block used in the analysis. There are 288 CDs in Canada, using the constant geographic boundaries of 1996.

Macro regions included the following: Atlantic Canada (Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick), Quebec, Southern Ontario, Northern Ontario, Prairies (Manitoba, Saskatchewan, Alberta), British Columbia and the Territories.

Regional type is defined using an Organization for Economic Co-operation and Development (OECD) classification scheme:

Predominantly Rural Regions: more than 50 percent of the population lives in a ‘rural community’*.

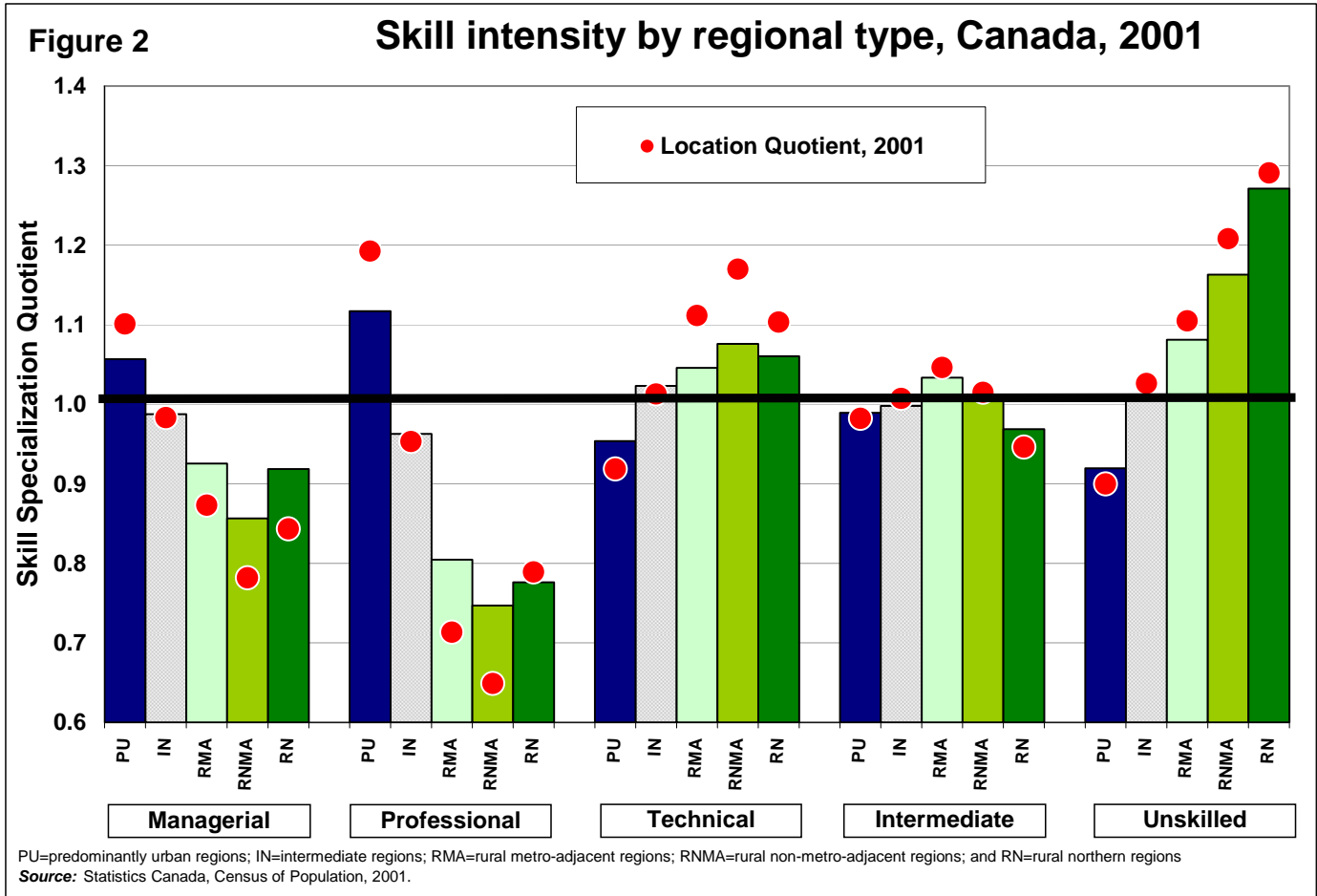
Intermediate Regions: 15 percent to 50 percent of the population lives in a ‘rural community’.

Predominantly Urban Regions: less than 15 percent of the population lives in a ‘rural community’.

Predominantly rural regions are further broken down to recognize diversity between different types. There are 3 types of predominantly rural regions: rural metro-adjacent regions, rural non-metro-adjacent regions and rural northern regions.

* An OECD rural community is a community with a population density less than 150 people per square kilometre.

More details on the classification and aggregation procedure are presented in Alasia and Magnusson (forthcoming).



The dots in Figure 2 show the unadjusted value of skill intensity as measured by the LQs and the height of the bars represent the SSQs. The patterns presented by the simple LQs are similar to those shown by the SSQs, although the magnitudes do change. Industry structure partially explains the regional variation in skill intensity – thus, the SSQ values are generally closer to the unit values than the corresponding LQ values. For instance, in predominantly urban regions, the LQ (i.e. the dot in Figure 2) for the managerial occupation group is 1.1. Note that the SSQ (i.e. the height of the bar) is lower, at 1.05. Adjusting for the mix of industries in predominantly urban regions (i.e. by calculating an SSQ) has explained part of the reason why the LQ for predominantly urban regions is higher than the national average. However, the SSQ remains greater than one which indicates that, even after adjusting for the

mix of industries, predominantly urban regions have a higher intensity of managerial occupations.

The opposite holds for rural regions. For example, in rural non-metro-adjacent regions, the LQ for managerial occupations is 0.78. The SSQ is closer to one, which indicates that part of the reason for the low LQ in rural non-metro-adjacent regions is the industrial structure. However, the low SSQ (0.86) indicates that, even after taking account of the industrial structure, rural non-metro-adjacent regions have a low intensity of managerial occupations. Thus, even after accounting for industry structure, there remain substantial regional differences in skill levels.

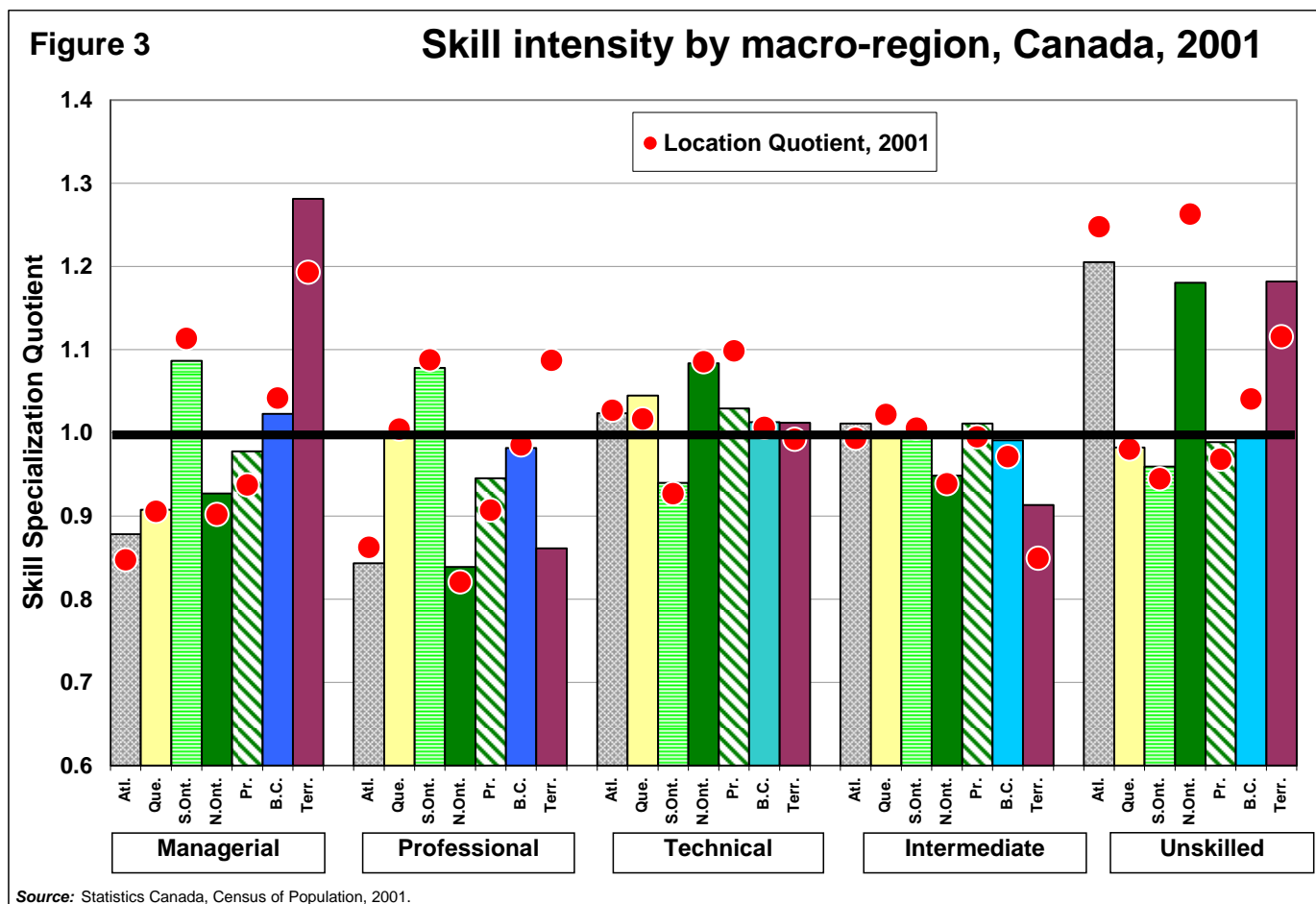
The second major pattern is a polarization of skill intensity in the highest and lowest occupational categories. Managerial and professional occupations are concentrated in urban areas. The

intensity of these two skill levels declines substantially from urban to intermediate to rural metro-adjacent to rural non-metro-adjacent regions. Predominantly rural regions, especially rural non-metro-adjacent and rural northern regions, have a high intensity of unskilled occupations. The intensity of unskilled employment increases substantially as one moves across the urban-rural gradient.

