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SUMMARY

■ This bulletin examines trends in fire service spending and the incidence of reported fires in Canada. It finds that the number of firefighters and spending on fire services is increasing even as the incidence of reported fires is decreasing based on available data.

■ The most complete data is for the province of Ontario where between 1997 and 2012 the number of firefighters increased by 36.3%, while the reported number of fires fell by 41.4%.

■ Part of the explanation for this inverse relationship is the different functions and activities that firefighters carry out. Evidence from

Ontario for the period from 2000 to 2012 shows that the number of fire-related calls fell by 15.3% while non-fire related calls increased by 23.8%.

■ Data limitations preclude comparisons between municipalities or conclusions about how to better control the growth in fire service costs in Canada. Still, there is evidence that these expenditures are growing independently of the incidence of reported fires and that municipal governments ought to look at how fire services are delivered as part of any efforts to better control overall spending.

Municipal Fire Services in Canada: A Preliminary Analysis

Introduction

Municipalities across the country are facing budgetary pressures. The situation is well-documented. As an example, a recent study published by the Fraser Institute found that municipalities in British Columbia's Metro Vancouver area increased spending by 74.2% over the 10-year period between 2002 and 2012 (Lammam and MacIntyre, 2014). The rapid pace of the spending increase has far exceeded population growth and inflation.

This type of spending growth is not unique to British Columbia. We are witnessing concerns about municipal expenditure growth across the country.

Part of the trend has been driven by increasing expenditures on emergency services such as police and fire services.¹ Indeed, the president of the Association of Municipalities of Ontario recently called the growth in emergency services spending “unsustainable” (Brennan, 2014, Aug. 18).

Other research published by the Fraser Institute (see Di Matteo, 2014) has studied the rise in police expenditures. The research has attempted to better understand which Canadian municipalities spend more efficiently in this area and what steps could be taken to learn from best practices to get policing spending under more control.

This study seeks to expand on this past research to understand how the number of firefighters and fire services expenditures are growing and placing pressure on municipal

budgeting. We show that the number of firefighters and spending on fire services is increasing even as the incidence of reported fires is decreasing. This inverse relationship suggests that fire services expenditures should be closely examined as part of any effort to better control overall municipal spending. We also discuss and suggest improvements in the way that data on the incidence of fires and fire services spending is collected.

This call for improvements comes about because there are a number of data limitations. Historical data on the number of firefighters and average hourly wages only covers a 16-year period from 1997 to 2012. There currently exists no aggregate data on fire services spending after 2008. There is also no single database with municipal-level data on fire services expenditures. In addition, there are limitations with respect to data on the number of fires in Canada (nationally and provincially) after 2002. The upshot is that none of these datasets cover the same time period. It is also important to note that, as will be discussed later in the paper, in addition to responding to fire calls, firefighters carry out a number of different other tasks. Still, there is value in using what data are available to begin to understand changes in staffing levels, expenditures, the number of fires, and how firefighting services are contributing to rising municipal costs in Canada.

There are four parts to this study. The first examines the growth in the number of firefighters in Canada over 16 years. The second evaluates spending on fire services between 1988 and 2008. The third compares the rise in the number of firefighters and the growth in fire services spending to the number of fires over a multi-year period. To this end, readily available data in Ontario provide an illustrative sense of the direction of growth in fire services

¹ Lammam and MacIntyre's (2014) examination of government spending in the 21 municipalities comprising Metro Vancouver finds that protective services (including firefighters) represents the largest share of municipal spending totaling over 30% in 2012.

relative to the incidence of reported fires. The final section presents the available data on the aggregate wage growth of firefighters in Canada.

This paper ultimately provides no policy recommendations. It is a preliminary study that examines trends in firefighter resources and fire service expenditures and the incidence of reported fires. It does not assess the efficiency of fire services or reach conclusions about whether the evolving nature of fire services activities and functions ought to be changed.

As mentioned, this is largely because data limitations make it difficult to derive conclusions about how to control the growth in fire service costs in Canada. Still, there is sufficient empirical evidence to show that these expenditures are growing independently of the incidence of reported fires and that municipalities ought to look at how fire services are delivered as part of any efforts to control overall spending in the medium- and long-term. The research also highlights the need to improve national data quality. Otherwise citizens will not be able to hold their public officials to account with respect to municipal expenditures in general and the efficiency of fire services spending in particular.

The number of firefighters

Overall, the number of firefighters² in Canada has increased considerably over a 16-year period. According to the *Labour Force Survey*, the number of firefighters in Canada rose by

² All the statistics presented in this document are for career firefighters, which include full-time and/or part-time uniformed firefighters regardless of assignments, who might work in the public or private sector. Volunteer firefighters are not included. We use “firefighters” throughout the rest of the paper to mean “career firefighters.”

25.1%, from 25,900 to 32,400, from 1997 to 2012 (Statistics Canada, 2014a).³

At the provincial level, Alberta has experienced the greatest increase in the number of firefighters over this period, from 2,700 to 4,300, or 59.3%. This is followed by British Columbia (a 43.8% increase), Manitoba (36.4%), Ontario (36.3%), and to a lesser extent, Saskatchewan (14.3%). Quebec and the Atlantic region, by contrast, reported an overall decrease in the number of firefighters over the past 16 years.

