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Policing in Ontario: Financial Impacts and Opportunities

An Analysis of Police Responsibilities, Cost Drivers and Opportunities for Managing Budgets in a Climate of Austerity

MPA Research Report

Submitted to

The Local Government Program
Masters of Public Administration
Western University

Michael A. Touw
July 2014

Executive Summary

Policing in Ontario is at a critical juncture, especially in a climate of ever increasing austerity. Governments, including municipalities, are facing financial pressure from many sides. Grants and funding from senior levels of governments are falling[i], infrastructure repair is falling behind, demand for services is increasing, and the ability to raise additional revenues is limited. In many Ontario municipalities, there is pressure to freeze or lower taxes, combined with the above pressures. The provision of police services is another significant, and increasing, cost pressure on municipal budgets.

This paper is focused on Ontario, however, police funding is an issue that is faced across North America. Salary and benefit costs that rise above the rate of inflation appear to be "universal" impacts across North America, felt by provincial and local governments as they are all forced to "compete" for available talent.

Through a series of statistical analyses, a variety of factors are studied and evaluated to determine what, if any, impact they have on police costs. All sixty-four provinces and states across North America are compared and evaluated. While there are undoubtedly many differences between these locales, which present challenges when comparing them, the differences may help to explain cost differentials as well.

While there are a variety of factors that impact police costs, the only ones that local (and provincial/state) governments can reasonably be expected to control are the numbers, and cost, of police officers.

While there is still an inarguable need to provide police services and to provide for public safety, there are many ways in which this can accomplished without increasing the number of uniformed

officers. Some of these are discussed briefly at the end of this paper, however, further research is needed to explore these in any depth. These are no doubt challenging times, but with these challenges come many opportunities.

"The central question for police leadership then should not be whether major changes will occur, but rather whether those changes will be prompted thoughtfully by police professionals or forced on the profession ... The former can lead to a professional renaissance where new, invigorating business models are developed, leading to major improvements in public safety."[ii]

Acknowledgements

I would like to thank the professors and staff, as well as fellow students and colleagues of the Local Government Program for the experiences and learning environment of the past three years. While I will enjoy my additional free time now that I have completed the program, I will miss the people, the sharing of knowledge, and the experiences.

I would like to thank Bob Young for teaching “research methods” in an interesting fashion, enabling and encouraging me to apply these analytical tools to my education and vocation. Thank you to Dr. Sancton for getting me pointed in the right direction when starting off on this MRP journey.

I acknowledge the support of the two municipalities I have worked for while completing this degree and for recognizing the benefits of continued learning.

Thank you to Bob Maddocks for introducing me to the Local Government Program and for encouraging me to enroll. I deeply appreciate his mentorship and advice over the years, as well as his guidance in the preparation of this report. Thank you also to Art and Jean Touw for hours spent reviewing and providing feedback and comments.

Finally, I would like to thank my extremely understanding and supportive wife and two young children (who didn’t always understand why Daddy had to do “homework”). This journey would not have been possible without their support and encouragement.

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1.0 Introduction

Since its inception in 1909, the Ontario Provincial Police force has grown and changed dramatically from its original 45 officers to the 9800 strong uniformed and civilian force that it is today. Over the years, the focus has also changed from strictly rural and traffic policing to include the provision of police services to 73% of Ontario's municipalities[iii]. During that time, the costs of providing this service have risen dramatically, far exceeding any CPI or inflationary indices. The Ontario Provincial Police now have one of the highest per capita policing costs in North America, and its 322 municipal clients (facing stagnant or decreasing budgets) are in a continual funding battle with the OPP over persistent rising costs. In addition to this, the remaining 122 municipal police forces face similar challenges as salary negotiations/arbitration awards are often linked to those of the OPP. Therefore, while this report contains many details concerning the OPP, the conclusions are intended to be applicable to police funding and costs throughout Ontario. Some of the general principles are also applicable throughout North America.