Thirdly, there is a more uniform distribution in the technical and intermediate occupational skill categories. The intermediate skill level has the least variation between regional types, especially once industry structure has been accounted for. Urban regions have a slightly lower intensity of technical skills while rural northern regions have the lowest intensity of intermediate skills.

Macro-regional pattern: The west/south versus the north/east

Figure 3 provides a different regional perspective on skill intensity across Canada. This figure reports the value of the SSQ in 2001 for seven macro-regions of Canada: Atlantic Provinces, Quebec, Southern Ontario, Northern Ontario, Prairies, British Columbia, and Territories. As in Figure 2, the dots represent the value of the LQ for the same region and skill level in 2001. This figure provides evidence of the macro-regional divide between the south and west of Canada compared to the north and east of Canada, as well as the peculiarity of the Territories' economy.



Contrary to what we observed for the types of regions, the difference between the SSQ and the LQ does not appear to follow a consistent pattern across the macro-regions of Canada. Even though the distribution of the two quotients is generally similar, there are a few noticeable differences. These differences are particularly marked for the Territories which, it should be emphasized, represent a small economy in terms of employment and which has some unique economic characteristics. In the Territories, the LQ for professional workers is above one but the SSQ for professional workers is below one. The high LQ indicates that the average worker in the Territories is more likely to have a professional occupation (compared to the Canadian average). The low SSQ indicates that if the Territories had the industrial structure of the rest of Canada, then the average worker in the Territories would be less likely to have a professional occupation. Thus, the Territories have a high share of workers with a professional occupation because their industrial structure is biased towards sectors with a higher share of professional workers. One of these sectors is the public services sector.

The most noticeable and consistent differences in the SSQ distribution between macro-regions are between the two extremes of the skill classes (professional and unskilled occupations) and for three macro-regions in particular (Atlantic Provinces, Northern Ontario and the Territories). Once we account for industry composition, the intensity of professional occupations is considerably below the national average in Atlantic Canada, Northern Ontario and the Territories (the bars in Figure 3 show an SSQ between 0.8 and 0.9); and for the first two regions the intensity of managerial occupations is also sizably below the national average. Conversely, these three macro-regions have a higher intensity of unskilled occupations (SSQ above 1.1).

The intensity of professional occupations is notably above the national average only for Southern Ontario. For this region, employment in

managerial occupations is more common than in the same set of national industries. The opposite is recorded for unskilled occupations. This confirms the leading position of the region in terms of higher skill occupations.

For most other regions and for technical and intermediate skill categories, the SSQ values do not deviate strongly from the national average, meaning that regional occupational staffing tends to be aligned with the national staffing. Northern Ontario and the Territories have slightly lower intensities of intermediate skills. Technical skills are more concentrated in Northern Ontario, but are less concentrated in Southern Ontario.

Finally it is interesting to observe some of the patterns recorded for the Prairies. This region has a higher intensity of technical skills, while recording a lower intensity of managerial skills. The SSQ for managerial and professional skills is higher than the value of the location quotient. This suggests that the industry structure of the region explains part of the low intensity recorded for these occupations. In contrast, the intensity of technical skills in the Prairies is lower when measured by the SSQ. There is a high level of agricultural work in this region and many agricultural occupations are included in the technical skills category. Adjusting for industry structure reduces the measure of intensity for technical skills in the Prairies. The SSQ still indicates an over specialization of technical skills, but it is much closer to the national average. This region provides a good example of how the industry structure of a region plays a role in explaining the mix of skills present in the workforce.

Local peculiarities in skill intensity: The impact of urban centres

Regional aggregate figures can conceal some local diversity. Geographic details on the spatial distribution of the SSQs are shown in Maps 1 to 5

(Appendix A) for managerial, professional, technical, intermediate and unskilled occupations, respectively. Each map reports the distribution of the SSQ by fixed classes¹. Several spatial patterns emerge, which reflect the results reported for the regional types in the previous section, while at the same time pointing out the peculiarity of some local economies.

First, the maps show that the intensity of technical occupations (Map 3) and intermediate occupations (Map 4) is more evenly distributed across the 288 census divisions of Canada. Almost all the CDs fall in the range of 0.90 to 1.09 of the SSQ index (and thus are lighter shades on the map). In contrast, the intensity of professional occupations (Map 2) and unskilled occupations (Map 5) exhibit greater diversity. About 26 percent of CDs have a SSQ below 0.7 for professional occupations (Map 2). At the opposite end, two CDs (0.7 percent of the 288 CDs of Canada) record an SSQ index above 1.3.

Secondly, in certain cases within macro-regions, the occupational intensity by CD displays a remarkable degree of territorial variation. For instance, even though the intensity of managerial occupations is higher in Southern Ontario than for most of other macro-regions of Canada (Figure 3), Map 1 indicates that these occupations are concentrated in only a few CDs. Not surprisingly, based on results shown in Figure 2, these CDs surround the main urban cores of the region. In several cases, other CDs in this region have a SSQ value below 1.

Rural females: Higher skills but fewer are working

Regional differences in occupational structure by gender show some interesting patterns. Regional differences by gender are often larger for males

1. The fixed classes for mapping the SSQ (as shown in the legend of Maps 1 to 5) are the same for each map and are equivalent to the SSQ bars in Figures 2 and 3.

than for females. In other words, the occupational structure of females, once we account for industry differences, tends to be more similar across regions. This is particularly evident for professional occupations. It should be noted, however, that the SSQ index is computed solely for people in the labour force and that the share of females in the labour force is 13 to 15 percentage points below that of males². In consequence, the SSQ is calculated on a lower share of total females.

Figure 4 summarizes the skill level gender pattern for the five regional types (predominantly urban to rural northern regions). The figure shows the difference between the SSQ results seen in Figure 2 and the male and female SSQ indices (the blue and yellow bars, respectively)³. Large differences in skill intensity (SSQ) exist between males and females in rural regions for managerial and professional skills. Females have a substantially higher intensity of managerial and professional skills than males in these regions (i.e. the yellow bars are positive, indicating that the female SSQ is higher than the SSQ for the two genders combined). In general, there is little difference between males and females across all other skill levels.

2. The Territories are once again an exception to this general pattern. In this region the male participation rate is 86.1 percent and the female participation rate is 79.5 percent, a difference of only 6.6 percentage points.

3. As illustrated in Figure 4, it is possible for both male and female SSQ indices to be below or above the combined SSQ index. The SSQ involves calculating a skill share which is weighted by the total employed population. Male and female skill shares are calculated using only the respective male or female employed populations. The combined skill share is calculated using the total employed population. Since the male and female employed populations are not equal, the combined skill share and SSQ index is not equal to the average of the male and female values.

