The Nature of Employment in Ontario Municipalities in 2030

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1. Introduction

Our goal in this paper is to present an overview of what we know about likely future employment patterns in employment in the municipal sector in Ontario. We start by providing a brief overview of the somewhat limited existing research on the topic along with a description of the different data sources that can be applied to studying this issue. Next, we present some descriptive evidence on employment in the public sector in Ontario using the 2006 Census of Population [Canada] Public Use Microdata File (PUMF) obtained from the 'ODESI' database. We then generate predictions of employment patterns in the municipal government sector, at five-year intervals between 2006 and 2030, from a simulation that we carried out using data taken from the 2006 Census microdata file; Ontario government sources; and OMERS administrative data (from their 2016 Annual Statement).

In addition, we consider the role that changing age structure and comfort levels with the internet are likely to have on the demand for 'in-person' municipal services in the future. We also consider the changing nature of technology and how that may affect the demand for labour in the municipal sector going forward. For example, the anticipated development of self-driving vehicles and potentially other forms of automation that may lead to a reduction in the number of employees needed especially in areas such as public transit.

In the final part of our paper, we provide a list of data shortcomings and topics where our analysis could be improved through future work to improve the quality of our predictions.

2. Review of the Literature

We have reviewed the literature and found a number of studies that shed light on the challenges that municipal governments in Ontario may face in terms of determining their employment levels moving forward and in finding sufficient new workers to replace retiring workers. However, we are surprised that more work does not exist in this area and our search for new studies on the topic is ongoing. We summarize the salient features of several studies below.

Winegard and Hollins (2017) consider the role of an ageing workforce on employment patterns in Ontario going forward. They forecast an increase in retirements over the next 10 years and an increase in life expectancy. Based on meetings with 2000 municipal workers across 100 retirement seminars, they report that municipal workers are generally very happy with their jobs and generally feel comfortable about their expected incomes in retirement. They recommend that employers should move towards more flexible work arrangements allowing some older workers to work fewer hours and have more flexibility in terms of their weekly working hours. They believe that allowing older workers to transition into part time work prior to retirement would benefit both the employee and the employer. Poisson and Wong (2011) make similar recommendations in their study on Canada's ageing workforce. They argue that employers should engage the older generation in order to make it more attractive for them to continue to work beyond the traditional retirement age.

Carson (2009) deals directly with the issue of managing succession planning in the municipal sector of Ontario. The results of a survey sent to members of the Ontario Municipal Human Resources Association (OMHRA) suggest that over one third of municipalities provided flexible working arrangements for workers. However, less than one quarter of municipalities were involved in succession planning for senior management. The author argues that succession planning can cut costs by reducing the need to

bring staff back on contract part-time positions after retirement and can facilitate transitions to new senior staff.

A study by the Federation of Canadian Municipalities (2013) identifies several the challenges that municipal governments may face in the future. The population of seniors over age 65 and those over age 85 is projected to rise over the next 20 years with the right with roughly 24% of the population being in the over 65 range. They also report that the labour force replacement ratio is 0.84 which is well below the rate of replacement of 1.0 needed for the number of young people coming into the labour market to fill positions of those expected to retire.

3. Projections: The Demographics of the Public Administration Sector from 2006 to 2030

To understand the nature of employment in the Public Administration sector, we must have an idea of the shape of the sector in the past and the possible path that the sector will follow in the future. Canada has a Census Program which aims to provide a statistical representation of the country every five years. In this paper, to highlight possible changes in the demographics of workers, we forecast and analyse changes in the sector from 2006 to 2030 based on the 2006 Census of Population [Canada] PUMF Individuals File obtained from the 'ODESI' database. The file consists of 844,476 records and represents 2.7% of the Canadian population. Using the weights provided in the Census, it is estimated that there were 31,241,030 people in Canada in 2006[1].

There have been two censuses carried out in Canada since 2006. We chose not to use the 2011 Census microdata since the long form which contains much of the demographic questions was voluntary which raises concerns about the representativeness of the respondents as a group. The 2016 Census long form was mandatory but the data files were not yet available as of the time of writing this paper. It would be interesting to update the analysis once the long form 2016 Census of Population [Canada] PUMF Individuals File is available.

The results follow in the subsections below.

3.1 The Ontario Population in 2006

Given the representation of all provinces in the census and our focus on Ontario, first we filter the 2006 Census of Population [Canada] PUMF Individuals File so that it includes only those who were recorded as living in Ontario. This leaves us with a total of 324,751 records in the sample. These records are representative of the 12,014,025 people who lived in Ontario at the time of the 2006 Census.

There are some interesting findings regarding the Ontario population. First, it is estimated that 18% of the population was aged 14 years or younger while 13% were aged 65 years and up. Individuals of working age (i.e. those in the 15 to 64 age group) made up 69% of Ontario's population.

[1] The microdata file contains a variable called 'WEIGHT' (weighting factor for individuals) which corresponds to the number of units (including the selected unit) represented by each record in the file. The average value of the WEIGHT variable is 36.99457415.

In 2006, the census metropolitan areas (CMAs) categories included: Ottawa – Gatineau; Oshawa; Toronto; Hamilton; St Catharines – Niagara; Kitchener; London; Windsor; Brantford – Guelph – Barrie; Kingston – Peterborough; Greater Sudbury / Grand Sudbury – Thunder Bay; and Other CMAs and census agglomerations (CAs). Most people (42%) lived in Toronto. The share of the Ontario population that was of working age and lived in each of the CMAs ranged between 2.17% (Kingston – Peterborough) to 43.05% (Toronto). The greatest share of the Ontario population who were aged 65 and over lived in Toronto (37.31%) while the lowest resided in Oshawa (2.44%).

In terms of the age structure within each of the CMAs, we find that the share of those living in the CMA of a working age ranged between 66.9% to 70.6% with St Catharines ranking lowest whilst Ottawa – Gatineau, Toronto and Kitchener ranked highest. The modal age for most CMAs was between 40 to 49 years. The percentage of people aged 65 and over within each CMA ranged between 16% (Kingston – Peterborough) and 11% (Kitchener). The least births took place in Kingston – Peterborough (16.2%) and the most in Oshawa (20.8%).

3.2 The Public Administration Sector in 2006

The 2006 Census questions respondents about which industry they worked in for the longest duration from January 1, 2005 to May 16, 2006, based on the 2002 North American Industry Classification System (NAICS 2002)[2]. The NAICS classification groups industries into 20 sectors, 103 subsectors and 328 industry groups. The question in the census relates to the 20 sectors which are each given a 2-digit code in the NAICS classification. Subsectors are usually given a 3-digit code. Under the NAICS classification system, the Public Administration Sector (code 91) has five subsectors: Federal Government Public Administration[3] (code 911); Provincial and Territorial Public Administration (code 912); Local, Municipal and Regional Public Administration (code 913); Aboriginal Public Administration (code 914); and International and Other Extra-Territorial Public Administration (code 919). Table 2810051[4] in Statistics Canada's CANSIM database records annually the number of persons employed, unadjusted for seasonal variation, by type of employee for selected industries classified using NAICS. According to the table there were 250,971 people employed in the Public Administration sector in the year 2000 of which 2.91%, 38.14%, 19.62%, and 39.34% worked in the Aboriginal Public Administration; Local, Municipal and Regional Public Administration; Provincial and Territorial Public Administration; and Federal Government Public Administration subsectors, respectively. These proportions were quite stable through 1991 to 2000. This suggests that the Local, Municipal and Regional Public Administration subsector is the second largest employer of public administration workers. In our simulations, we incorporate OMERS administrative data on the number of municipal employees by region of Ontario to compensate in part for the lack of detail on the Local, Municipal and Regional Public Administration subsector in the 2006 Census PUMF[5].

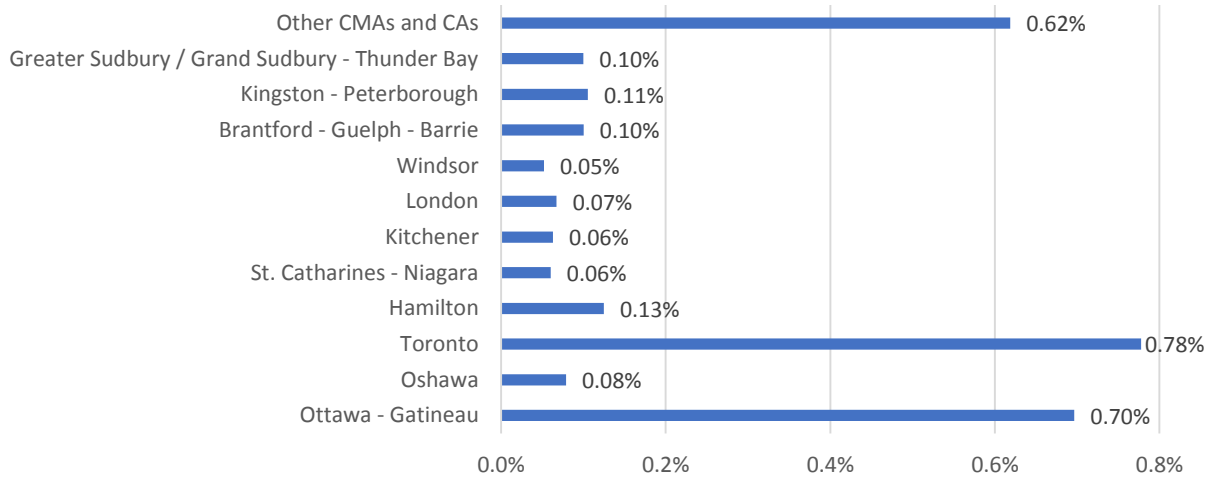
We filter the 2006 Census of Population [Canada] PUMF Individuals File so that it includes only those who lived in Ontario; only those who worked in Ontario and in Canada; and only those who worked in

[2] Persons with two or more jobs report for the job in which they worked more hours.
[3] Defense services are included as an industry group under the Federal Government Public Administration subsector.
[4] Note that this table contains data for 1991 to 2000 and has now been terminated.
[5] See section 3.3.

the Public Administration sector. We also include only those who are recorded as being employed in the week prior to the Census day.