Around the country, as of 2012, the majority of firefighters work in Ontario (42.9%), followed by Quebec (16.4%), and British Columbia (14.2%). Census data enable us to evaluate the distribution of firefighters by sector. In 2011, the vast majority of firefighters (92.8%) worked in public administration, mainly in local governments (85.7%).⁴ They were also employed in the transportation sector (1.2%), and waste management and remediation services (1.3%)⁵

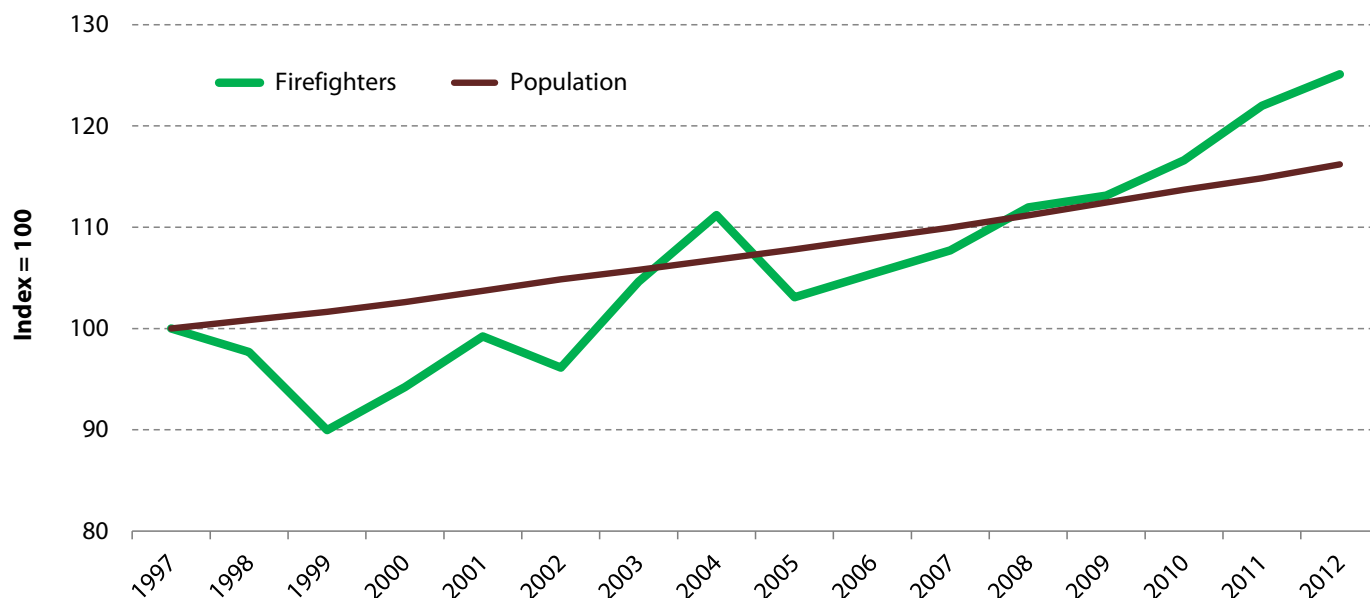
³ Data on the number of firefighters is provided by Statistics Canada’s Labour Force Survey (LFS). To maintain confidentiality, the number of firefighters in a given year corresponds to a two-year moving average. For simplicity, throughout this publication we refer to the number of firefighters in a particular year (i.e. 1997), but in actuality the number is a two-year moving average of that year and the next one (i.e. 1997 and 1998). The firefighters data include firefighters working in both the public and private sectors.

⁴ About 6.2% of the total number of firefighters works in the federal (2.6%) and the provincial government (3.5%) (Statistics Canada, 2013a).

⁵ This industry comprises establishments primarily engaged in waste collection, treatment and disposal services (land fill sites, incinerators, or other treatment or disposal facilities for non-hazardous and hazardous waste); environmental remediation services (clean-up of contaminated buildings, mine sites, soil or ground water, hazardous material removal, etc.); and septic tank pumping services.

Municipal Fire Services in Canada: A Preliminary Analysis

Figure 1: Canada—Comparative Growth in Population and Number of Firefighters as an Index, 1997 to 2012 (1997 = 100)



Sources: Statistics Canada, 2013b and 2014a; calculations by authors.

(Statistics Canada, 2013a). That most firefighters in Canada are employed by local governments is consistent with concerns about the extent to which fire services spending is placing pressure on municipal budgets.

Figure 1 illustrates the growth in the number of firefighters in Canada compared with the growth in population between 1997 and 2012. The information in figure 1 is presented in the form of an index in order to capture comparative changes in each variable. By giving each variable an index value of 100 in the starting year (1997), subsequent changes in relation to the initial year's value become more evident. Figure 1 shows that while the number of firefighters increased by 25.1% between 1997 and 2012, the population expanded by just 16.2% over the same period.