The central focus of this research is to develop theory and analysis that will attempt to describe the underlying causes for both the high cost of providing policing services in Ontario. It will then provide some police service cost reduction options for municipalities who are struggling to balance budgets and fund ever increasing law enforcement costs. This will be done in part by comparing and contrasting policing in Ontario with other provincial and state police departments.

2.0 Theory

This is a critical time for municipal policing in Ontario. Municipalities, and governments at all levels, are facing financial pressure from many sides. Grants and funding from senior levels of government are falling[iv], infrastructure repair is lagging, demand for services is increasing, and with a slow growth economy, the ability to raise additional revenues through property taxation is limited. In many Ontario municipalities, there is also a pressure to freeze or lower taxes, which serves to exacerbate the above pressures. The provision of police services is another significant, and increasing, cost pressure on municipal budgets. 73% of Ontario municipalities receive police services from the Ontario Provincial Police through a variety of service delivery methods. The end result is almost always the same; costs rising each year, with seemingly little or no impact from the expression of municipal concerns regarding rising costs.

The Ontario Provincial Police had its origins in response to increasing lawlessness in Northern Ontario following the discovery of gold and silver. From there, the Force has continued to evolve, yet still seems to struggle with the reality of providing cost effective police service in Ontario after more than 100 years in existence. In 1921, a restructuring took place which installed a Commissioner at the head of the organization and began to shape the OPP into the police force that exists today. In 1945, the OPP first began to provide policing services in municipalities. Until 1982, this municipal policing service was paid for completely by the province of Ontario. In 1982, an inter-ministerial committee developed a cost recovery formula for municipalities which had an OPP contract for policing. This committee examined police operating costs and determined what could reasonably be charged to a municipality receiving contract service. The cost recovery formula included:

- Uniform and civilian salaries and benefits
- A per officer charge for other operating expenses, such as vehicles, uniform and equipment, support services, etc.

Along with the cost recovery formula, a five year contract term was implemented for municipalities who had an OPP contract. The cost recovery formula was then reviewed at each contract renewal.

By the mid 1990's, there were 102 municipal police services in Ontario, along with 35 municipalities contracted to the OPP and 576 municipalities policed by the OPP at no direct cost. In 1998, the Province of Ontario amended the Police Services Act (through the Local Services Restructuring) which fully transferred the responsibility of providing and funding adequate and effective municipal policing to local governments. Municipalities in Ontario now had several options for policing[v]:

1. Establish and provide a municipal police force (for example, Kingston Police Department)
2. Enter into an agreement with other municipalities to establish a joint police services board
3. Enter into an agreement with one or more municipalities to provide an amalgamated police force
4. Contract from a neighbouring police department
5. Contract with the OPP to provide service (with full cost recovery) under section 10 of the Police Services Act (PSA)
6. Or default to Section 5.1 of the Police Services Act and obtain non-contract OPP service (with full cost recovery)

By 2012, the municipal policing landscape in Ontario had 122 municipal police forces, 150 OPP contracted municipalities and 172 OPP non-contract policing arrangements.

The municipal cost recovery process is based on a "detachment policing model" where officers in a detachment are not designated for a particular municipality or for provincial service, but where hours and work are billed depending on activity and/or location. Costs are billed for full time uniformed officers (FTE) and for other direct operating expenses (ODOE). As an example, a detachment may serve one or more municipalities, based on where it is located geographically, and it may/often also serves as a provincial detachment to provide policing to King's Highways, provincial parks and waterways.

All municipalities (with OPP service) are billed under the cost recovery model, regardless of whether they are contract or non-contract municipalities. In this billing model, salaries and benefits account for approximately 85% of costs, while "other direct operating expenses" (ODOE) account for the remaining 15%. Other direct operating expenses include support staff, vehicles, equipment, uniforms, some infrastructure, etc., all related to the provision of policing services in Ontario.