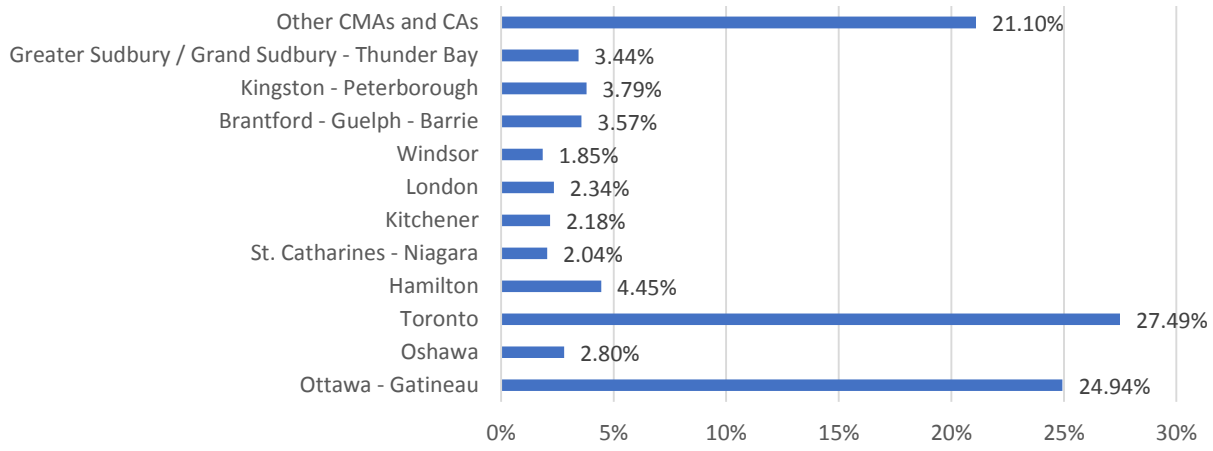
There is a great deal of variability across the CMAs in terms of the number of public administration employees, which is not surprising given the differences in the sizes of the CMAs and the fact that Toronto and Ottawa – Gatineau are major centres for public administration (being the provincial and federal capitals, respectively). Of all 12,014,025 respondents in the Census PUMF, 0.78% lived in Toronto and worked for the sector and 0.7% lived in Ottawa – Gatineau and worked for the sector (see figure 1).

Figure 1: Share of Ontario Working Population Residing in Each CMA, 2006



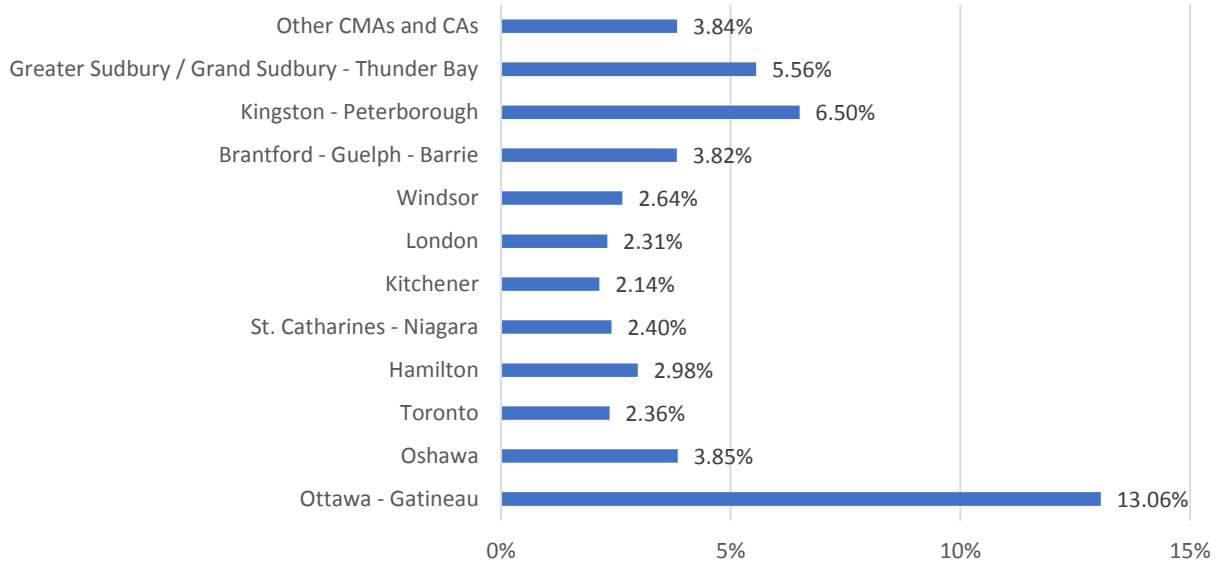
In 2006, most of the 309,423 employees in the Public Administration sector who responded in the census resided in Ottawa – Gatineau (24.94%) and Toronto (27.49%).

Figure 2: Share of Total Workers in Ontario Public Administration Sector Residing in Each CMA, 2006



It is interesting to think of these jobs as a fraction of all employment in the public-sector to try to account for the differences in population residing in each of the CMAs. 13.06% of people of working age (15 to 64 years) residing in Ottawa – Gatineau were employed in the Public Administration sector.

Figure 3: Share of Working Population in Each CMA Working in Public Administration, 2006



In 2006, the modal age group of workers in the sector was 40 to 44 years. In the 1981 Census of Population [Canada] PUMF Individuals File, the modal age group for workers in the sector was 30 to 34 years which is almost a decade younger than in 2006. 98.9% of the workers were aged 15 to 64 years.

3.3 Projections of the Municipal Government Workforce from 2006 to 2030

Next, we carry out a set of projections, based primarily on the 2006 Census microdata, designed to map out how employment in the municipal sector in Ontario is likely to evolve through to 2030. As described above, we filtered the 2006 Census of Population [Canada] PUMF Individuals File to include only those who lived and worked in Ontario (Canada) in the Public Administration sector. We then predict employment for the years 2010, 2015, 2020, 2025 and 2030.

For simplicity, we assume that between 2006 and 2030, all public-sector workers who do not retire will remain in their jobs (and not change their occupation). At the end of each five-year interval, those aged 64 and younger are assumed to continue working over the next five years. However, we assume that half of those aged 65 to 69 years will retire while the others continue to work for at least another five years. All of those aged 70 and over are also assumed to retire at the end of the five-year period. If an individual retires then we assume that s/he is replaced by someone aged between 25 to 29 who has the same personal characteristics[6] as the retiree. This ensures that there are enough workers for the public

[6] Only the age group of the individual changes. So, for example, the occupation and other characteristics (e.g. highest education level), remain the same as when they were in the 65 to 69 or 70 and over age groups.

sector to continue its services. For simplicity, we further assume no new young hires are added to the 15 to 19 age group each year. This process enables us to obtain the age distribution of workers in the public sector at each five-year increment.

To obtain a more realistic distribution, we multiply the age distribution for 2006 by the weight included in the microdata file. For 2010 to 2030, we scale the numbers up using the Ontario Ministry of Finance population projections[7] assuming that the ratio of public sector workers to the Ontario population remains the same as in the 2006 Census (2.58%). The idea behind this benchmarking is that as the Ontario population grows, it seems reasonable that the demand for municipal services would grow proportionately and that this would be captured in our simple simulation by scaling up the total municipal employment proportionately.

We then use data from OMERS 2016 Annual Statements on the number of active members[8] to estimate the number of municipal government workers in 2006 to 2030. To do this we assume that the share of the Ontario population working in the public sector (2.58%) remains the same as in the 2006 Census and use this to find the number of public sector workers in 2016 with the help of the Ontario Ministry of Finance's population projection for 2016. The number of workers in the municipal government is then found by multiplying the share of public sector workers who work for the municipal government in 2016 (128,305 / 360,133 = 36%) by the total number of public sector workers in 2006 to 2030. We assume that the age structure in the public sector also applies to the municipal government.

Table 1: Number of Municipal Government Workers in Ontario, 2006 to 2030

Age Group	2006	2010	2015	2020	2025	2030
15 to 24 Years	8,607	2,464	0	0	0	0
25 to 29 Years	9,582	7,911	5,146	8,907	17,756	23,342
30 to 34 Years	10,966	10,476	8,310	5,526	9,410	18,710
35 to 39 Years	13,786	11,989	11,004	8,923	5,839	9,916
40 to 44 Years	17,622	15,073	12,593	11,816	9,428	6,152
45 to 49 Years	17,411	19,266	15,832	13,522	12,484	9,934
50 to 54 Years	16,607	19,036	20,237	17,000	14,287	13,155
55 to 59 Years	10,650	18,157	19,995	21,730	17,962	15,055
60 to 64 Years	3,783	11,643	19,072	21,470	22,959	18,927
65 Years and Over	1,226	4,510	14,410	27,045	33,503	36,153
Total	**110,238**	**120,525**	**126,599**	**135,939**	**143,630**	**151,344**

Table 2: Number of Retirements in the Municipal Government in Ontario, 2006 to 2030

	2006	2010	2015	2020	2025	2030
Total Retirements	890	2,442	8,295	16,805	22,161	24,057

[7] These projections can be found at https://www.fin.gov.on.ca/en/economy/demographics/projections/table1.html. For 2020 to 2030, we use the reference scenario.