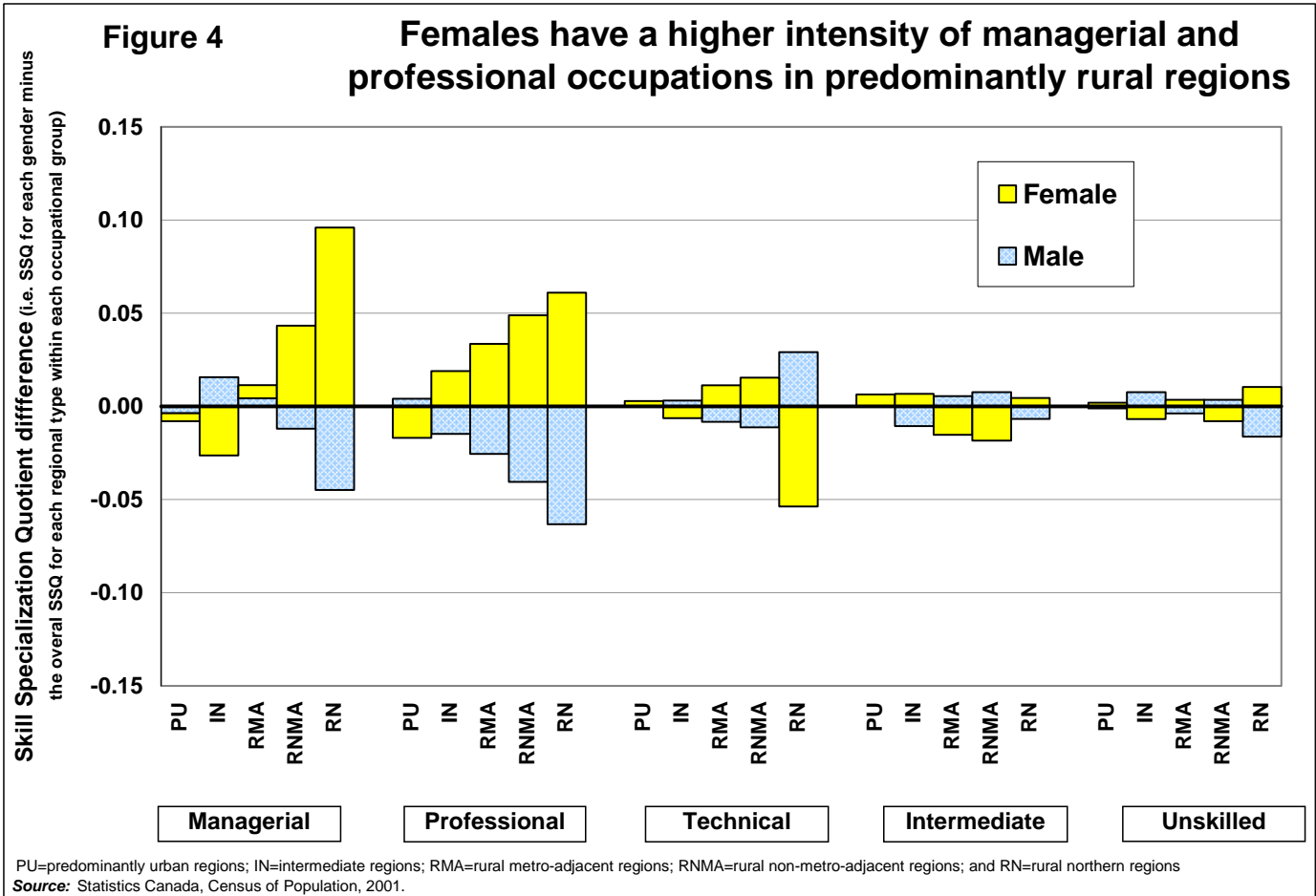
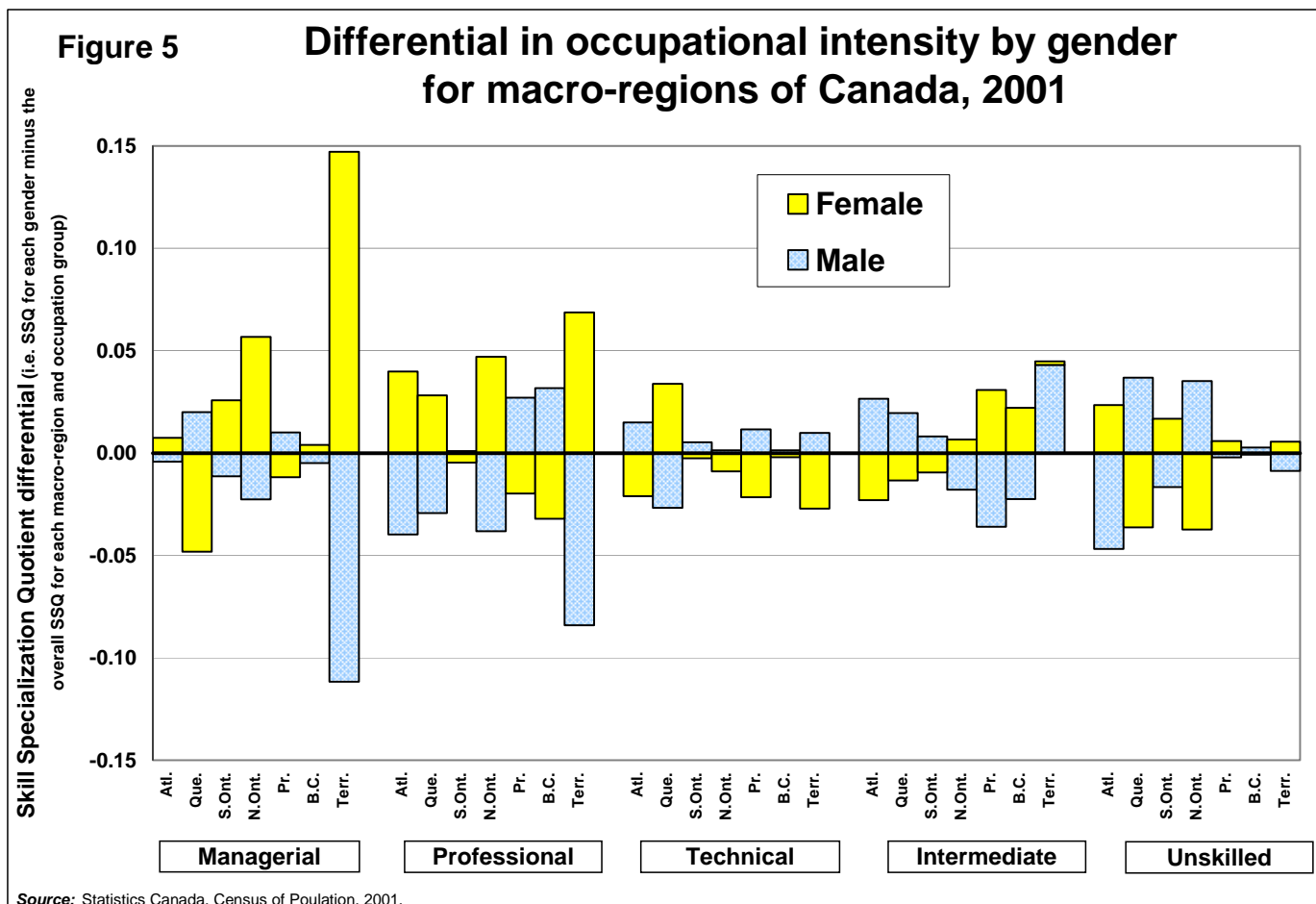


Figure 5 summarizes the macro-regional differences by gender in 2001, using the seven macro-region aggregates. In general, regions that have high participation rates for both males and females show limited difference in the occupational intensity between genders. This is the case for Southern Ontario, the Prairies and British Columbia. In these regions, there is very little difference between the intensity of skills between males and females. In contrast, Atlantic Canada shows greater variation between genders. In managerial and professional occupations females have a higher intensity than males. However, this intensity is still low relative to Canada. Females also have a higher intensity of unskilled occupations, while males have a higher intensity in the technical and intermediate skill groups. In Northern Ontario, females have a

higher intensity of managerial and professional skills, and males have a higher intensity of unskilled occupations.

The Territories is an interesting case. In the Territories, females have a much higher intensity of managerial occupations, although the intensity of both males and females is above the national average. Females also have a much higher intensity of professional occupations. Males have a higher intensity of technical, intermediate and unskilled occupations. Finally, Quebec appears to be the only macro-region for which some sizable differences are recorded for all skill groups. Males have a higher intensity of managerial, intermediate and unskilled occupations and females have a higher intensity of professional and technical occupations.



Changes over time: Further polarization

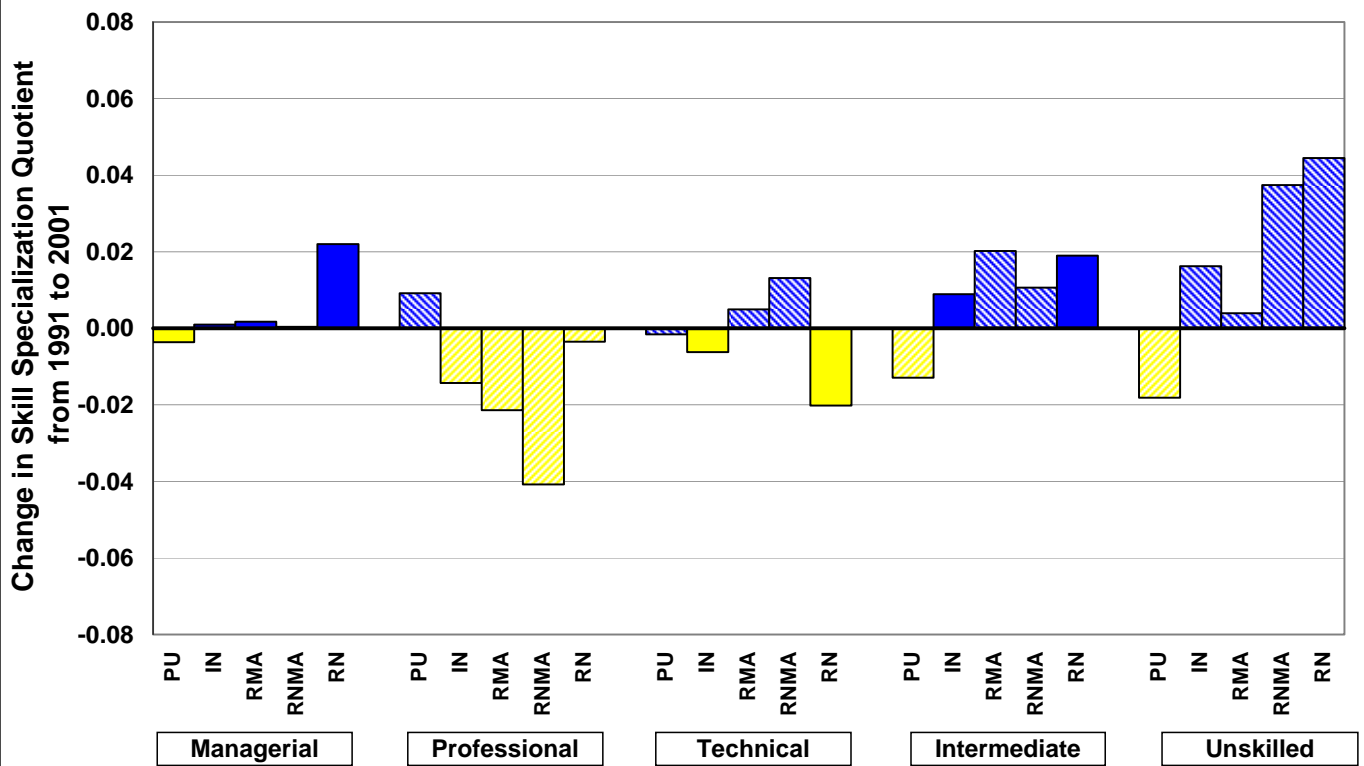
The changes in regional skill intensity over the 1990s are generally small. Nonetheless, they signal a further polarization of the occupational structure between urban and rural areas. Figure 6 shows the difference between SSQs in 1991 and 2001 (the value of the quotients are reported in Appendix B, Table 2). Two types of information can be drawn from this figure:

- a) If the bar is above the zero line, the SSQ increased between 1991 and 2001 (and a decrease is indicated for cases where the bar is below the zero line); and
- b) If the bar has a solid colour, the SSQ is converging towards the national average

(and a bar with stripes indicates the SSQ is diverging away from the national average).

Figure 6 suggests the following major trends. First, the concentration of professional occupations declined sizably in predominantly rural regions, with the largest decline recorded for rural non-metro-adjacent regions. Rural regions were already below the national average in 1991; hence, this decline means that predominantly rural regions are showing an even lower intensity of professional occupations by 2001 (i.e. they are diverging away from the Canadian average intensity of professional occupations). In contrast, the intensity of professional occupations increased slightly in urban regions.

Figure 6 The intensity of the unskilled occupational group increased in predominantly rural regions between 1991 and 2001



PU=predominantly urban regions; IN=intermediate regions; RMA=rural metro-adjacent regions; RNMA=rural non-metro-adjacent regions; and RN=rural northern regions
 Source: Statistics Canada, Census of Population, 2001.

At the opposite end of the occupational spectrum, the intensity of unskilled occupations increased in the most remote rural regions (rural non-metro adjacent and rural northern regions). These are the largest changes in skill intensity across all skill groups and regions. For urban regions the intensity of unskilled occupations declined over the 1990s. Thus, at the end of the decade unskilled occupations were more concentrated in rural areas.

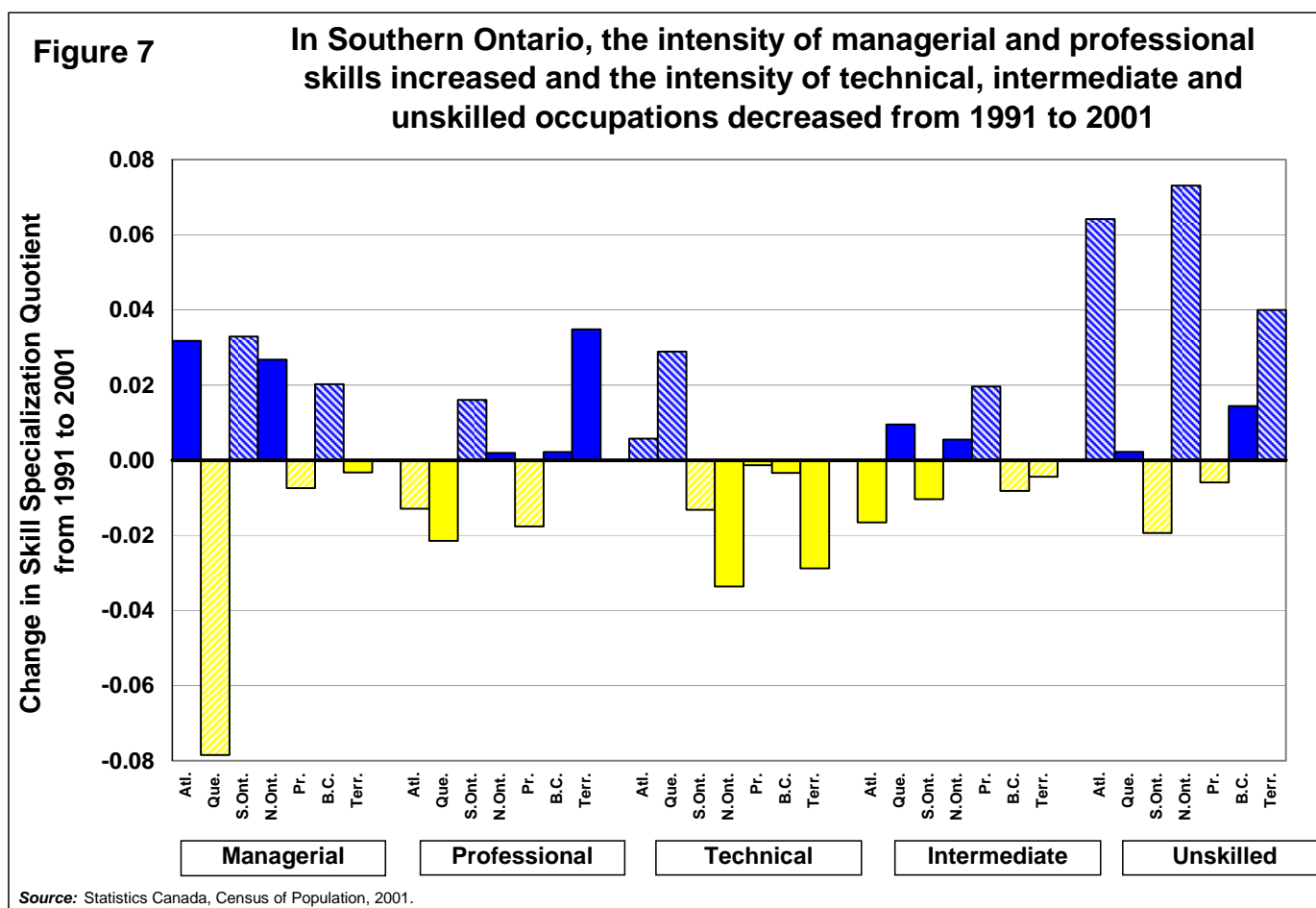
Second, the SSQ changed very little for managerial occupations, with the exception of rural northern regions where the SSQ increased. This may be due, in part, to the creation of Nunavut in the late 1990s. Additional managerial jobs may have been required to facilitate the administration of a new Territory.

Third, the changes for technical and intermediate occupations are generally small and present a mixed pattern. There was a small increase in the intensity of technical skills in rural metro-adjacent and non-metro adjacent regions, while the intensity declined in rural northern regions. In contrast, in most rural regions the intensity of intermediate skills increased during the 1990s, while it declined for urban regions.

Change over time at the macro-regional level: The strong getting stronger

The pattern of change in skill intensity at the macro-regional level shows some differences compared to the change across regional types seen in the previous section (i.e. the urban-to-rural gradient of predominantly urban regions to predominantly rural regions). This suggests that the patterns of change do not entirely overlap for these two geographies. Some of the dynamics of the 1990s are better captured by one type of spatial aggregation than the other.

Southern Ontario is the most evident example of high-skill intensity growth and low-skill intensity decline. In this region, the SSQ grew for managerial and professional occupations and shrank for unskilled occupations (Figure 7). The intensity of managerial occupations also grew in the Atlantic Provinces, Northern Ontario and British Columbia. The Territories are the only region, other than Southern Ontario, that reports a substantial increase in professional occupations. Quebec reports a substantial decline of managerial skills intensity from the 1991 value, when the index was close to the national average.



At the other end of the occupational spectrum, the Atlantic Provinces, Northern Ontario and the Territories have a growing intensity in unskilled

occupations. Unskilled occupations were already concentrated in these regions in 1991 and this intensity substantially increased by 2001.

For the other occupational categories, namely technical and intermediate occupations, the SSQ is close to the national average and the changes over the decade tend to be small. Similarly, for the central and western Canadian regions, the patterns are somewhat mixed. For the Prairies, the SSQ for managerial and professional occupations declined slightly during the 1990s, but the intensity in the unskilled category also declined. The skill intensity in British Columbia changed only slightly in all occupational categories from 1991 to 2001.