In Ontario, the Police Services Act, section 4, requires several core police services that municipalities must provide[vi]:

1. Crime Prevention
    a. Provision of community based crime prevention initiatives
2. Law Enforcement
    a. Need processes to address provision of 24 hour policing, community patrol, communications, supervision, traffic patrol, road safety, criminal investigations,

criminal intelligence, analysis (crime, calls, public order), waterways, court security, investigative support, other law enforcement related activities)

3. Victim Assistance
    a. Need to provide assistance to victims of crime
4. Public Order
    a. Every police service required to have access to the services of a public order unit within a reasonable response time and must have procedures in place to govern when unit is deployed and how it is used
5. Emergency Response
    a. Must have access within a reasonable time to tactical units, hostage rescue, major incident command, crisis negotiator, explosive forced entry technician, explosive disposal technician

Further, municipalities must provide all infrastructure and administration necessary for the provision of such services.

In summary, in Ontario, policing is governed by the Police Services Act. Section 5 of this Act lays out the options by which municipalities can meet their obligations to provide policing services within their boundaries. One of these options is to enter into an agreement with the Ontario Provincial Police for the provision of police services. If a municipality fails to provide service by any of the means described above, the default (PSA section 5.1) is for the OPP to provide services and invoice the municipality under a non-contract policing arrangement.

In either of these two scenarios, costs are billed back to municipalities through a cost recovery formula. This formula has been in place since 1982 and was updated in 1996. Since then, it has been updated five more times and in 2011, the Treasury Board approved an annual update to

more accurately reflect actual costs and to allow both the OPP and municipalities to better control and forecast policing costs.

The cost of providing policing service in Ontario (through the OPP and municipal police services) continues to rise and is an ongoing concern for Ontario municipalities[vii]. The Auditor General of Ontario released the 2012 Annual Report in December of 2012 and highlights the escalating policing costs and contrasts them with a corresponding 40% decline in crime rates over the last two decades. Ontario currently has the highest per capita police costs (OPP and municipal) in Canada at $320 per capita compared to the national average of $286 per capita (excluding the Territories)[viii] and $263 per capita in the United States[ix].

With decreasing crime and traffic accident rates, policing costs should be leveling off or decreasing, not continuing their skyward climb, further away from the national (and continental) average. This research paper investigates some of the potential causes for this as well as thoughts on means to reduce the fiscal pressure of policing on municipalities in Ontario.

And while this paper is focused on Ontario, how best to manage and pay for policing costs is an issue that is faced across North America. According to the U.S. Department of Justice's Bureau of Justice Statistics, public expenditures on policing in the United States more than quadrupled in the United States between 1982 and 2006, averaging 8.6% per year.[x] Salary and benefit costs that increase above the rate of inflation appear to be "universal" impacts across North America, similar to the huge increases awarded to the OPP, and then by municipal police services who are forced to compete.

3.0 Hypothesis

The intent of this paper was to research the reasons and cost drivers behind the high price of policing in Ontario and to compare these to other jurisdictions in Canada and the United States to determine if there was any statistically relevant data that could explain the high cost of policing in Ontario. The research question and associated propositions were used to focus the data gathering and to guide the conclusion.

The guiding purpose of this research was to develop theory that will describe the underlying causes for the high cost of providing policing services in Ontario (both OPP and municipal police forces).

There were six general theories that guided the research:

1. How much (or to what extent) do the number of law enforcement personnel contribute to policing costs? For example, is it a simple measure of more police personnel leading to higher costs?
2. Do the kilometers of roads in a jurisdiction have an impact on police costs? For example, does a jurisdiction with a large road count have higher costs due to traffic patrols and accident response?
3. Is there a relationship between the GDP of a province or state and its police costs? For example, does a higher GDP reflect lower unemployment levels and lower crime levels? Or does a higher GDP allow more funding for policing?
4. Is there a relationship between population and police costs? For example, does an increase in population lead to an increase in policing or is there a threshold of efficiency or “critical mass”?