[8] We assume that the number of active members is the same as the number of municipal government employees.

Our simulation indicates that while the share of the working population (those in the 15 to 64 age group) in the municipal government is estimated to decrease between 2006 to 2025 from 1.042% to 0.885%, the share is then expected to rise to 0.907% in the year 2030 (see figure 4).[9]

Figure 4: Share of Working Population Working in Municipal Government, 2006 to 2030

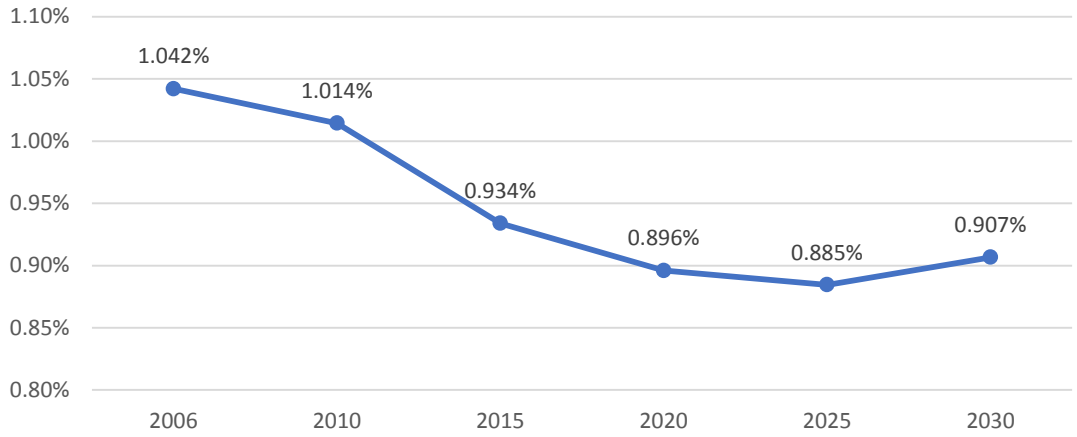
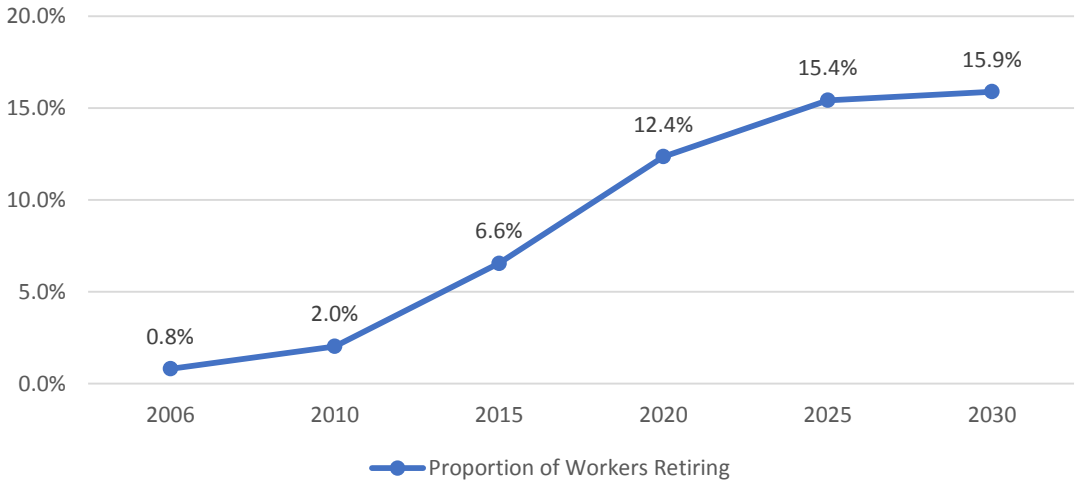


Figure 5: Projected Retirements Occuring Each Year, 2006 to 2030



As can be seen from figure 5, the number of retirements at the end of each 5-year period will increase from approximately 0.8% to 15.9% by 2030.

[9] We assume that the age distribution for the Ontario population in 2006 is as given in the census. For 2010 and 2015, we use the age distribution in 2006 to determine the number of people in age group using the Ontario Ministry of Finance population projections to determine the total number of people in Ontario. The age distribution of the 2020 to 2030 Ontario populations are based on Ontario Ministry of Finance population projections found at https://www.fin.gov.on.ca/en/economy/demographics/projections/table6.html.

We also have access to OMERS regional data on the age distributions of active members (/municipal government workers) in 2016. There are 6 zones in Ontario: East; Far North; Greater Toronto Area (GTA); North; South; and West. A summary of the zones, and regions is provided in table 3.

Table 3: Regional Information, OMERS 2016 Annual Statement

Zone	Region
East	Frontenac, Hastings, Lanark, Leeds & Gren, Lennox & Add, Northumberland, Ottawa - Carlton, Peterborough, Pres - Russell, Renfrew, S, D, & Glengarry
Far North	Algoma, Cochrane, Kenora, Manitoulin, Rainy River, Thunder Bay, Timiskaming
GTA	Durham, Peel, Toronto, York
North	Bruce, Grey, Haliburton, Kaw lakes, Muskoka, Nipissing, Parry Sound, Simcoe, Sudbury
South	Brant, Elgin, Ham - Went, New Haldimand, Niagara, Norfolk
West	Perth, Waterloo, Chat-Kent, Dufferin, Essex, Halton, Huron, Lambton, Middlesex, Oxford, Wellington

We calculate the age structure for each region in every year based on the age distribution provided in the OMERS 2016 Annual Statement. For example, to find the number of municipal workers in the 15 to 24 age group in the East region in 2006, we multiply the share of municipal workers in the 15 to 24 age group in the East region in 2016 by the total number of municipal workers in that age group in 2006.

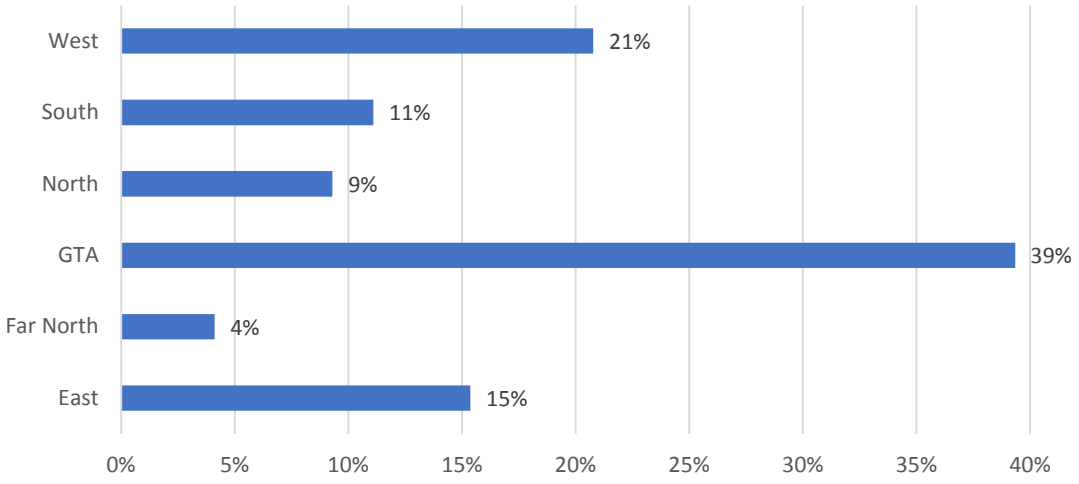
The total number for all ages by region from 2006 to 2030 is provided in table 4:

Table 4: Total Number of Workers for All Ages by Region, 2006 to 2030

	East	Far North	GTA	North	South	West	Total
2006	16,941	4,528	43,375	10,253	12,236	22,905	**110,238**
2010	18,201	4,924	48,354	11,065	13,509	24,472	**120,525**
2015	18,792	5,044	52,176	11,375	14,236	24,977	**126,599**
2020	20,081	5,247	57,197	12,039	15,219	26,155	**135,939**
2025	21,416	5,422	60,760	12,736	16,050	27,245	**143,630**
2030	22,830	5,658	63,825	13,500	16,882	28,650	**151,344**

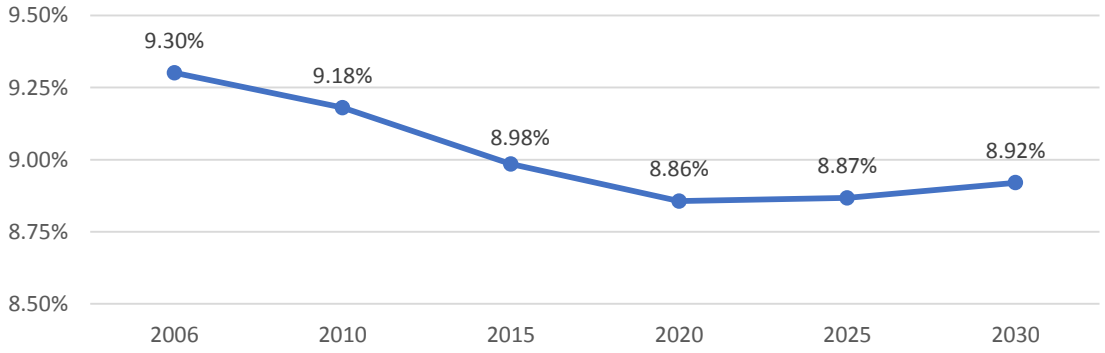
Figure 6 illustrates that, in 2006, most municipal government workers worked in the GTA region as also indicated in table 4.