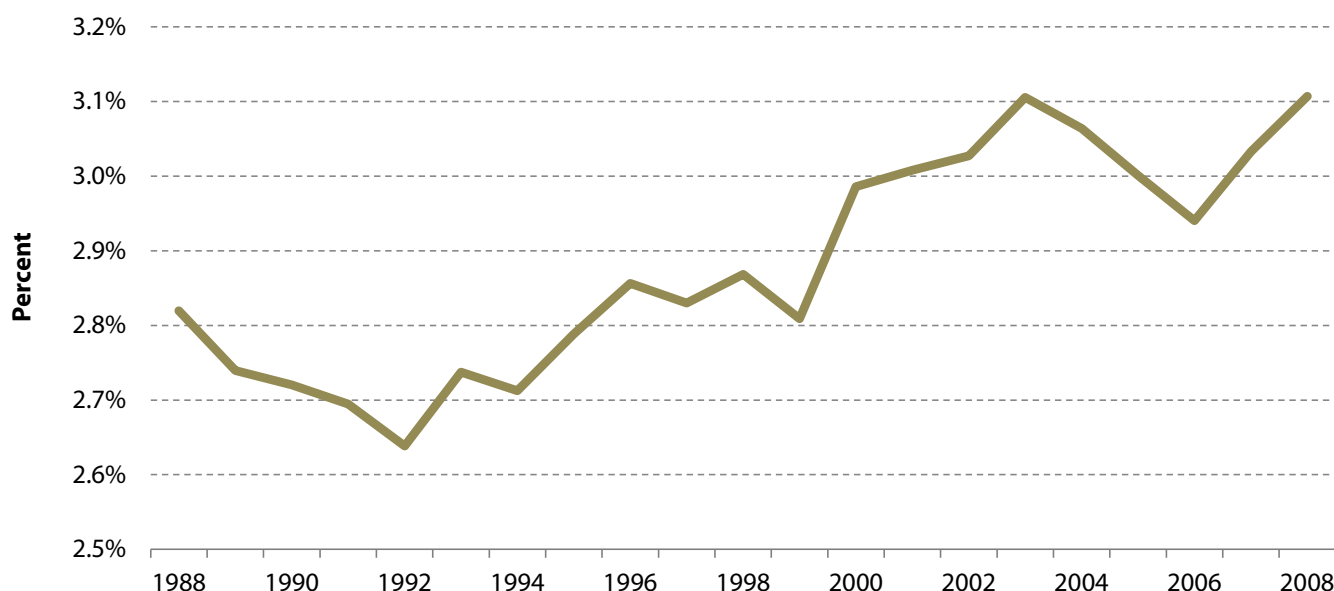
These data show that the number of firefighters has grown over the past 16 years in the aggregate faster than normal benchmarks, such as population growth, that are typically used to assess public staffing and expenditures.

Firefighting spending

Data on fire services spending is also limited. Statistics Canada's Financial Management System (FMS) is the only source that provides information on firefighting spending by local governments. This data has since been discontinued and it is only available from 1988 to 2008.⁶

⁶ Statistics Canada terminated FMS series in 2010 and replaced it with the Government Finance Statistics (GFS) series. The breakdown provided by the new system is not similar to the FMS and unfortunately, spending in protective services such as policing, firefighting, etc., is not included.

Figure 2: Firefighting Spending as a Percentage of Total Spending, Canada, 1988 to 2008



Sources: Statistics Canada, 2009; calculations by authors.

Figure 2 shows expenditures on firefighting services as a percentage of local government expenditures from 1988 to 2008. The proportional cost increased from 2.8% in 1988 to 3.1% in 2008. Although data after 2008 are not available, up until that time, the trend of firefighting spending relative to total spending was clearly increasing. The consequence is that, over this period, fire services spending was consuming an ever-greater share of municipal spending in Canada.

We have created an index to enable a comparison of firefighting and two other areas of municipal spending: education (school boards) and transportation and communication (which includes expenditures on public transit, spending on roads, water transport, etc.) in Canada beginning in 1988 (see figure 3). In order to reflect the fact that local government spending on education, and transportation and communication are greater than firefighting, we have

normalized these expenditure categories to equal 100 in 1988 to allow for their presentation in a single graph.⁷ Since 1988, spending on fire services has increased by 167.4% while spending on education, and transportation and communication at the local level has increased by 116.3% and 155.7%, respectively.