5. How much does population density contribute towards policing costs? For example, if population density is very high, or alternatively very low as in Northern Ontario, are police costs higher?
6. Does the geographic area of a jurisdiction impact its police costs? If a police service is required to patrol a very large area (and perhaps including land, sea, air), does this lead to an increase in cost?

These questions were intended as a means by which to focus research and provide a framework for the outcomes.

4.0 Methodology

The research involved was both quantitative and statistically based. Some work has been done in this field, however most seems to be focused solely *within* police departments and how to improve efficiencies based on internal data and analysis. This research report seeks to compare and contrast police forces across Canada and the United States in an effort to determine why there are such large discrepancies in per capita policing costs between Ontario and North American comparators.

While there are obviously differences among the 64 states, provinces and territories in North America, and not all are similar to Ontario, all jurisdictions were still examined and compared. This was done with the expectation that the variances between locales may help to explain reasons behind police costs, either high or low. Therefore, all 64 locations were used throughout the research in order to compare data and cost drivers related to each respective per capita police cost.

Police costs per capita are displayed in the tables below for each province and state in North America. The American costs were obtained from 2007 US Census Data and the Canadian costs were obtained from a 2009 “Police Resources in Canada” report published by Statistics Canada.

Table 1: Canadian Policing Per Capita Costs

Province	Per Capita Cost ($)	Province	Per Capita Cost ($)
Newfoundland and Labrador	276	Manitoba	312
Prince Edward Island	219	Saskatchewan	326
Nova Scotia	284	Alberta	263
New Brunswick	253	British Columbia	310
Quebec	297	Yukon	727
Ontario	320	Northwest Territories	1175
Nunavut	1265		
AVERAGE	**286 (464 with Territories)**		

Table 2: American Policing Per Capita Costs

State	Per Capita Cost ($)	State	Per Cap. Cost ($)
Alabama	211	Missouri	238
Alaska	347	Montana	215
Arizona	322	Nebraska	202
Arkansas	169	Nevada	385
California	381	New Hampshire	225
Colorado	278	New Jersey	353
Connecticut	259	New Mexico	304
Delaware	346	New York	393
District of Columbia	851	North Carolina	225
Florida	345	North Dakota	166
Georgia	224	Ohio	258
Hawaii	239	Oklahoma	200
Idaho	200	Oregon	259
Illinois	317	Pennsylvania	215
Indiana	175	Rhode Island	311
Iowa	197	South Carolina	205
Kansas	244	South Dakota	171
Kentucky	148	Tennessee	221
Louisiana	277	Texas	220
Maine	176	Utah	217
Maryland	317	Vermont	228
Massachusetts	282	Virginia	247
Michigan	233	Washington	219
Minnesota	272	West Virginia	148
Mississippi	196	Wisconsin	267
		Wyoming	335
AVERAGE	**263**		

Data was collected from a variety of sources, including Statistics Canada, the US Census Bureau, various literature, books, journals and professional organizations, such as police service boards and other police organizations.

There is an almost overwhelming amount of data and information available from these sources, including statistics, numerical data, funding, crime rates, populations served, call volumes, etc. There was sufficient empirical and statistical information regarding police services and societal data that no surveys or interviews were conducted.

5.0 Measurement

Data was collected and compiled from many sources, but in particular Statistics Canada, the US Census Bureau, various literature, books, journals, police/professional organizations, and police service boards, etc. Data, general attitudes and municipal concerns were also observed and witnessed firsthand at several conferences and provincial events, such as the Association of Municipalities of Ontario (AMO), Rural Ontario Municipal Association (ROMA), local Police Services Boards, the Eastern Ontario Wardens Caucus (EOWC).