Figure 6: Share of Municipal Government Workers in Each Region, 2006



Between 2010 and 2030, the proportion of municipal government workers[10] in the North; Far North; and West is expected to fall. The proportion in the GTA is expected to rise. That in the East is likely to fall between 2006 and 2020 then rise between 2020 and 2030. The proportion in the South is projected to rise between 2006 and 2015 then steadily fall thereafter. See figures 7 to 12 for illustrations of the aforementioned trends.

Figure 7: Proportion of Municipal Government Workers in the North Region, 2006 to 2030



[10] The share of municipal government workers working in a region out of the total municipal government workers in a particular year.

Figure 8: Proportion of Municipal Government Workers in the Far North Region, 2006 to 2030

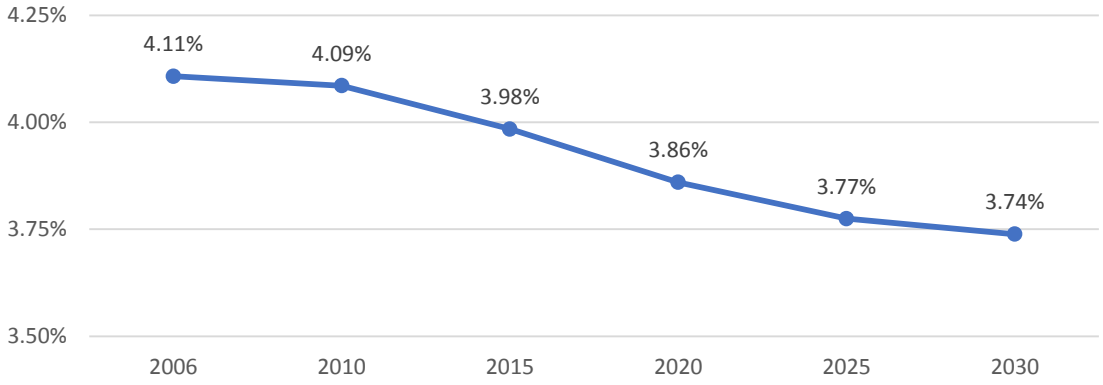


Figure 9: Proportion of Municipal Government Workers in the East Region, 2006 to 2030

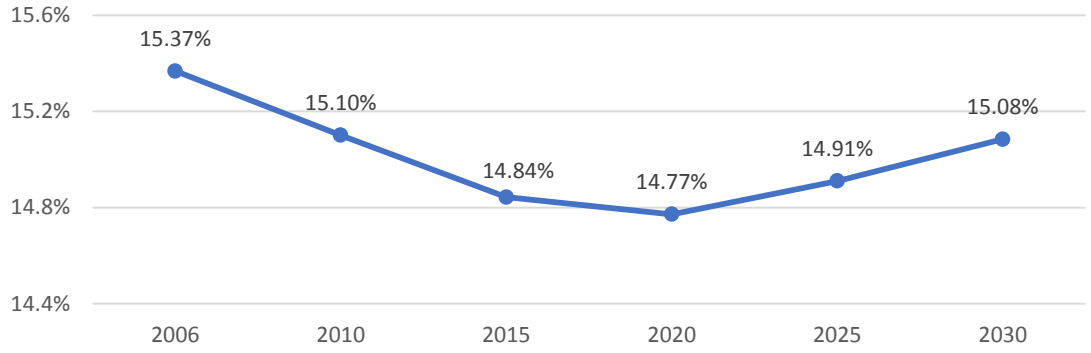


Figure 10: Proportion of Municipal Government Workers in the South Region, 2006 to 2030

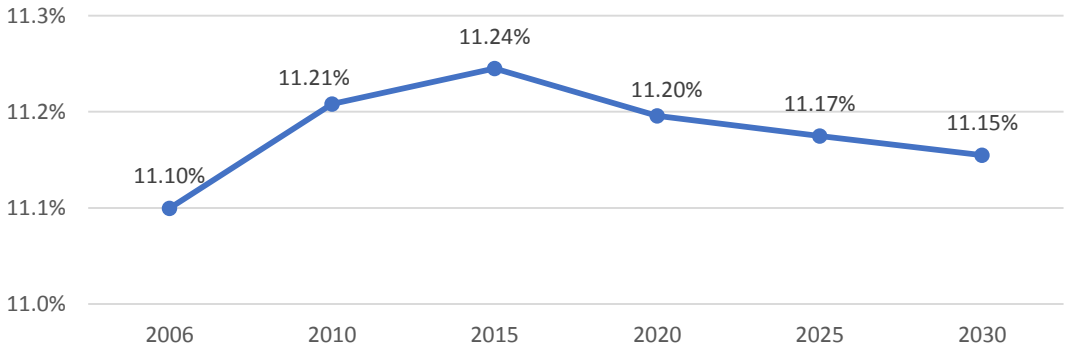


Figure 11: Proportion of Municipal Government Workers in the West Region, 2006 to 2030

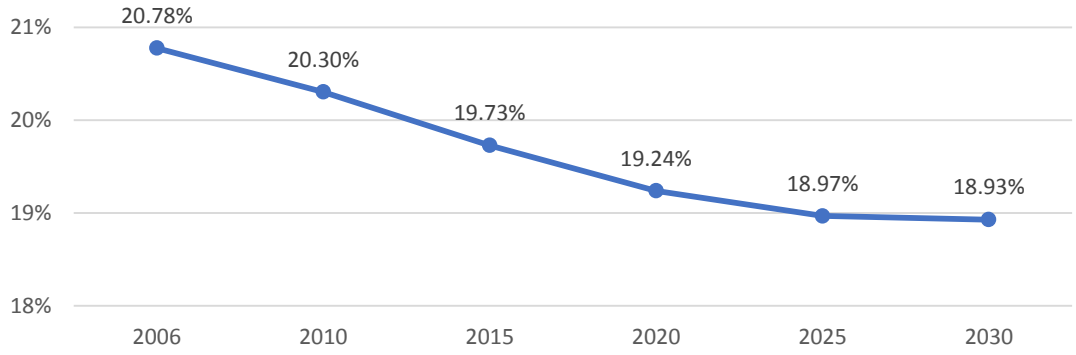
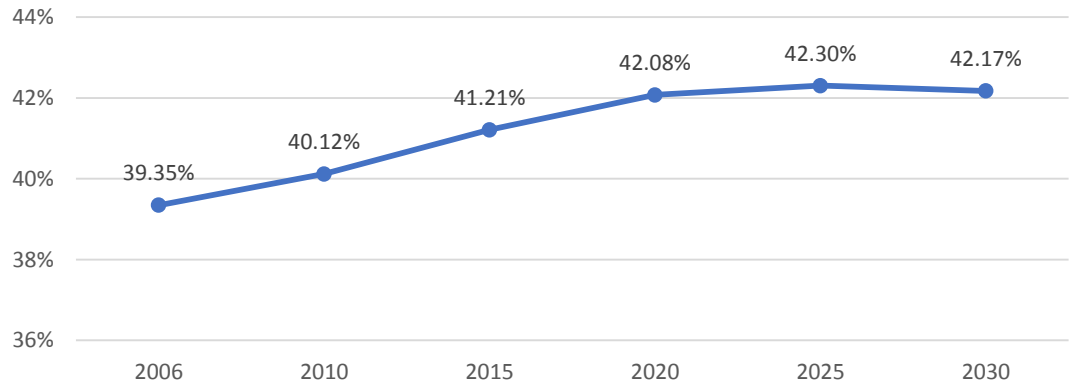
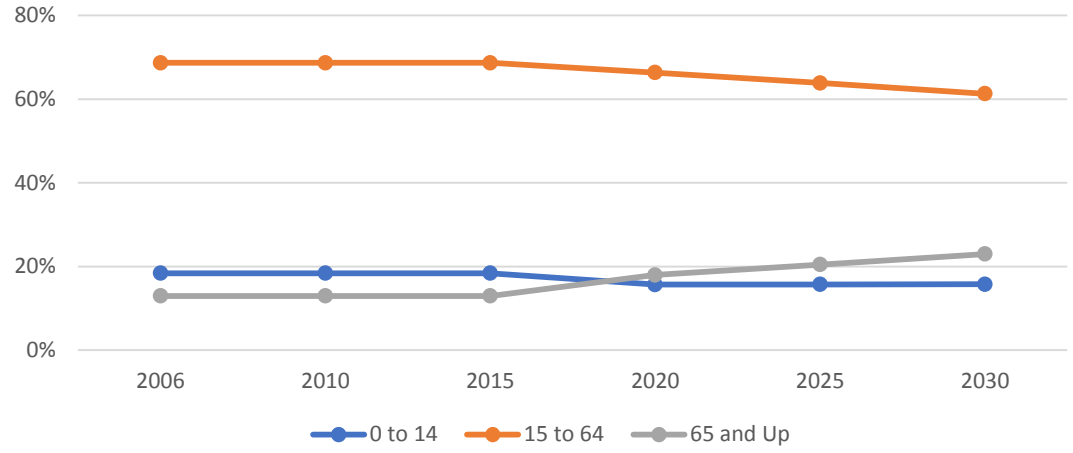


Figure 12: Proportion of Municipal Government Workers in the GTA Region, 2006 to 2030



The changes in the workforce may not only be because the number of municipal government workers is projected to rise but may also be due to changes in the age structure of the population between 2006 and 2030. Between 2006 and 2030, it is projected that there will be an increase in the number of those at retirement age (i.e. those aged 65 and over) and a decrease in those of working age (15 to 64 years). The share of the population which is of working age is set to decrease from 69% to 61%. According to the estimates, 13% of the population were of retirement age in 2006 while almost double (23%) are projected to reach that age group in 2030. This trend is illustrated in figure 13:

Figure 13: Proportion of Population Aged 0 - 14, 15 - 64, and 65+ in Ontario, 2006 to 2030



The graph above further captures the possibility that while between 2006 and just before 2020, there will be more people being born than retiring, the trend will switch such that by 2030, there will be a growing number of people retiring than being born. This could quite possibly to be due to the baby boomer generation[11].