Mapping the change: core urban regions versus rural regions

Maps 6 and 7 summarize the change in the SSQ at the CD level between 1991 and 2001, for professional and unskilled occupations respectively. Census divisions are classified into six groups:

- CDs where the SSQ was above the national average in 1991 and had further increased by 2001 (dark green).
- CDs where the SSQ was above the national average in 1991 but had declined towards the national average by 2001 (light green).
- CDs where the SSQ was above the national average in 1991 but had fallen below it by 2001 (orange).
- CDs below the national average in 1991 and which had further declined by 2001 (dark red).
- CDs below the national average in 1991 which had increased but still remained below the national average by 2001 (light red).
- CDs that were below the national average in 1991, but were above it in 2001 (grey).

This classification does not account for the magnitude of the changes and the distance from the national average (for a more analytical approach see Alasia and Magnusson,

forthcoming). Nonetheless, the patterns that emerge are rather informative. The regional differences for the two skill types are marked and the patterns are almost the inverse of each other.

In Map 6 almost all urban CDs are in the green shades (meaning they have a high and often growing intensity of professional occupations), with a few notable exceptions. These exceptions are Halifax and St. John's (Newfoundland and Labrador) where the light red colour indicates SSQ below, but moving towards, the national average. Also, Winnipeg and Regina show indices that are marginally below the national average and are marginally declining. Edmonton was slightly above one in 1991 but was below it by 2001. A few other CDs have moved from a SSQ below one to a SSQ above one. Among these are Sarnia and some other natural resource regions. The large majority of CDs, and the large majority of Canadian rural space, fall into the dark red shades, meaning they have a low and declining intensity of professional occupations. It should be noted, however, that even large parts of Southern Ontario are characterised by CDs with lower and declining SSQs for professional occupations.

Map 7 shows the change in SSQ for unskilled occupations. The patterns are essentially the inverse of the pattern observed for professional occupations. This map uses the same categories as Map 6. The main urban agglomerations appear in dark red shades, meaning that unskilled occupations are less intense than the national average and their intensity is further declining. Most of the other urban CDs are in light red shades or in orange, meaning either they are converging from the bottom (but are still below the Canadian average) or they have moved from above one to below one over the decade. In contrast, most of the rural space appears in either dark green or light green. This means, respectively, a high and increasing intensity of unskilled occupations, or a high but declining intensity of unskilled occupations.

Conclusions

This bulletin has investigated the spatial variation of occupational structure and its changes over the 1990s. There are two major findings. First, the occupational structure of urban and rural regions appears polarized, even when differences in industry structure are taken into account. Secondly, this polarization increased during the 1990s.

The first result indicates that if one compares a rural region and an urban region with identical distributions of employment by industrial sector, the rural region will tend to have the lower skilled workforce in each industry. In contrast, the urban region will tend to have the higher skilled workforce for the same industries. This polarization is particularly marked for the highest and lowest occupational skill classes, i.e. professional and unskilled occupations. Compared to the average staffing requirement recorded for Canada as a whole, urban economic sectors record a higher intensity of professional occupations, while rural industries record a higher intensity of unskilled jobs.

These results, and in particular the trends over the 1990s, suggest that the spread of the knowledge economy has a territorial dimension. Overall, the occupational structure has become more polarized between regional types and macro-regions. Rural areas are either lagging in the process of skill intensification or have increasingly become the location for unskilled jobs. In either case, the result has been a growing intensity of lower skill occupations in rural regions and of higher skill occupations in urban regions. Widening occupational differentials has been identified as a potential problem for the economic sustainability of rural regions. Research suggests that globalization places a premium on skills (Alasia, forthcoming). With globalization, human skills rather than the natural resource-base determine the competitiveness of a region and in this process skilled workers may gain relative to unskilled workers. The concentration of lower skill jobs in

certain areas could increase their economic vulnerability, as lower skill occupations are increasingly threatened by international competition and the associated trends of outsourcing and mechanization. Thus, concentration of lower skill occupations in some areas could also worsen the regional distribution of income.

Overall, these results provide further evidence that a process of agglomeration of resources, in this case human capital resources in the form of higher skill occupations, has primarily occurred in urban regions over the last decade.

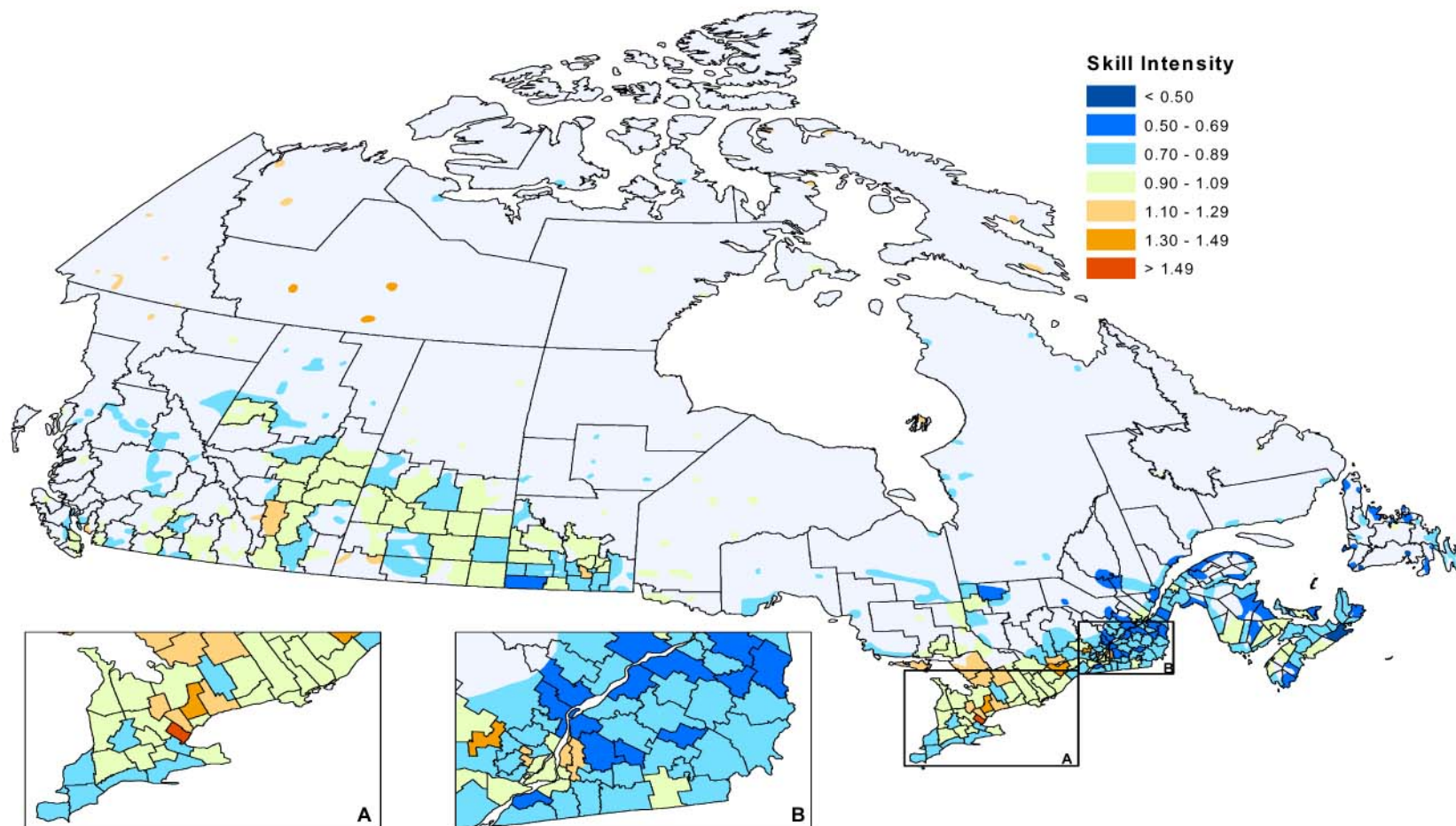
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Appendix A: Maps