The number of fires⁸

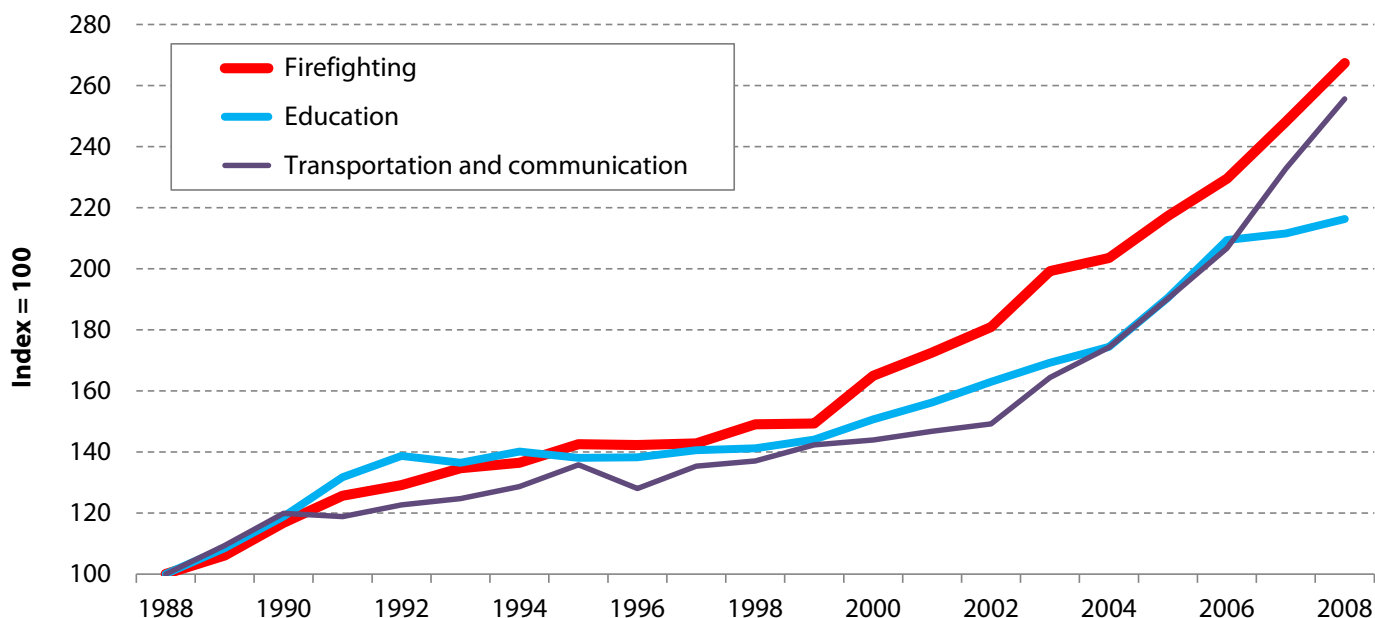
The growth in the number of firefighters and overall expenditures on fire services is incom-

⁷ In 2008, local spending on education was \$48.0 billion, or 12 times the amount spent on firefighting (\$3.8 billion). Similarly, spending on transportation and communications was \$15.8 billion, or four times firefighting spending (Statistics Canada, 2009).

⁸ All the statistics on the number of fires here and elsewhere (unless otherwise noted) pertain to fires with loss reported. Loss fires are defined as any fire where an injury, fatality, or dollar loss has been reported.

Municipal Fire Services in Canada: A Preliminary Analysis

Figure 3: Canada—Comparative Growth in Local Government Spending as an Index, 1988 to 2008 (1988 = 100)



Sources: Statistics Canada, 2009; calculations by authors.

plete in isolation. The role of fire services is to respond to the incidence of reported fires and thus it seems logical that the number of firefighters would grow in concert with the number of fires. But we actually find an inverse relationship between the trend in the number of firefighters and the number of fires—even allowing for the possibility that the decreasing number of fires may be partly a result of more firefighters providing more public fire education and thereby preventing fires.

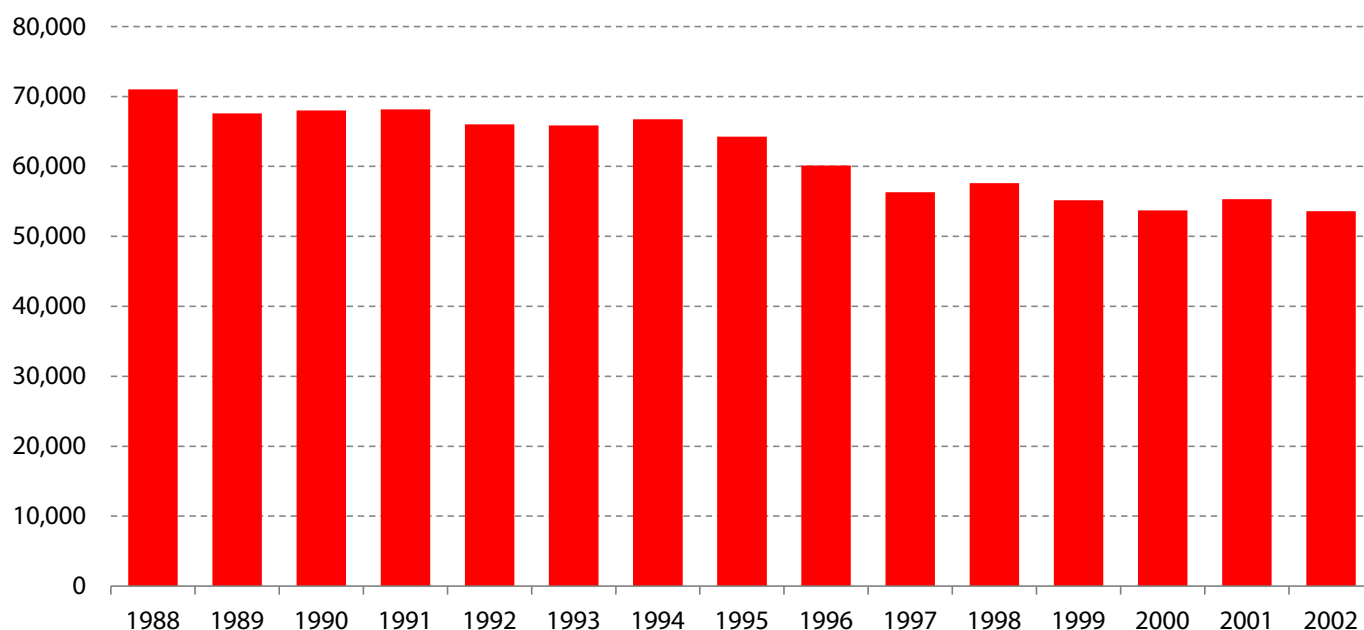
Unlike the United States, Canada does not have an ongoing national fire information database.⁹ Between 1988 and 2002 the Council of Canadian Fire Marshals and Fire Commission-