Figure 14: Changes in Relative Proportions by Age Group Between 2006 and 2030 of Ontario Population

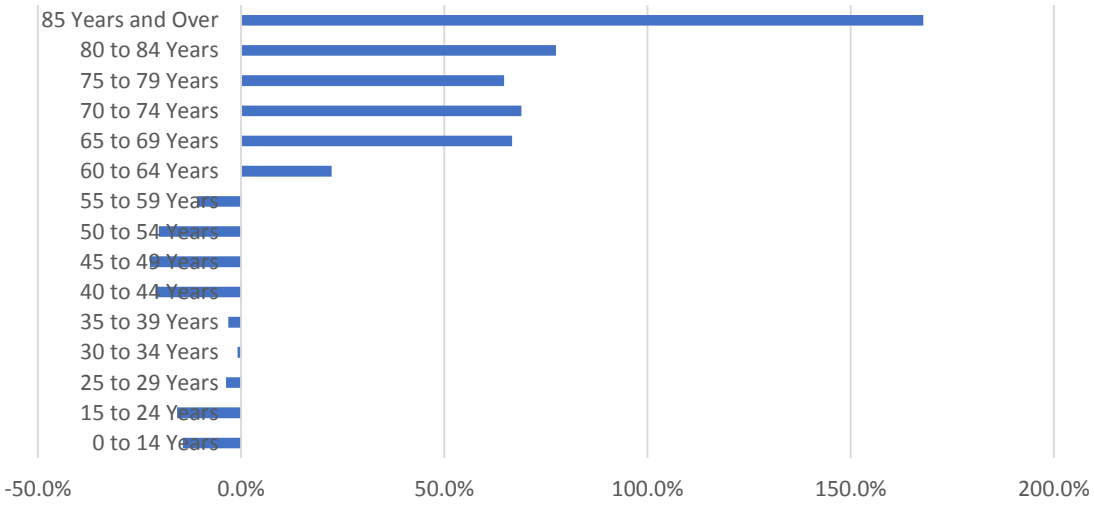
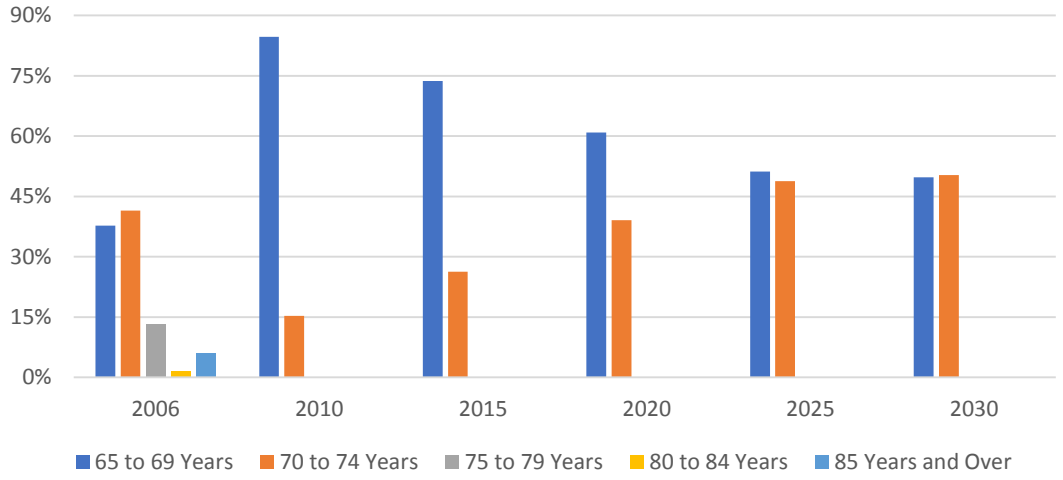


Figure 14 (above) shows that between 2006 and 2030, the 60 and over age groups will experience growth while the proportion of each of the other age groups will decline.

[11] See McFarland et al. (2015).

Figure 15: Number of Municipal Government Workers Retiring by Age Group, 2006 to 2030



In 2006, most retirements[12] were probably from the 70 to 74 age group. This changed substantially in 2010. In 2010, 85% of retirees from the sector were likely to be aged 65 to 69 years. The number of people retiring in the 70 to 74 age year group is expected to increase while those retiring at 65 to 69 years will reduce until the number in both groups converge in 2030 (figure 15).

Splitting employees into groups based on the type of occupation that employees performed (namely managers and supervisors; professionals; administrative and clerical personnel; all other roles), highlights that most employees aged 65 years and over were managers and supervisors.

Table 5: Proportion of Occupations Performed by Workers in the 15 to 64 Years and 65 and Over Age Groups

Year	Age Group	Managers and Supervisors	Professionals	Administrative and Clerical Personnel	All Other Roles
2006	15 to 64 Years	98.47%	98.92%	98.91%	99.00%
	65 and Over	1.53%	1.08%	1.09%	1.00%
2030	15 to 64 Years	73.18%	76.73%	76.52%	76.42%
	65 and Over	26.82%	23.27%	23.48%	23.58%

We find that most retirees in 2006 were people employed in roles other[13] than managers and supervisors; professionals; and administrative or clerical personnel[14]. In 2030, 26.8% of retirees will be

[12] Total retirements at the end of a period, say 2006, is calculated as the sum of half of those aged 65 to 69 years and all those aged 70 and over.

[13] The 'All Other Roles' category includes semi-professionals and technicians; skilled sales and service personnel; skilled crafts and trades workers; intermediate sales and service personnel; semi-skilled manual workers; other sales and service personnel; and other manual workers.

administrative and clerical personnel, 24.1% professionals and 14.6% managers and supervisors but most will be in other roles.

One potential issue for our analysis to date is that as of December 12th, 2006, mandatory retirement was abolished in Ontario. This could lead to substantially different retirement behaviour in subsequent years. We are considering how best to incorporate this into our analysis.

Figure 16: Retirements by Occupation as a Share of Total Retirements, 2006 vs. 2030

In 2006, most workers worked full time. It is expected that there will be a rise in the share of employees who work part time while there will be a fall in those who work full time in 2010. However, from 2015 to 2030, the share of employees who are full time workers will be greater than those working part time. The percentage of those aged 15 to 64 working part time is projected to rise and those full time to fall. The rise in part time workers highlights the possible need for flexible working opportunities in the

[14] The availability of occupation information is an advantage of the Canadian Census data over the OMERS administrative data which we understand does not have information on job type.

future. The share of those aged 65 years and older working part time is expected to fall from 39% to just 4% while those working full time rise from 61% to 96%.

Figure 17: Share of Employees Working Full Time and Part Time, 2006 to 2030

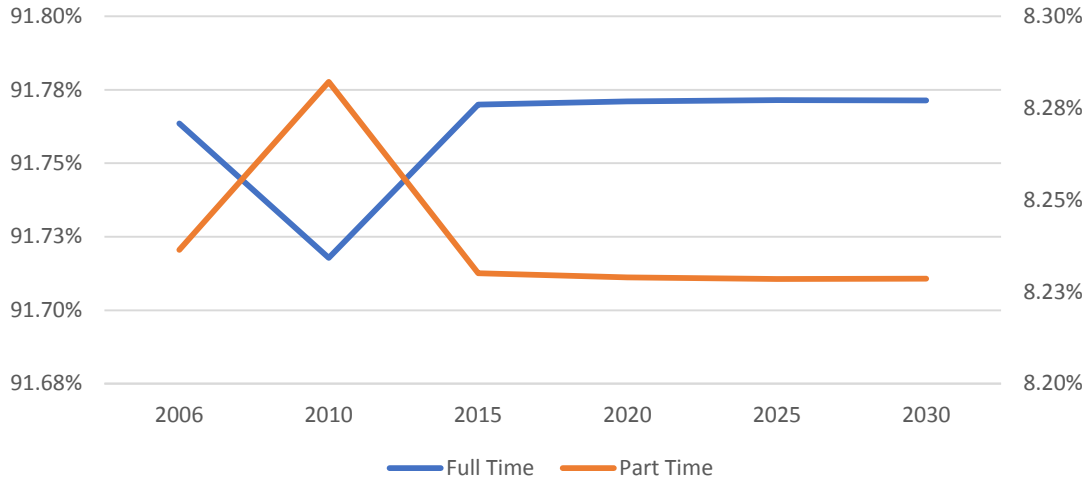


Figure 18: Share of the15 to 64 Years and 65 Years and Over Age Groups Working Full Time, 2006 vs. 2030