Data was collected for the following for all 64 provinces, territories and states:

1. Number of police officers (both uniformed officers as well as civilian employees), expressed as a ratio of law enforcement personnel per 100,000 residents
2. Geographic area of jurisdiction (measured in square kilometers or square miles and including land and water)
3. Population (total population for each jurisdiction according to each respective census bureau)
4. Population density (calculated as number of people per square kilometer)
5. Kilometers or miles of road patrolled by provincial/state police (calculated as the number of kilometers of roads within a jurisdiction and assuming that all were patrolled by police. Note that data for “lane kilometers” was not available, just road lengths, so this doesn’t differentiate between 1 km of Highway 401 and 1 km through a subdivision.)
6. GDP for each state/province (gross “domestic” product for each state/province as of 2009)

7. Per capita cost of policing (calculated as the total cost of providing police services within a jurisdiction divided by the total population. Does not include costs for justice system or strictly federal agencies (FBI, CIA, etc.) but does include RCMP where providing municipal policing service (PEI, NS, NB, MB, SK, AB, BC)

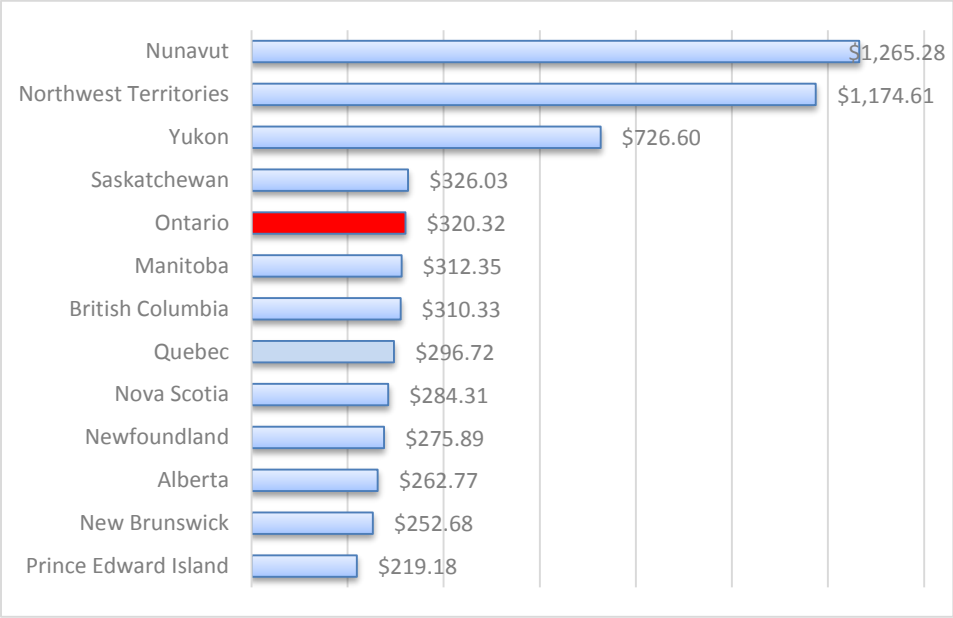
By comparing this data between Ontario and the other jurisdictions, it was expected that variations would be apparent which would assist in explaining some of the reasons for the high cost of policing in Ontario. Through careful statistical analysis, those factors which are having an influence can be separated from those which are similar or do not have a significant impact as a cost driver.