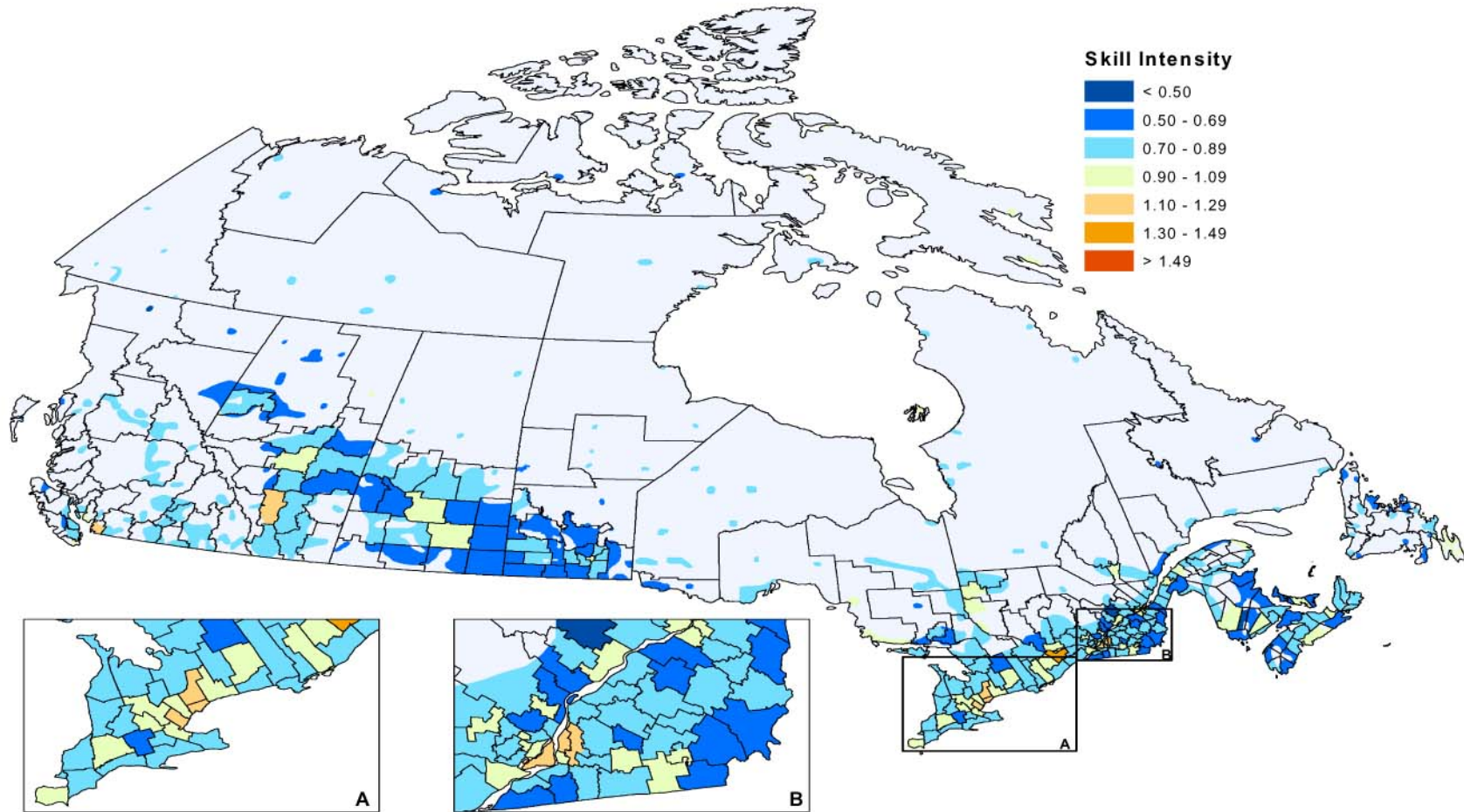
Map 1. Managerial occupations intensity, 2001 (SSQ values)



Source: Statistics Canada, Census of Population, 2001.

Map produced by Spatial Analysis and Geomatics Applications (SAGA), Agriculture Division, Statistics Canada, 2004.

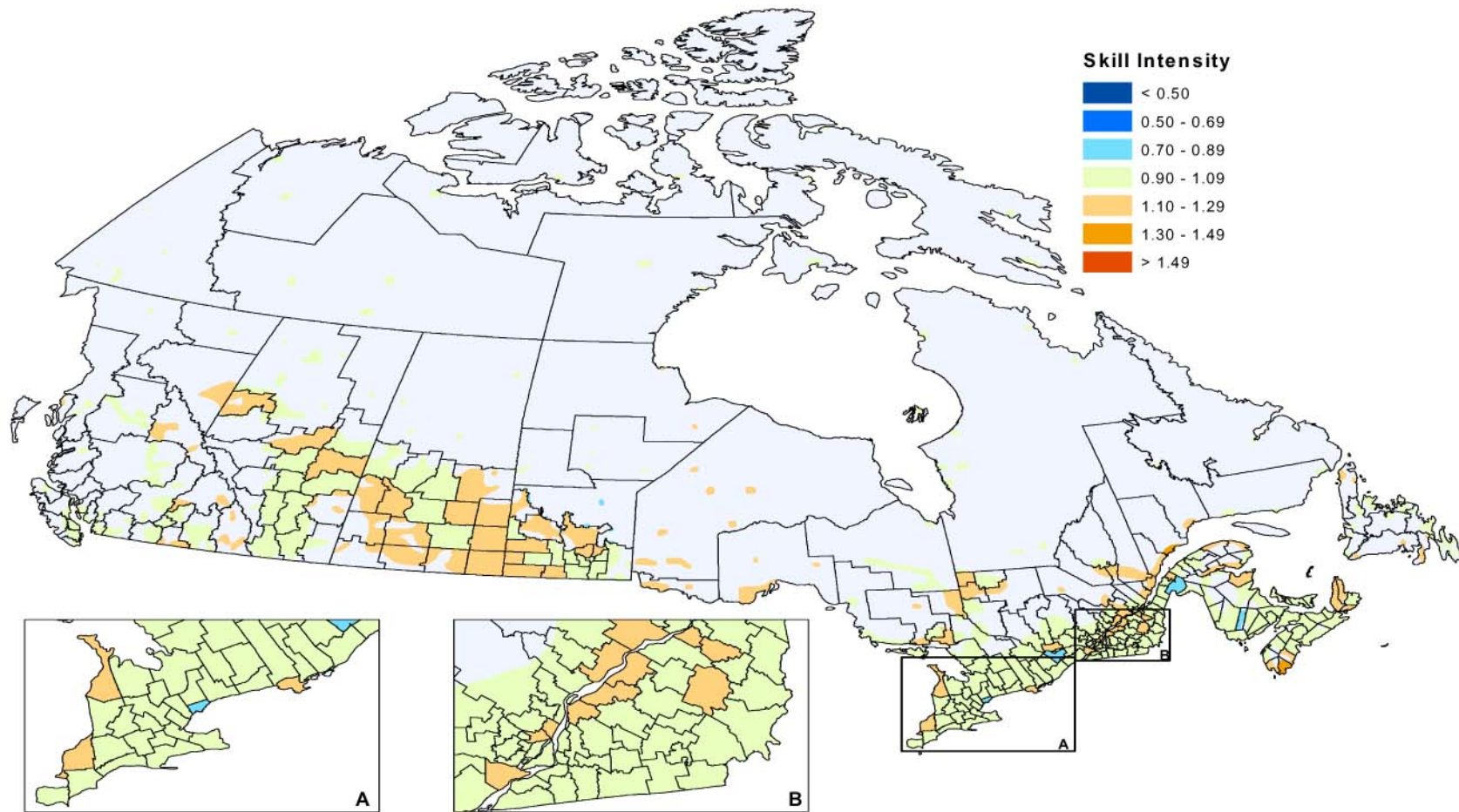
Map 2. Professional occupations intensity, 2001 (SSQ values)



Source: Statistics Canada, Census of Population, 2001.

Map produced by Spatial Analysis and Geomatics Applications (SAGA), Agriculture Division, Statistics Canada, 2004.

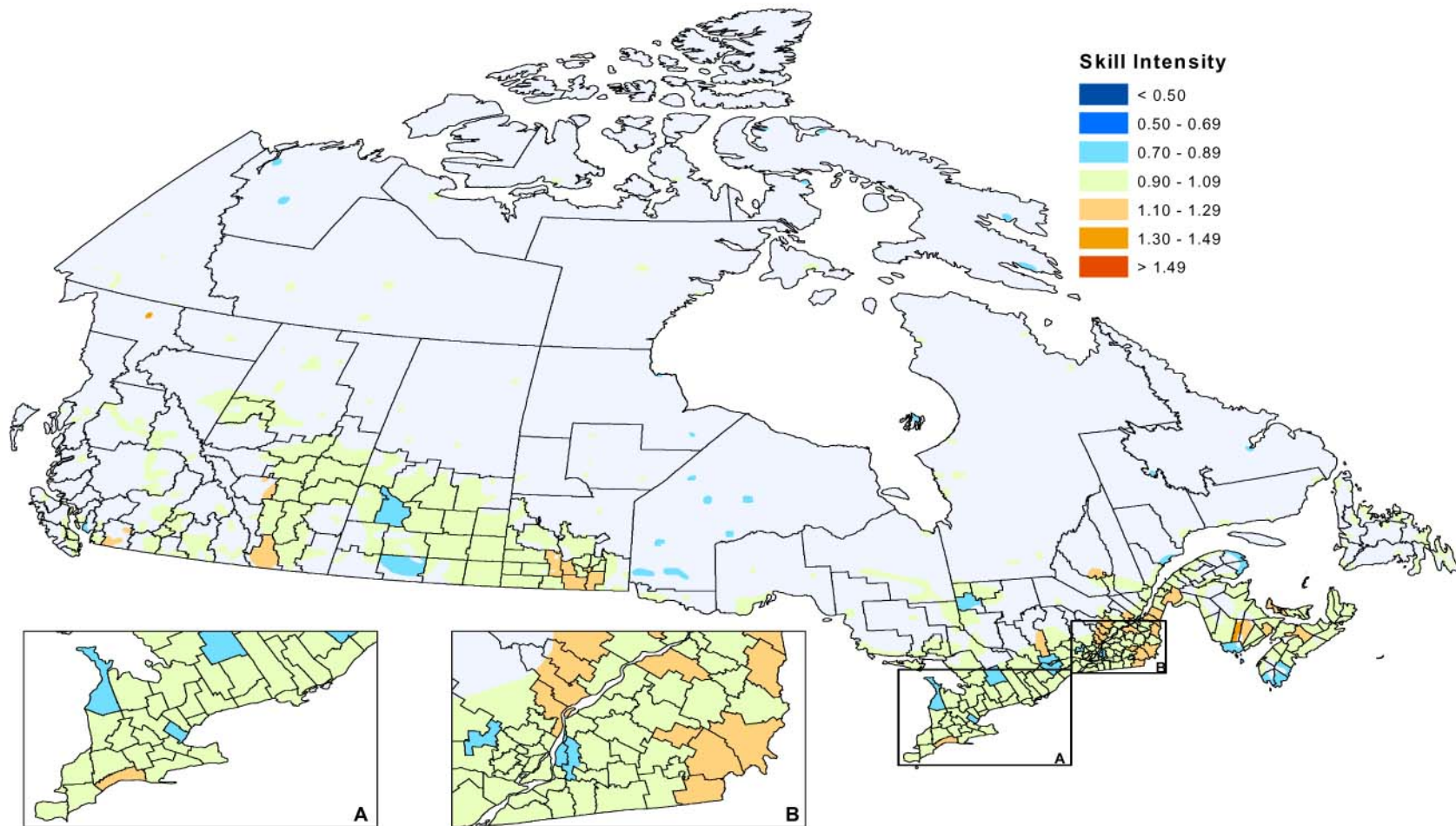
Map 3. Technical occupations intensity, 2001 (SSQ values)



Source: Statistics Canada, Census of Population, 2001.