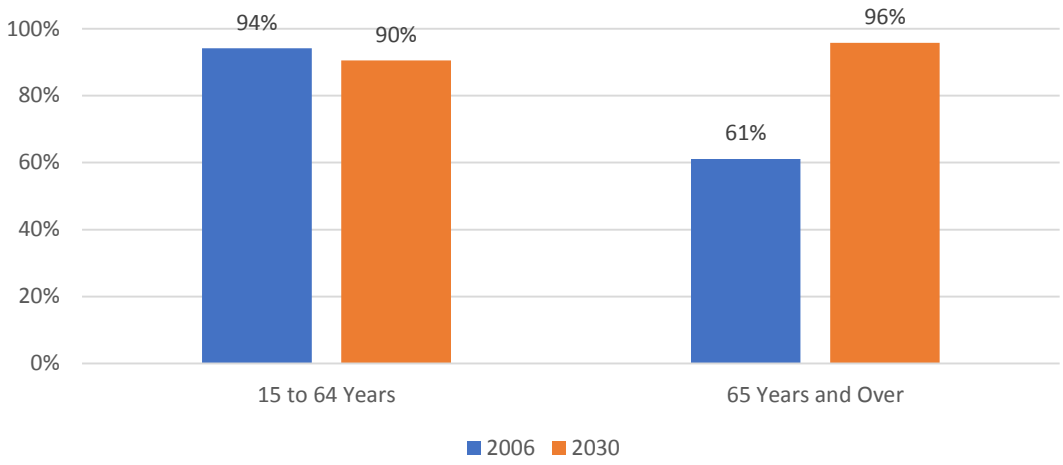
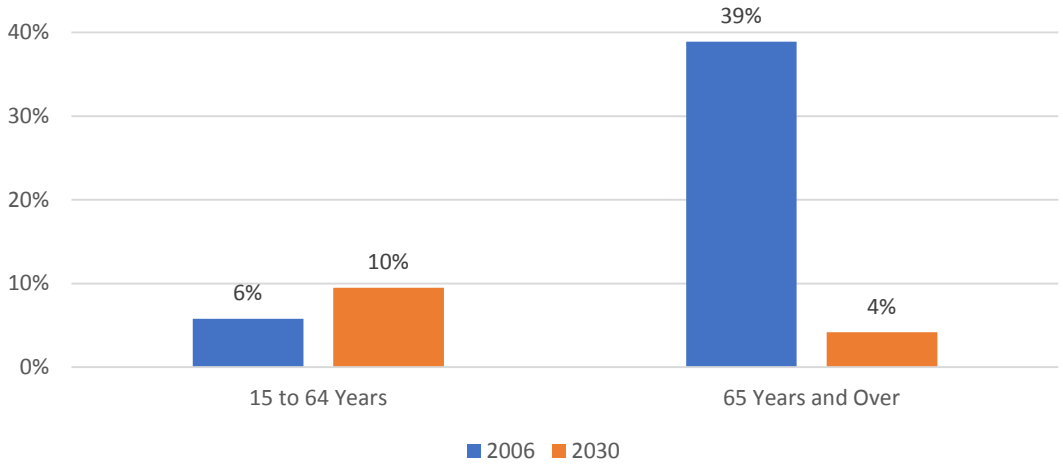


Figure 19: Share of the15 to 64 Years and 65 Years and Over Age Groups Working Part Time, 2006 vs. 2030



In 2006, it is estimated that 17.03% of municipal government workers were immigrants and non-permanent residents. This share is expected to increase to 18.93% in 2030 highlighting the possibility that there may be a further reliance on people who are not Canadian citizens or permanent residents to make up for the possibly shrinking working age Ontario population.

Figure 20: Immigration Status of Municipal Government Workers, 2006

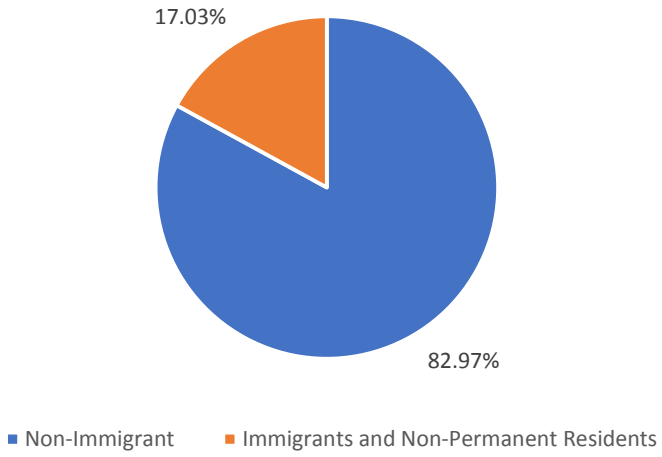
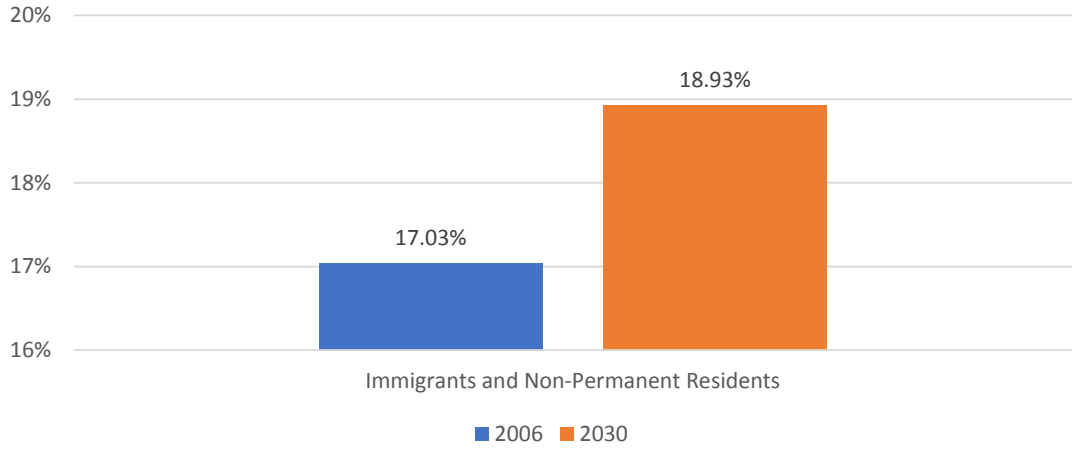
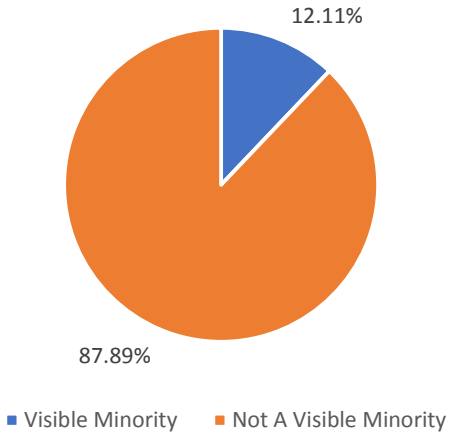


Figure 21: Share of Municipal Government Workers That Are Immigrants and Non-Permanent Residents, 2006 vs. 2030



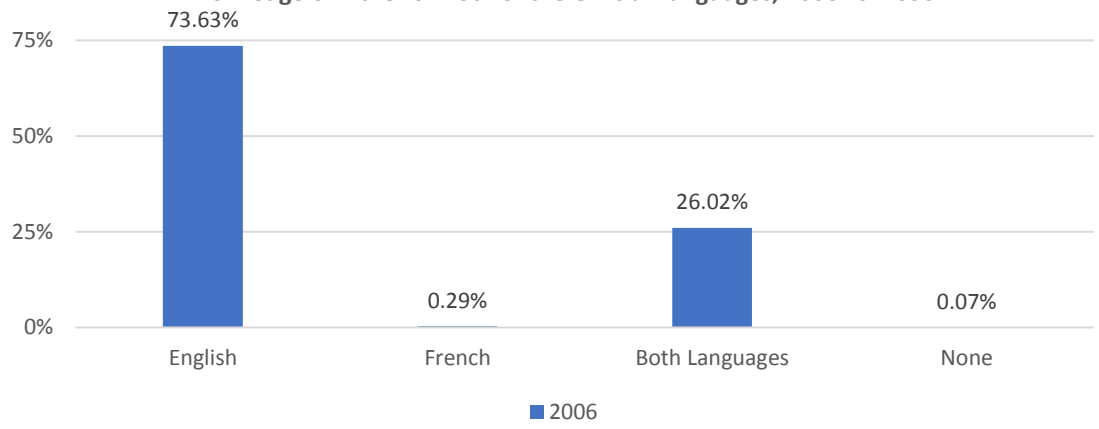
Related to the issue of immigration is the fact that in 2006, 12.11% of Public Admin workers were likely to have been visible minorities and this percentage is expected to remain steady in 2030. The greatest number of visible minorities are either South Asian (e.g. East Indian, Pakistani, Sri Lankan, etc.), Black or Chinese. This 2030 prediction is likely to be a lower bound on the actual number given the fact that the proportion of people in the Ontario population who are members of visible minority groups has ben rising across time. Our simulation replaces retired workers with younger workers (aged 25 to 29) with the same characteristics. Ideally, our simulation should be adjusted to account for the fact that among more recent birth cohorts, the fraction of people who are members of visible minority groups is higher than was the case for earlier birth cohorts and this will tend to push the fraction who are visible minorities in future years higher.