6.0 Analysis

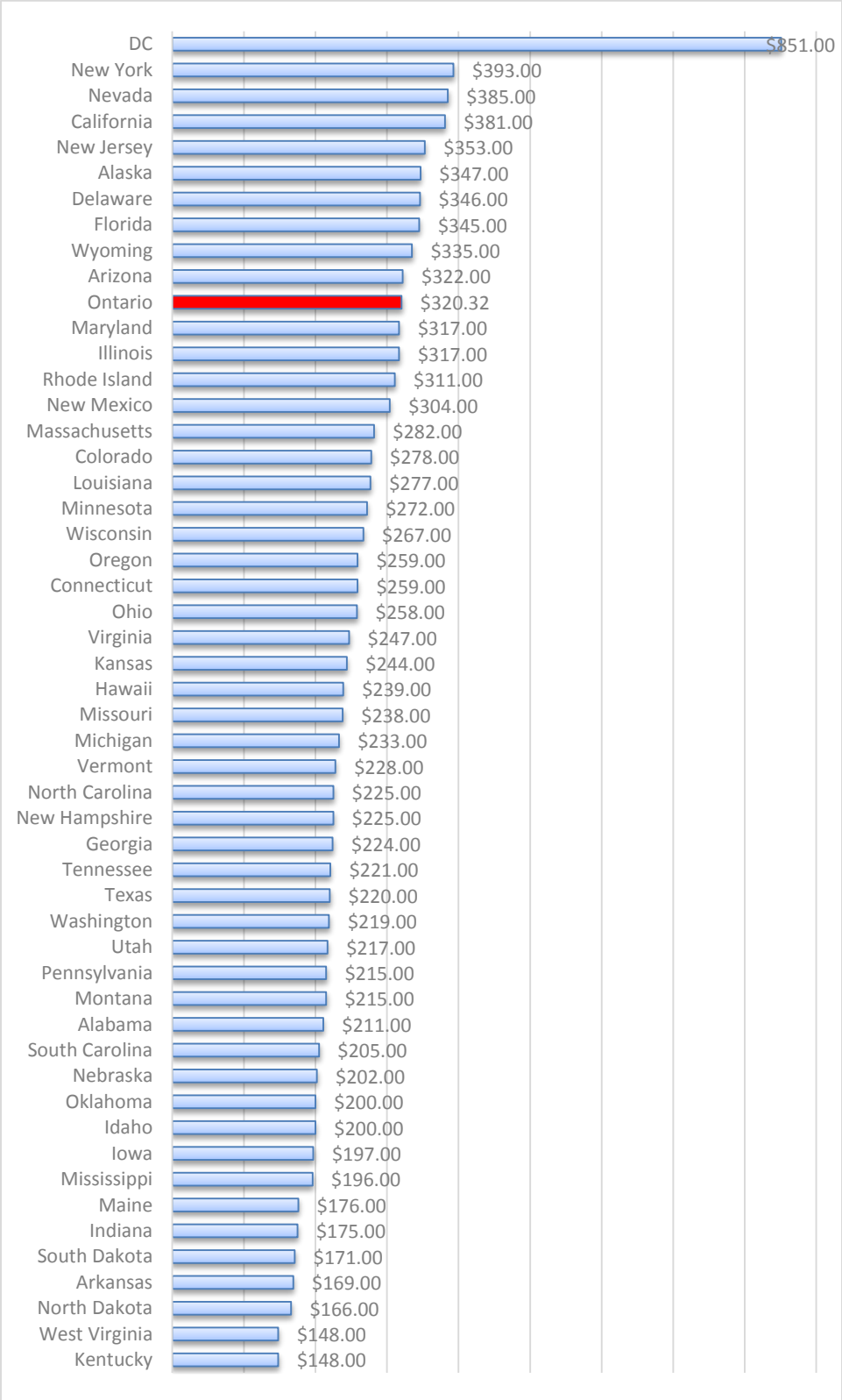
Originally, I had considered selecting a small subgroup of jurisdictions that could be compared to Ontario and carry out an analysis based on these, however, the sampling error would have been too large and any results would probably not have been relevant or statistically significant. There are undoubtedly also different cost drivers impacting Canadian policing services versus American policing services and, therefore, having a larger representative group was important to this research.

Prior to carrying out any significant analysis, the first step is a descriptive, univariate analysis. Data is presented in a bar graph initially to provide a visual representation of all the samples. Data was collected for a "cross section" of time. Due to the variety of sources used for the numerical data, there is a small range in this "cross section" from 2009-2011. Because of the large volume of data and relative closeness in dates, this cross sectional window of 2009-2011 wasn't deemed significant to the outcome.