ers (CCFM/FC) collected statistics on reported fires and fire losses in Canada. This data series has been discontinued, which prevents longitudinal analysis.¹⁰ The data presented below use the available reports from CCFM/FC and pertain to the number of reported fires, including those classified as residential occupancies, assembly, institutional, business and personal service, mercantile property, industrial manufacturing property, storage property, special property and transportation equipment, and miscellaneous property. In general, a large proportion of the fires occurred in residential property (about 40%).

⁹ Reports and statistics on fires in the US are available through the National Fire Protection Association (NFPA) at <http://www.nfpa.org/research/reports-and-statistics/fires-in-the-us>.

¹⁰ Reports from 1986 to 2002 and 2007 are available electronically at <http://www.ccfmfc.ca/stats.html>. Although the CCFM/FC published a report in 2007, the total number of reported fires in Canada was not provided in that publication since some provincial data was incomplete or unavailable.

Figure 4: Number of Fires, Canada, 1988 to 2002



Source: Council of Canadian Fire Marshals and Fire Commissioners [CCFM/FC], various years.

The available data indicate that the number of reported fires in Canada decreased from 71,009 in 1988 to 53,589 in 2002, or 24.5% in that period (see figure 4).¹¹

Firefighting spending versus the number of fires

Figure 5 compares the trends of spending by local governments on firefighting and reported fires in Canada from 1988 to 2008. Although data on reported fires in Canada are only available up to 2002, they show that the number of

fires in Canada declined by 24.5% from 1988 to 2002. Meanwhile, local government spending on firefighting increased by 81.0% in nominal terms, or 28.9% in real terms, over the same period. Between 2002 and 2008 (the period for which we do not have data on the number of fires), firefighting spending increased by 47.7% in nominal terms, or 29.5% in real terms.

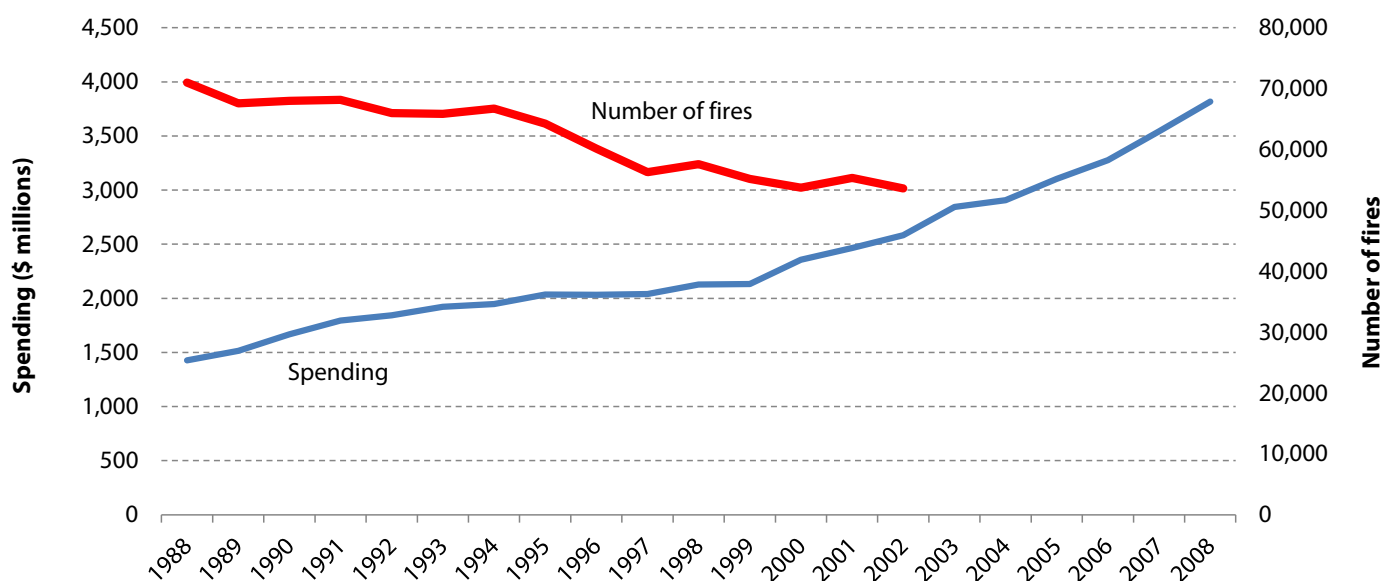
The number of firefighters versus the number of fires in Ontario