Map produced by Spatial Analysis and Geomatics Applications (SAGA), Agriculture Division, Statistics Canada, 2004.

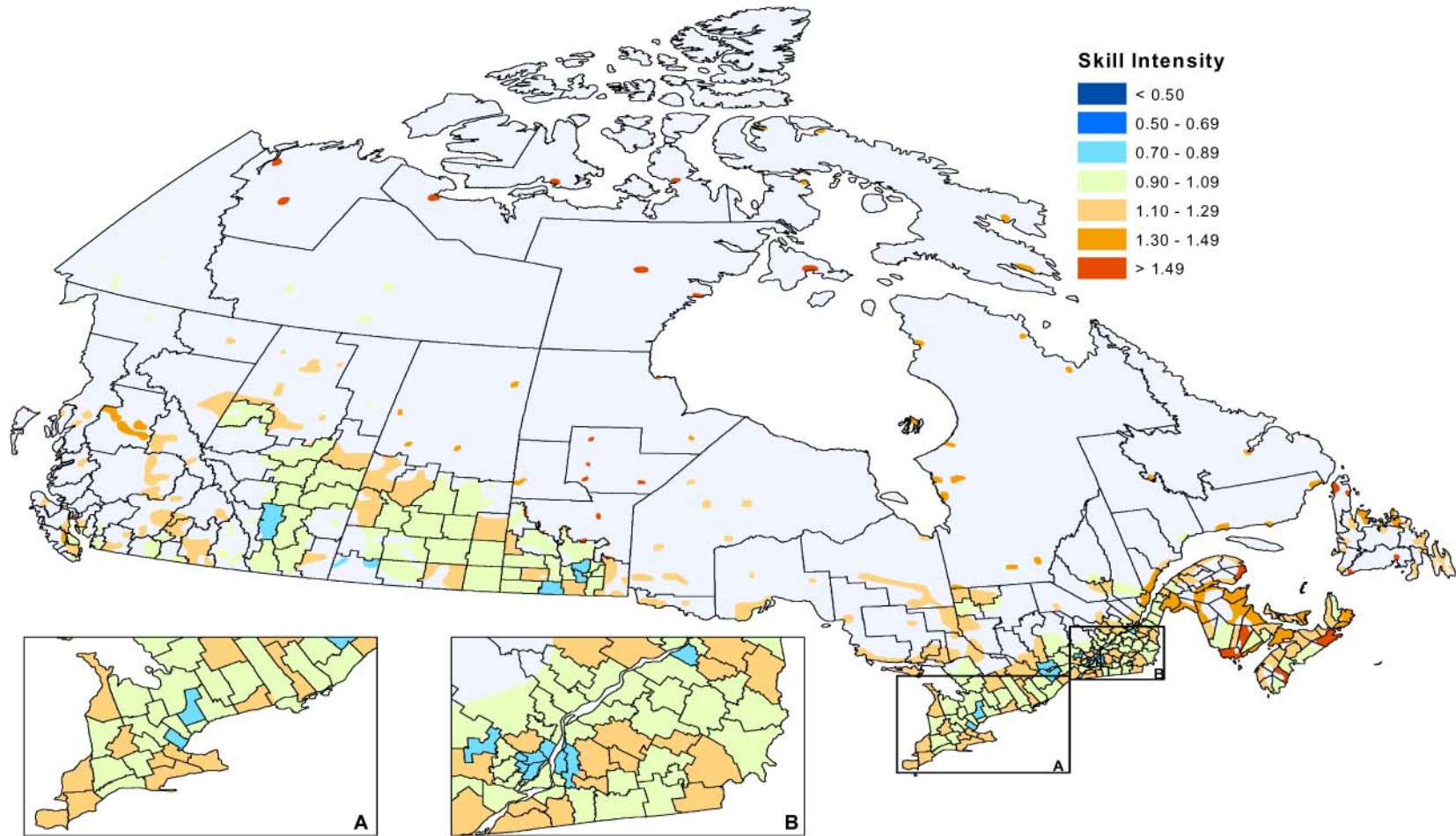
Map 4. Intermediate occupations intensity, 2001 (SSQ values)



Source: Statistics Canada, Census of Population, 2001.

Map produced by Spatial Analysis and Geomatics Applications (SAGA), Agriculture Division, Statistics Canada, 2004.

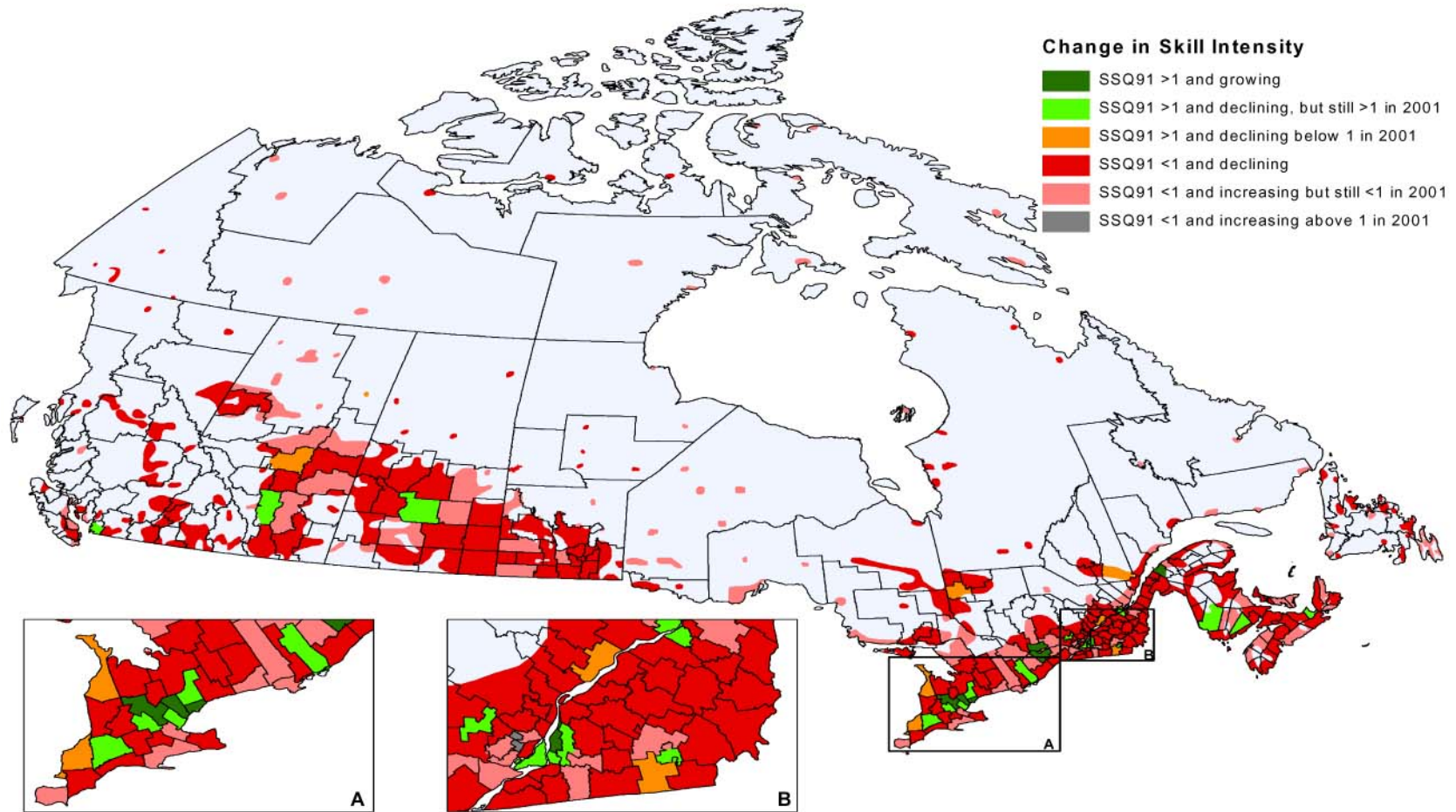
Map 5. Unskilled occupations intensity, 2001 (SSQ values)



Source: Statistics Canada, Census of Population, 2001.