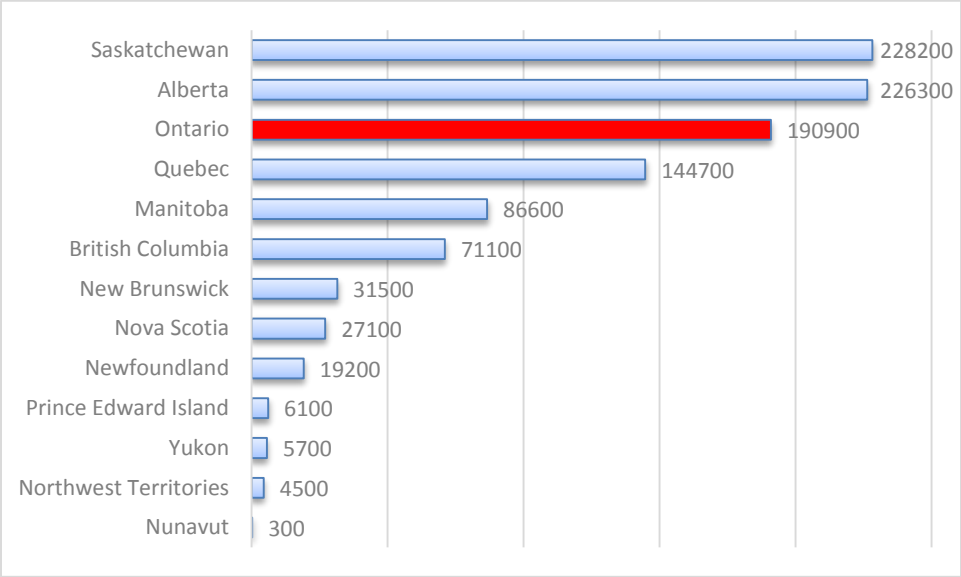
Graph 1: Cost Per Capita Summary (Canada)



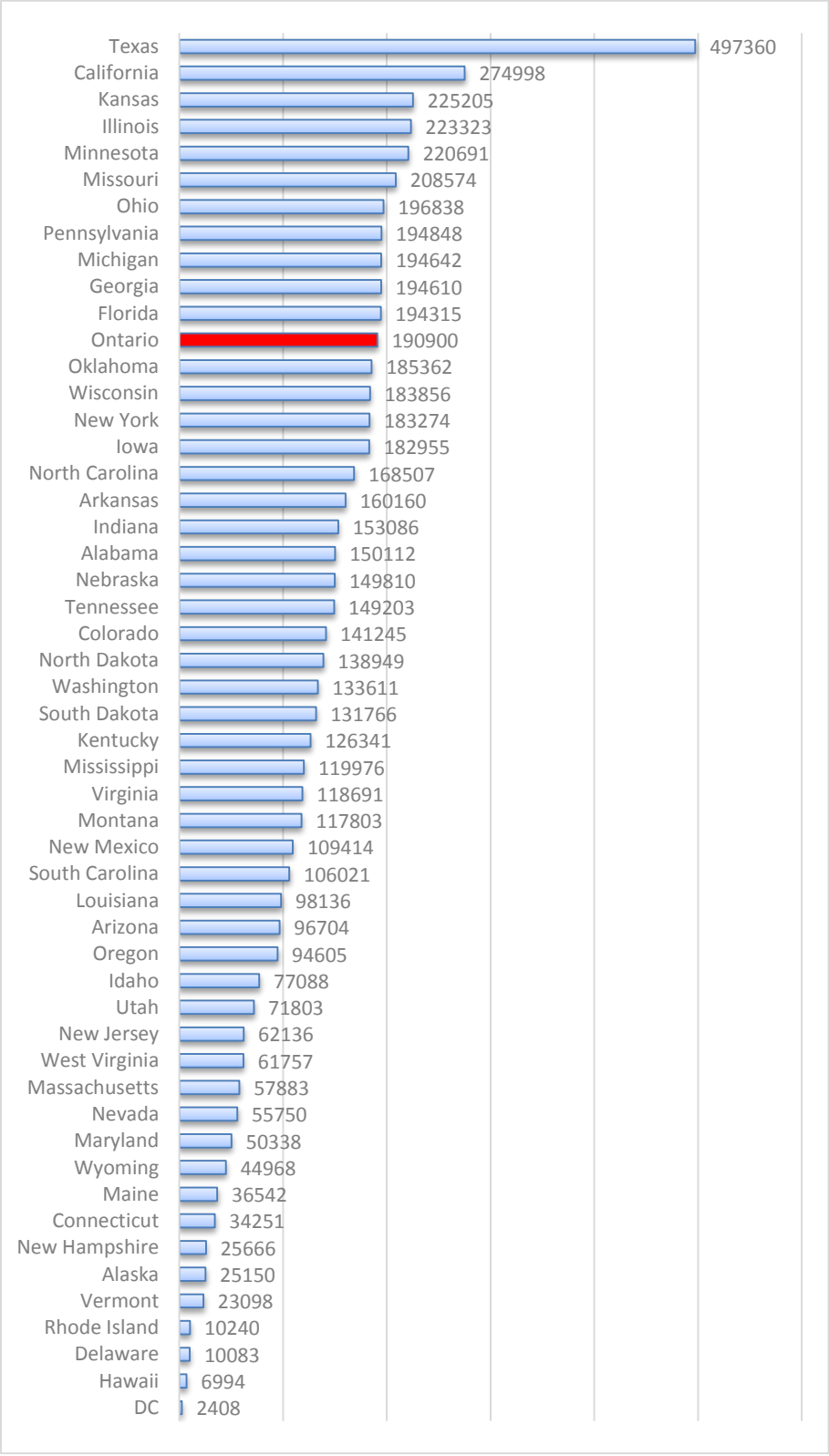
Graph 2: Cost Per Capita Summary (USA)