Due to data constraints, we cannot analyze the reported fires with loss and the number of firefighters for Canada. But as an illustration, we can analyze these two variables for Ontario. Figure 6 presents the results. Over the 16 years from 1997 to 2012, the number of fires in Ontario fell by 41.4%, while the number of firefighters increased by 36.3%. The diametrically opposite trends show an inverse relation-

¹¹ This paper does not evaluate the causes for the decline in the number of fires. Other research attributes it to a range of factors including updated building codes with non-combustible construction materials (such as walls and floors made of metal or gypsum), more sophisticated sprinkler systems, fire and smoke dampers, and fireproofing materials. See, for instance, Licht (2005).

Municipal Fire Services in Canada: A Preliminary Analysis

Figure 5: Firefighting Spending versus Number of Fires, Canada, 1988 to 2008



Sources: Statistics Canada, 2009; Council of Canadian Fire Marshals and Fire Commissioners [CCFM/FC], various years.

ship between the number of fires and number of firefighters.

The different functions and activities for fire services

Of course the role of fire services extends beyond that of simply fighting fires. Firefighters also respond to medical emergencies and motor vehicle accidents, and assist police in their inquiries. These activities consume time and resources (Toronto Fire Services, 2014). Yet it is difficult to quantify the extent to which non-fire related activities and functions are contributing factors in fire services resources and expenditure growth across the country.

For instance, from 2000 to 2012, the number of fire-related calls decreased by 15.3% while the number of non-fire related calls increased by

23.8% (Ontario, Office of the Fire Marshal and Emergency Management, 2014).¹²

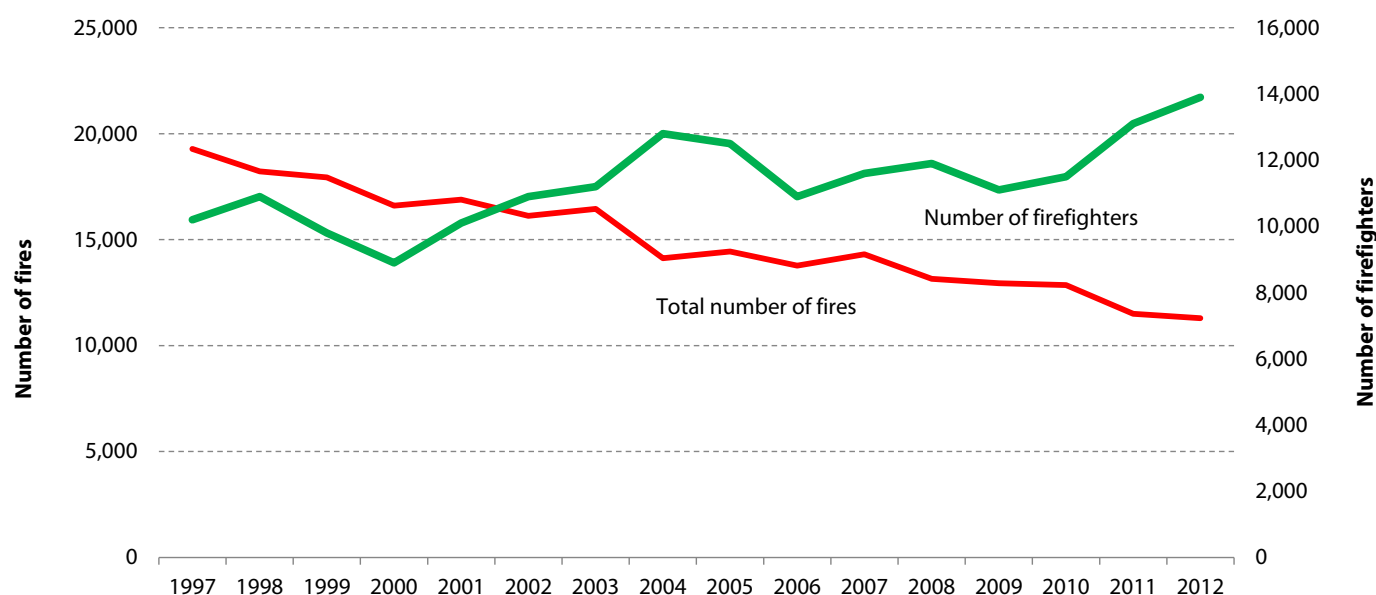
The Toronto Fire Services releases annual data on the number of response calls it receives each year and categorizes the calls in 18 groups, one of which is actual “fires.”¹³ In 2013, the most recent year for which data are available, the Toronto Fire Services received 109,463 response calls of which 10,854, or only 9.9%, were for actual fires (including vehicle fires). About 44% were for medical issues (Toronto Fire Services, 2014: 16). This composition has been largely consistent over the past 9 years. Between 2005 and 2013, response calls for

¹² In this context, fire-related calls include both fires with loss reported and non-loss fires.