Map produced by Spatial Analysis and Geomatics Applications (SAGA), Agriculture Division, Statistics Canada, 2004.

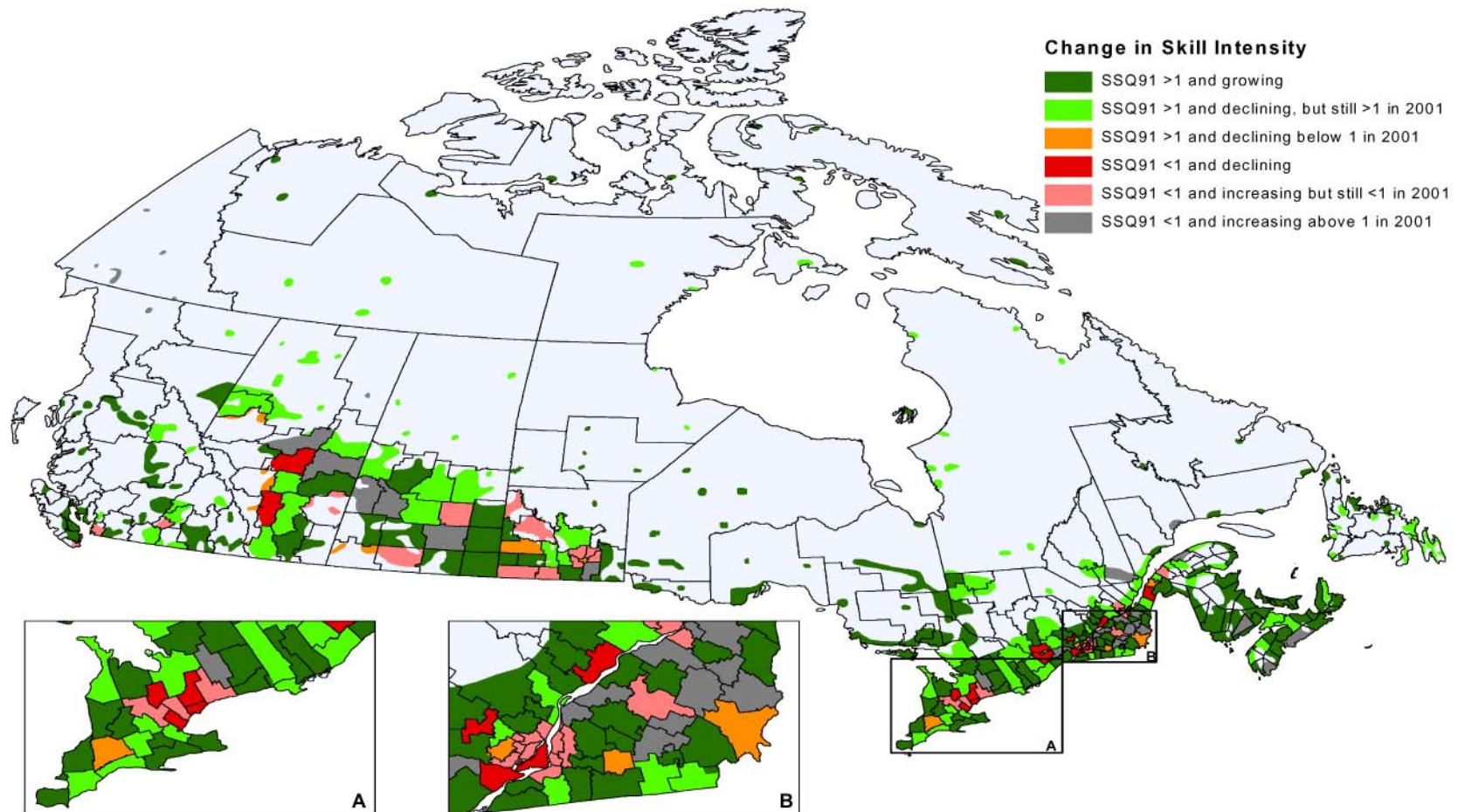
Map 6. Change of professional occupations intensity, 1991 - 2001



Source: Statistics Canada, Census of Population, 1991 & 2001.

Map produced by Spatial Analysis and Geomatics Applications (SAGA), Agriculture Division, Statistics Canada, 2004.

Map 7. Change in unskilled occupations intensity, 1991 - 2001



Source: Statistics Canada, Census of Population, 1991 & 2001.

Map produced by Spatial Analysis and Geomatics Applications (SAGA), Agriculture Division, Statistics Canada, 2004.

Appendix B: Statistical tables

Table 1: Change in employment by industry and skill level, 1991 - 2001

Total employment by industry, 1991 - 2001			
Industry	1991	2001	Percent change
Agriculture and related services	521,335	456,075	-13
Other primary (fishing, hunting, forestry, mining, gas and oil)	346,680	319,210	-8
Manufacturing - natural resources related	540,215	575,020	6
Manufacturing - labour intensive	386,135	409,895	6
Manufacturing - scale-based	722,845	710,250	-2
Manufacturing - product-differentiated plus science-based	434,915	514,280	18
Construction	933,425	920,390	-1
Distributive services	1,675,340	1,938,410	16
Business services	1,612,975	2,146,780	33
Consumer services	3,548,325	3,903,630	10
Public services	3,498,045	3,682,615	5

Total employment by occupational skill group, 1991 - 2001			
Occupational skill group	1991	2001	Percent change
Managerial	1,383,405	1,620,905	17
Professional	1,866,910	2,530,910	36
Technical	4,256,890	4,341,510	2
Intermediate	4,761,010	5,002,100	5
Unskilled	1,952,015	2,081,145	7

Source: Statistics Canada, Census of Population, 1991 and 2001

Table 2: Skill specialization quotient by type of region, Canada, 1991, 1996 and 2001

Regional type	Occupational skills group														
	Managerial			Professional			Technical			Intermediate			Unskilled		
	1991	1996	2001	1991	1996	2001	1991	1996	2001	1991	1996	2001	1991	1996	2001
Predominantly urban	1.06	1.06	1.06	1.11	1.11	1.12	0.96	0.96	0.95	1.00	0.99	0.99	0.94	0.94	0.92
Intermediate	0.99	1.00	0.99	0.98	0.97	0.96	1.03	1.02	1.02	0.99	1.00	1.00	1.00	0.99	1.01
Rural metro-adjacent	0.92	0.92	0.93	0.83	0.81	0.80	1.04	1.03	1.05	1.01	1.03	1.03	1.08	1.08	1.08
Rural non-metro-adjacent	0.86	0.87	0.86	0.79	0.79	0.75	1.06	1.06	1.08	1.00	1.00	1.01	1.13	1.14	1.16
Rural northern	0.90	0.93	0.92	0.78	0.82	0.78	1.08	1.07	1.06	0.95	0.94	0.97	1.23	1.22	1.27

Source: Statistics Canada, Census of Population, 1991, 1996 and 2001

Table 3: Skill specialization quotient by macro-regions, Canada, 1991, 1996 and 2001

	Occupational skills group														
	Managerial			Professional			Technical			Intermediate			Unskilled		
	1991	1996	2001	1991	1996	2001	1991	1996	2001	1991	1996	2001	1991	1996	2001
Atlantic Provinces	0.85	0.89	0.88	0.86	0.86	0.84	1.02	1.02	1.02	1.03	1.01	1.01	1.14	1.15	1.21
Quebec	0.99	0.97	0.91	1.02	1.03	1.00	1.02	1.04	1.05	0.99	0.98	1.00	0.98	0.96	0.98
Southern Ontario	1.05	1.07	1.09	1.06	1.06	1.08	0.95	0.94	0.94	1.01	1.01	1.00	0.98	0.98	0.96
Northern Ontario	0.90	0.91	0.93	0.84	0.85	0.84	1.12	1.09	1.08	0.94	0.95	0.95	1.11	1.12	1.18
Prairie Provinces	0.99	0.92	0.98	0.96	0.95	0.95	1.03	1.04	1.03	0.99	1.00	1.01	0.99	1.02	0.99
British Columbia	1.00	1.04	1.02	0.98	0.98	0.98	1.02	1.00	1.01	1.00	1.00	0.99	0.98	1.00	1.00
Territories	1.28	1.22	1.28	0.83	0.89	0.86	1.04	1.05	1.01	0.92	0.90	0.91	1.14	1.13	1.18

Source: Statistics Canada, Census of Population, 1991, 1996 and 2001

Table 4: Percent distribution of employment by occupational skill group within each region, Canada, 2001

	Predominantly urban regions	Intermediate regions	All predominantly rural regions	Rural metro-adjacent regions	Rural non-metro-adjacent regions	Rural northern regions
Managerial	11.5	10.2	8.7	9.1	8.1	8.8
Professional	19.4	15.5	11.2	11.6	10.5	12.8
Technical	25.6	28.2	31.6	31.0	32.6	30.8
Intermediate	31.5	32.3	33.0	33.6	32.6	30.4
Unskilled	12.0	13.7	15.5	14.8	16.1	17.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Statistics Canada, Census of Population, 1991, 1996 and 2001

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