Figure 22: Share of Municipal Government Workers Who Are Visibile Minorities vs Those Not A Visibile Minority, 2006



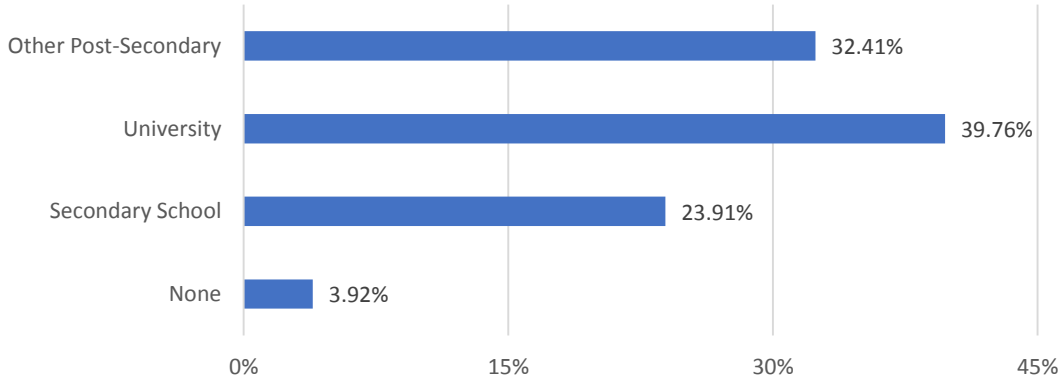
Continuing the issue of diversity, 2.95% of workers in 2006 are estimated based on the Census records to have had an Aboriginal identity while 97.05% did not. The greatest number identified themselves as North American Indians. The results indicate similar proportions in 2030.

Figure 23: Share of Municipal Government Workers With Knowledge of Either or Both of the Official Languages, 2006 vs. 2030



73.63% of workers are likely to have reported knowledge of only English; 0.29% reported only knowledge of French; and 26.02% knowledge of both official languages in 2006. The shares should remain relatively unchanged in 2030.

Figure 24: Share of Municipal Government Workers Under Each Highest Education Qualification Category, 2006



Most municipal government workers are expected to be highly educated. In 2006, 39.76% possibly had a qualification earned at the university[15] and 32.41% had other post-secondary[16] qualifications. Over half (58%) of those with a university qualification had a Bachelor's degree. 23.91% of workers had at least a high school graduation certificate or equivalent and 3.92% of them had not achieved any educational qualification. The proportions are expected to be the same in 2030. This result should be viewed with some caution since the nature of the simulation is such that a retired worker is replaced with a worker with the same personal characteristics (including highest educational qualification). If there is a trend

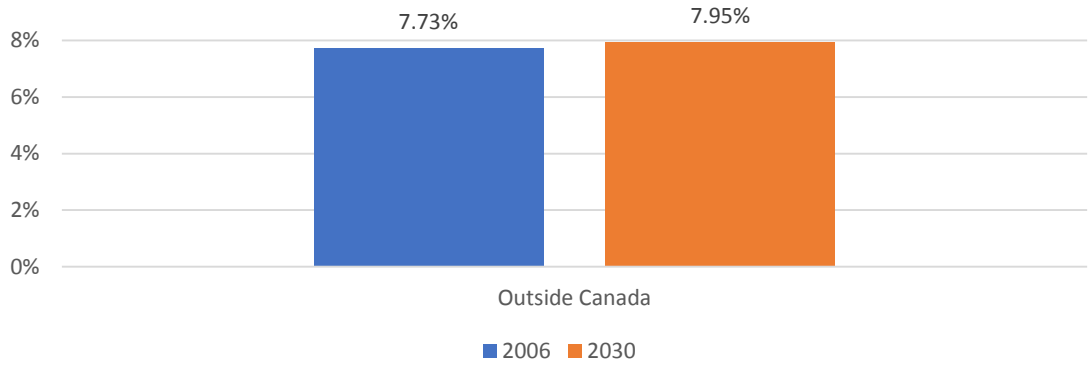
[15] 'University' includes a university certificate or diploma below bachelor level; Bachelor's degree; university certificate or diploma above bachelor level; degree in medicine, dentistry, veterinary medicine or optometry; Master's degree; and earned Doctorate degree.

[16] 'Other Post-Secondary' includes a trades certificate or diploma; registered apprenticeship certificate; and college, CEGEP or other non-university certificate or diploma.

towards higher education levels across birth cohorts, we would expect to see rising education levels in the municipal sector as well.

In 2006, 92.27% of workers had studied for their highest educational qualification in Canada. The percentage of those workers with qualifications from outside Canada is projected to rise from 7.73% in 2006 to 7.95% in 2030.

Figure 25: Share of Municipal Government Workers Who Completed Their Highest Qualification Outside Canada, 2006 vs 2030



3.4 Possible Future Improvements to the Simulations

Above, we presented the predictions from a somewhat simple simulation. In the future, the analysis could be deepened further by exploring a different set of assumptions and data.

We make several strong assumptions regarding the retirement process. At the end of each period, half of those aged 65 to 69 years and all of those aged 70 and over are assumed to retire. If an individual retires then they are replaced with someone aged between 25 to 29 who has the same characteristics as them. Based on feedback we received after completing our simulations, we have learned that the average age of people taking a first job in the municipal sector is older in Ontario – roughly 37 years. Future work should take this into account by considering the sensitivity of the simulations to the hiring of older workers as replacements for retiring workers.

There are other ways in which the simulation could be improved. For example, one could estimate an econometric model of retirement behaviour of municipal employees and use that to forecast which workers will retire at different ages rather than assuming fixed probabilities as we do above. Also, rather than assuming that the replacement workers have the same personal characteristics as the retiring workers, one could randomly draw workers from the younger parts of the age distribution, so long as they had the education and occupation needed to fulfill the job of the retiring worker, and use these workers to replace the municipal workers who are retiring. This would lead to more plausible evolutions of personal characteristic such as visible minority status and education.

We could also investigate the possibility of an early retirement since, though the instances may be few, there are some workers who are eligible to retire at say age 55. Changes in the number of municipal government workers arising due to death and terminations could also be considered.

An analysis using the confidential Census data from 2006 and possibly earlier censuses (2001, 1996, 1991, 1985 and 1981 could potentially be used) accessed through one of the Research Data Centres (such as the Carleton-Ottawa-Outaouais Local Research Data Centre) would have several advantages. For example, the confidential census data would have much more detailed information on occupation. We believe this could allow for the identification of municipal workers from other public administration workers in Ontario. Unfortunately, the tight timeframe for this study precluded the possibility of gaining access to the confidential census data.

4. Factors that Could Affect the Future Municipal Employment in Ontario:

As has already been noted, we have maintained the assumption that the demand for labour in the municipal sector in Ontario will remain fixed as a proportion of the population. Given that the population is forecasted to grow between now and 2030, we are anticipating growth in employment in the municipal sector. However, a number of factors could lead to changing that relationship. On the supply side of the labour market, if there were a relative shortage of workers, that could push up wage costs making it more likely that governments would substitute out of labour and into capital (e.g. computers and other equipment). On the demand side of the labour market, there could be changes in demand for municipal services which could lead municipal governments to either hire more or fewer employees. In the next two subsections, we briefly discuss a few supply side and demand side factors that could be relevant and give an overall indication of how important they are likely to be between now and 2030 for the evolution of employment in the municipal sector in Ontario.

4.1 Supply Side Factors

With the ageing of the large baby boom generation, there is widespread concern about the supply of workers that will be available in the future to fill the number of vacancies that are expected across the entire Canadian economy in response to the wave of retirements that are expected. This suggests that as the large number of retirements that are forecasted for the municipal sector occurs, it may become progressively more difficult for municipal governments to find replacement workers. In our simulations, we have abstracted from these issues assuming that each retirement can be matched with an otherwise identical new hire in the 25 to 29 age group. In practice, this could be difficult but not impossible. Below, we consider the factors that are likely to affect how difficult it is to replace these retired workers and find new workers who will allow the municipal sector to expand to match the growth in the Ontario population.

4.1.1 Changes to Retirement Patterns by Age

Concerns regarding the large number of retirements expected over the next 10 to 15 years in Canada in general, and in the municipal sector in Ontario in particular, assume that retirement patterns will be similar to what they have been in the past. However, if workers begin to postpone their retirement decisions this tendency to work longer will at least in part diminish the need to hire new workers. Winegard and Hollins (2017) argue that the Canadian average age at retirement has been climbing again after a long decline.

If there are a larger number of retirements than the general shortage of qualified workers then neo-classical economics would suggest that the wages paid to those workers should be bid up over time. Higher wages will tend to reduce the number of workers demanded by firms (possibly through substitution out of employment and into capital investment) and will tend to draw workers into the labour market who might otherwise be outside of it. This latter effect would include in part the workers who would have retired had the wage paid not risen and instead choose to stay on a few more years at the higher wage rate. It is difficult to predict exactly how large this effect will be. Using the OMERS administrative data in conjunction with the confidential census data (accessed through an RDC) it would at least be possible to try to estimate retirement behavior models in order to get a better sense of the magnitude of this effect.

There are other reasons why municipal workers may work to later ages in the future than they do currently. For example, the trend towards improved health in retirement and greater life expectancy across birth cohorts suggests a greater likelihood of workers continuing to work to older ages than their predecessors did, in similar jobs in the past.