¹³ Other categories include rescue operations, police assistance, fire alarm ringing, and non-emergency calls. See Toronto Fire Services (2014).

Municipal Fire Services in Canada: A Preliminary Analysis

Figure 6: Ontario Fires and Number of Firefighters, 1997 to 2012



Sources: Council of Canadian Fire Marshals and Fire Commissioners [CCFM/FC], various years; Ontario, Ministry of Community Safety and Correctional Services, 2013; Statistics Canada, 2014a.

actual fires was always less than 10.0% of overall responses and in 2011 was as low as 7.1% (Toronto Fire Services, 2012: 10; Toronto Fire Services, 2014: 16).

In 2013, the City of Calgary's fire department reported that only 3.4% of response calls were for actual fires and 50.1% were for medical assistance. From 2009 to 2013, the proportion of response calls for actual fires decreased in that city from 4.6% to 3.4%. Meanwhile, the proportion of response calls related to medical assistance increased consistently over this period, from 45.0% in 2009 to 50.1% in 2013 (Calgary Fire Department, 2013: 15).

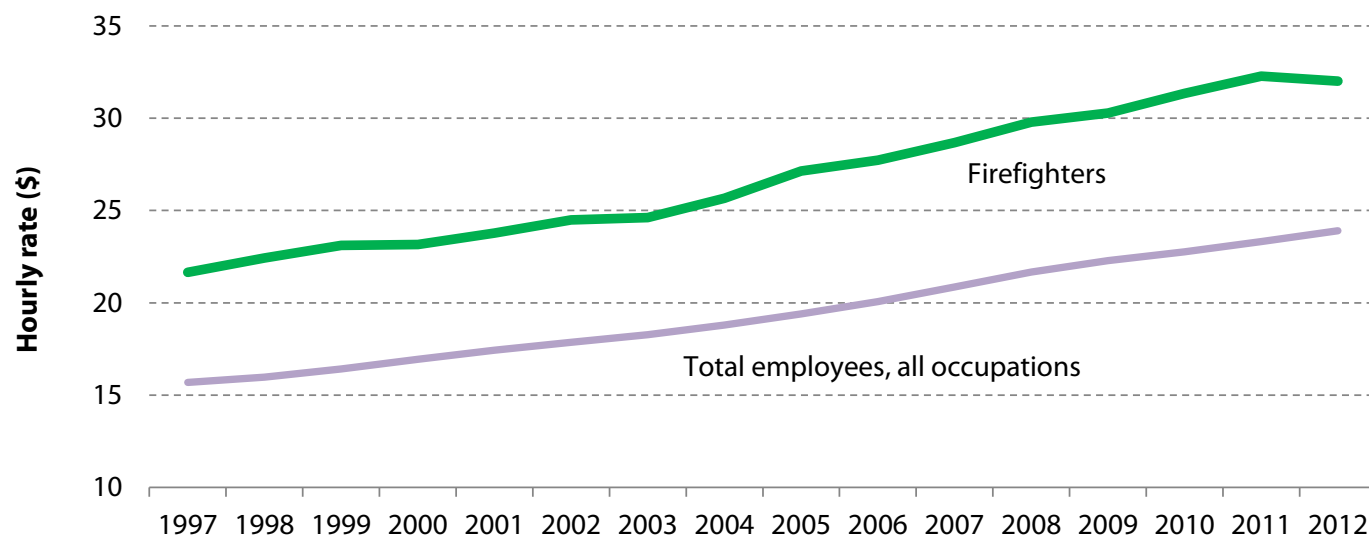
Similarly, the City of Montreal's public reporting finds that, in 2013, 3.8% of incidents were for actual fires and more than 60% were first response calls (Securite Incendie Montreal,

2014: 27). From 2009 to 2013, the proportion of response calls for actual fires decreased from 8.0% to 3.8%. Meanwhile, the proportion of first response calls in the city increased consistently over this period from 57.3% in 2009 to 62.0% in 2013.

These illustrative cases provide a sense of how other functions and activities are consuming a considerable share of firefighting resources and time.

There has been limited research on the different functions and activities carried out by municipal fire services. One study commissioned by the City of Toronto noted the extent to which the city's fire department is increasingly active in emergency medical services. The report records that "firefighter medical response has become a normal practice in

Figure 7: Average Hourly Rate, Two-year Moving Average, both Full- and Part-time Employees, 1997 to 2012



Sources: Statistics Canada, 2014a and 2014c.

many Ontario municipalities” (City of Toronto, 2013: 105). Yet as of 2012 the City of Toronto began to restrict the use of fire services personnel to medical emergencies in the name of saving resources on the grounds that the benefit of dispatching firefighters to medical emergencies was limited. There are questions, then, about the evolving role of fire services personnel and the extent to which their work is providing value for money.