If municipal governments want to encourage employees to work longer to reduce the need to find new workers in a tight labour market, movements towards more flexible work hours and work arrangements may be significant factors that make municipal workers agree to work for more years before retiring. In some ways work flexibility may in fact be more important to these workers than a small increase in the wages they receive. They may feel that they have adequate retirement savings but may postpone the start of retirement if they enjoy their jobs and have enough flexibility to be able to do the leisure activities they want to do while remaining employed.

4.1.2 Current Federal Focus on Increased Immigration and Temporary Foreign Workers

The current federal government has indicated on a number of occasions that it is interested in increased levels of immigration moving forward. This was in fact part of their election platform and was manifested in the large increase in refugees admitted shortly after the election in response to the Crisis in Syria. In addition, there is interest in increasing economic and family immigration numbers as well. The government has already raised the level of immigration to approximately 300,000 a year. At one point, the government was floating the idea in policy circles of increasing total annual immigrant intake to roughly 500,000 immigrants over a four-year timeframe. It was only after pressure in the media that they stepped back from these ambitious increases. However, it is reasonable to assume that the government will continue to push up the level of immigration so long as the economy remains strong. Given the support that this government has in opinion polls, it seems likely that they will win another election which means that the near future for Canada is likely to see increased immigration compared to the level which existed previously (roughly 250,000 immigrants per year since 2000).

This should ease pressures on municipal governments to find new workers relative to what would be the case in the absence of this increase in immigration. However, an important question remains as to how easily the new immigrants can be transitioned into the vacancies created in the municipal sector due to the retirements. There has been concern since the mid-1980s that immigrants to Canada have not easily transitioned into jobs in Canada that seem appropriate given their education and other skills that they bring with them from their home country (see, for example, Green and Worswick, 2012). That said, even if the new immigrants end up in private sector jobs rather than the municipal sector, their presence

should influence the overall availability of workers to the municipal sector. They will tend to mitigate against the need for wage increases making it easier for municipal governments to find qualified workers in the labour market even if those workers are native-born individuals.

In addition to the current federal government's strong support for immigration, there has been a consistent message in support of temporary foreign workers, which is somewhat surprising given the controversy surrounding the program under the previous Conservative government. The current federal government does seem to be sympathetic to the view of employers who claim to be struggling to find suitable workers to fill vacancies. It is unclear to us whether temporary foreign workers are a realistic supply of labour for municipal governments in the future. A more likely scenario might be that there would be a growing supply of temporary foreign workers coming to Canada in general, and Ontario in particular, and that this new supply of labour makes it easier for municipal governments to hire from the native-born population in the labour market. In this regard, it is also worth mentioning that there has been a rapid growth in the number of temporary foreign workers entering Canada not through the traditional Temporary Foreign Worker Program but through the International Mobility Program (IMP).[17] The IMP is a collection of sub programs that are typically tied to international trade agreements allowing for the movement of certain types of foreign workers into Canada to work on a temporary basis. For example, NAFTA allows for some workers to come to Canada from the US and Mexico as would the new free trade agreement currently being put into place with the European Union (CETA). Similarly, the proposed Trans-Pacific Partnership would open up these possibilities to workers in many other countries (such as China and Japan). It seems likely that this source of workers will continue to grow in Canada and this will mitigate some of the challenges that Canadian employers will face in terms of finding suitable employees in the future as the baby boom cohort retires.

4.2 Demand Side Factors

Next, we consider factors that could change the demand for employees in the municipal sector in Ontario over the next 13 years. Some factors will directly affect the productivity of municipal employees while others will affect the demand for municipal services which will in turn have an impact on municipalities' demand for employees to provide those services.

4.2.1 Implications of an Aging Population Growing More Comfortable with Computers

An aging population may lead to changes in the pattern of demands for government programs especially in the area of health and wellness. It is unclear how this will affect a municipality's demand for labour as a whole but it could change the types of employees being hired. It may also lead to a reallocation of municipal employees across to different parts of each organization.

While the average age of the Ontario population will rise over the next 13 years, it is also important to realize that the population will become more comfortable with internet interactions with governments through greater experience and the fact that the fraction of the population in the older cohorts who perhaps have never gained comfort with this new technology will be in decline. Also, technological improvements will likely make these internet-based interactions easier for the user making them more likely to be the first choice of a local citizen when interacting with the municipality than is the case

[17] See Brochu et al. (2016).

currently. If more of these interactions can be done over the internet and through smartphone technologies, this would lead to a decline in the need for face-to-face interactions with municipal employees. This would lead to a reduction in the number of administrative employees needed, but may lead to a greater need for more highly skilled administrative employees, especially those with IT skills to manage website interactions. It seems possible that some of the latter labour service needs could be contracted out reducing the need for these types of services to be provided by municipal employees.

A large literature exists in economics on skill-biased technical change where computers have replaced workers who were formally employed to carry out repetitive and non-complex tasks.[18] It is argued that the effect of the enormous reduction in the cost of computing power has led to a relative increase in demand for university-educated workers (thought to be complements to computers in production) relative to workers with high school or less education (thought to be substitutes for computers in production). It is likely that this trend will continue and will be relevant to the municipal sector in Ontario. The one argument against it being a major factor is that consumers typically prefer to interact with people than computers, especially in a service delivery context, and so the extent to which there will be a decline in the need for municipal workers will likely depend on the extent to which the interaction with the members of the public involves a complex interaction. If the interaction is simple then internet (or more generally computer) interactions are likely to become the norm. However, in cases where the situation is complex and the interaction requires a complex judgement, it may remain important to have a personal interaction between the member of the public and a municipal employee.

4.2.2 Ridesharing and Demand for Public Transit

The dramatic growth in 'ridesharing' services, provided by companies such as Uber, calls into question the future level of demand for public transit services in Ontario. It is difficult to predict the exact magnitude of this effect but it seems likely that public transit ridership as a percentage of the population will fall since some of the trips that would have been taken through public transit in the future will be taken through ridesharing. Careful consideration needs to be given to how public transit ridership is likely to be affected in the future due to the availability of ridesharing since this could have a significant impact on the demand for public transit drivers. That said, ridesharing may be relatively less effective during rush hour than during off peak hours. It may be necessary to have the same public transit system capacity during peak periods but buses and trains may be relatively less full than they currently are during off peak hours making the system less profitable for the municipalities running them.

4.2.3 Robotics and Automated Vehicles

In the longer-term, demand for municipal employees may be affected by developments in the areas of robotics and automated vehicles. Automation in general is developing at a remarkable rate. Bloomberg (2017) reports that production of robots in China jumped 27 percent in 2016 to roughly 90,000. This number is expected to rise to 160,000 by 2019. The report argues that this is likely to have a negative consequence on medium-skilled workers. However, it is unclear how easily robots can function in a municipal government setting given that the service sector is the sector where we have seen the least growth in robotics given the importance of human interaction.

[18] See for examples, Autor et al. (2003) for the US and Warman and Worswick (2015).

In contrast, the development of automated vehicles could have a significant effect on municipal demand for employees in the medium to long term. While development of automated vehicles seems to be moving forward rapidly, we are doubtful that we will see automated buses operating in Ontario by 2030. The regulatory hurdles that would need to be cleared and the challenges of operating these vehicles in the winter time in Canada seem too great to be cleared by 2030. That said, autonomous vehicles used in public transit are likely to be a real possibility by 2040 or 2050 and so this should be part of a long-term planning horizon of municipal governments.

5. Concluding Remarks

We have reviewed the existing literature on the future of municipal employment in Ontario with the goal of shedding light on key factors that will determine the growth and employment in this subsector. In addition, we have investigated the viability of different data sources for use in statistical analyses in this area. We have used the public use micro datafile of the Census of Canada available through the University network. To maintain the confidentiality of respondents, some information is aggregated and, consequently, it is not possible to identify the subsector of Local, Municipal and Regional Government employees. However, it is possible to identify Public Administration employees. So we derive, using custom tabulations, the number of municipal government workers (by year, region and age group) using OMERS administrative data and use population projections from the Government of Ontario. This allows us to more accurately account for regions of the province where there is an especially large number of public administration employees who are not municipal employees (for example, Ottawa with its large share of federal employees and Toronto with its large share of provincial employees). Our simulations are designed to forecast the level, composition and average characteristics of municipal employees moving forward in five-year increments through 2030. Our analysis should be considered preliminary and does hinge on a number of strong assumptions. It is intended mainly to stimulate consideration of the issues and perhaps form the foundation for more thorough analysis in the future. Ideally, future analysis would take advantage of the confidential versions of the Censuses perhaps including the 2016 census microdata files once they are available. It should be possible to identify municipal employees in the confidential versions of the current and historical census master files.

In the final section of the paper, we consider a number of reasons why public administration employment in general and municipal employment in particular may evolve in new ways going forward. We consider factors such as the ageing of the population, growing comfort level with IT based interactions, growing reliance on immigration for population growth as well as ridesharing and rapidly improving technologies for automation.

It is clear that the municipal sector in Ontario is entering a period of significant change with a large number of workers retiring by 2030. While there will likely be a tightening of the labour market over that period as the large baby boom cohort retires, the strong support by the federal government for immigration (and to a lesser extent temporary foreign workers) suggests that growth in the labour force will continue over this period. It is also likely that retirement ages may continue to creep upwards due to improvements in employee health at older ages and possibly in response to higher wages that may result from a tighter labour market in the future.

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