Wages

Expenditures on firefighter compensation have increased over the period for which data are available. A wage comparison between firefighters and the average employee might help explain the increasing trend in firefighting spending. Figure 7 displays the trend in the average hourly wage rate for firefighters versus all employees (considering all occupations)

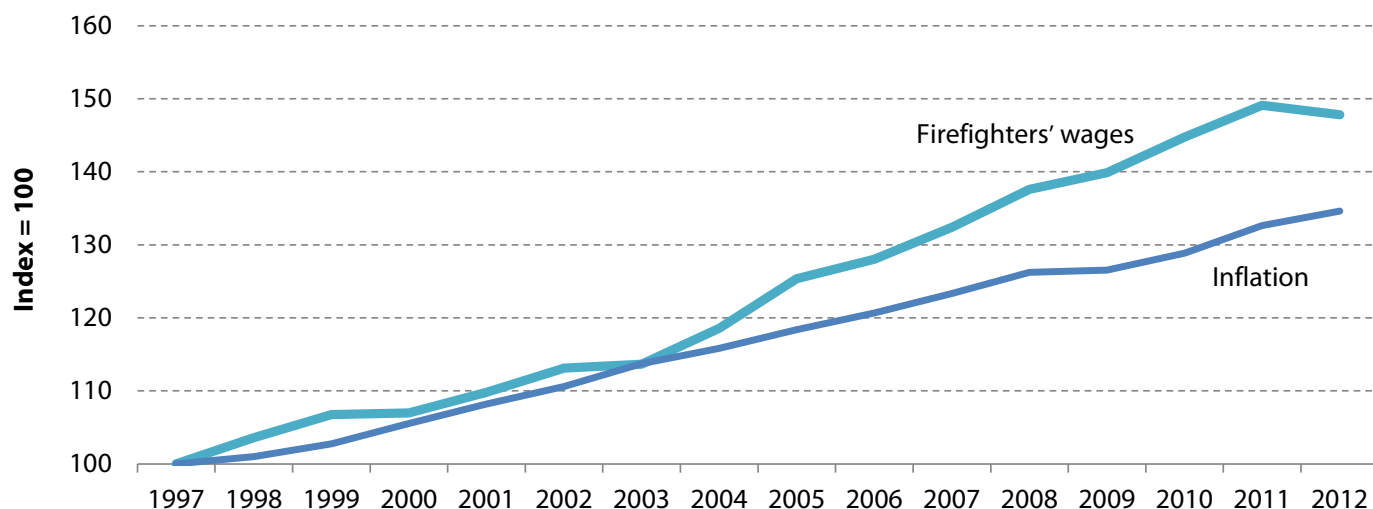
between 1997 to 2012.¹⁴ The average hourly wage rate for all employees (including firefighters) consistently lagged behind that for firefighters alone over this period, with an average annual difference of \$7.28, or 37.5%.

Figure 8 illustrates the growth in the average hourly wage rate by comparing it to the growth in price levels (inflation). Over the 16 years from 1997 to 2012, firefighters’ average hourly wage rate increased by 47.8%. Price levels, meanwhile, grew by 34.6%.

¹⁴ To maintain confidentiality, the average hourly wage rate for firefighters in a given year corresponds to a two-year moving average. For simplicity, throughout this publication we refer to the average hourly wage rate for firefighters in a particular year (i.e. 1997), but in actuality the number is a two-year moving average of that year and the next one (i.e. 1997 and 1998).

Municipal Fire Services in Canada: A Preliminary Analysis

Figure 8: Canada—Comparative Growth in Firefighters' Wages and Inflation as an Index, 1997 to 2012 (1997 = 100)



Sources: Statistics Canada, 2014a and 2014b; calculations by authors.

This analysis provides some insight into the extent to which spending on compensation for firefighters has grown over the 16-year period. The consequence of the increased wage spending is that municipal governments are spending more on the number of the firefighters and their compensation than they used to. The issue of indirect compensation, such as pension benefits, is another layer of the compensation debate that is difficult to quantify broadly.¹⁵

Conclusion

Municipal governments across Canada are facing considerable budget pressures. Some are

arguing for greater resources—including new revenue sources—to cover these and other costs. But it is necessary to understand what is driving these costs before any decisions are taken to change the spending mix or augment their revenue-generating capacity.

Municipal leaders themselves have pointed to expenditures on fire services as one source of this spending growth. Using available data, this analysis has tried to better understand how firefighter staffing and fire services expenditures have grown. It has also sought to compare these measures to the incidence of reported fires. There appears to be a negative relationship. Indeed, the number of firefighters and the growth in fire services expenditures diverges from the incidence of reported fires. This divergence leads to obvious questions about what is driving these increases if it is not actual firefighting.

Data limitations preclude us from comparing Canadian municipalities to understand

¹⁵ Palacios and Clemens (2013) found that workers in the public sector have a wage premium compared to their counterparts in the private sector. Moreover, they enjoy more generous non-wage benefits than private-sector workers including higher rates of pension coverage, higher rates of defined benefit pensions, lower ages of retirement and lower rates of job loss.

Municipal Fire Services in Canada: A Preliminary Analysis

which ones are more efficient and could provide a source of best practices. This means that more data are required to assess how staffing and costs have changed across the country and what steps can be taken to control them. But even with those limitations, this study does provide some evidence that there may be room for improvement with respect to the efficiency of current staffing and expenditures in fire services departments across Canada.

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Municipal Fire Services in Canada: A Preliminary Analysis



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