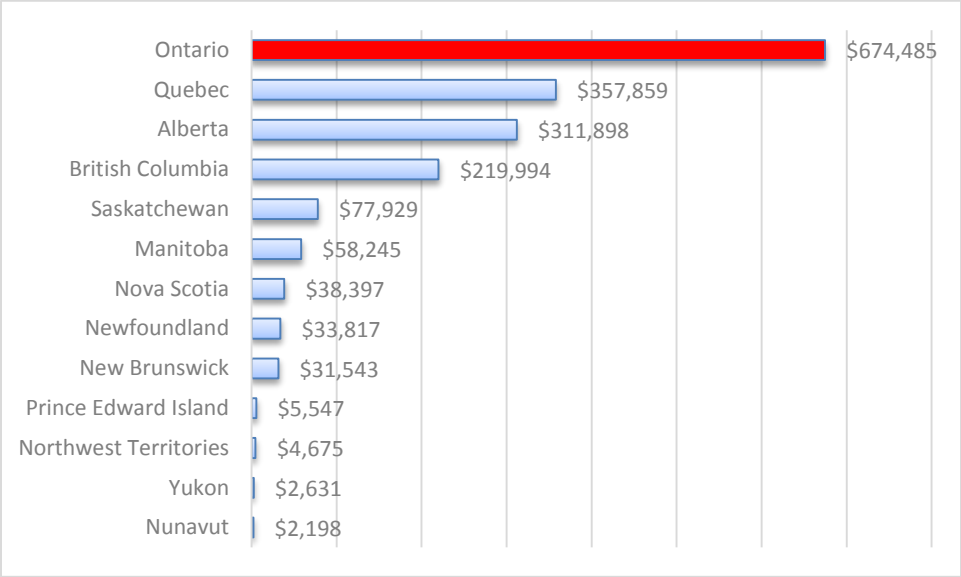
Graph 3: Kilometers of Roads (Canada)



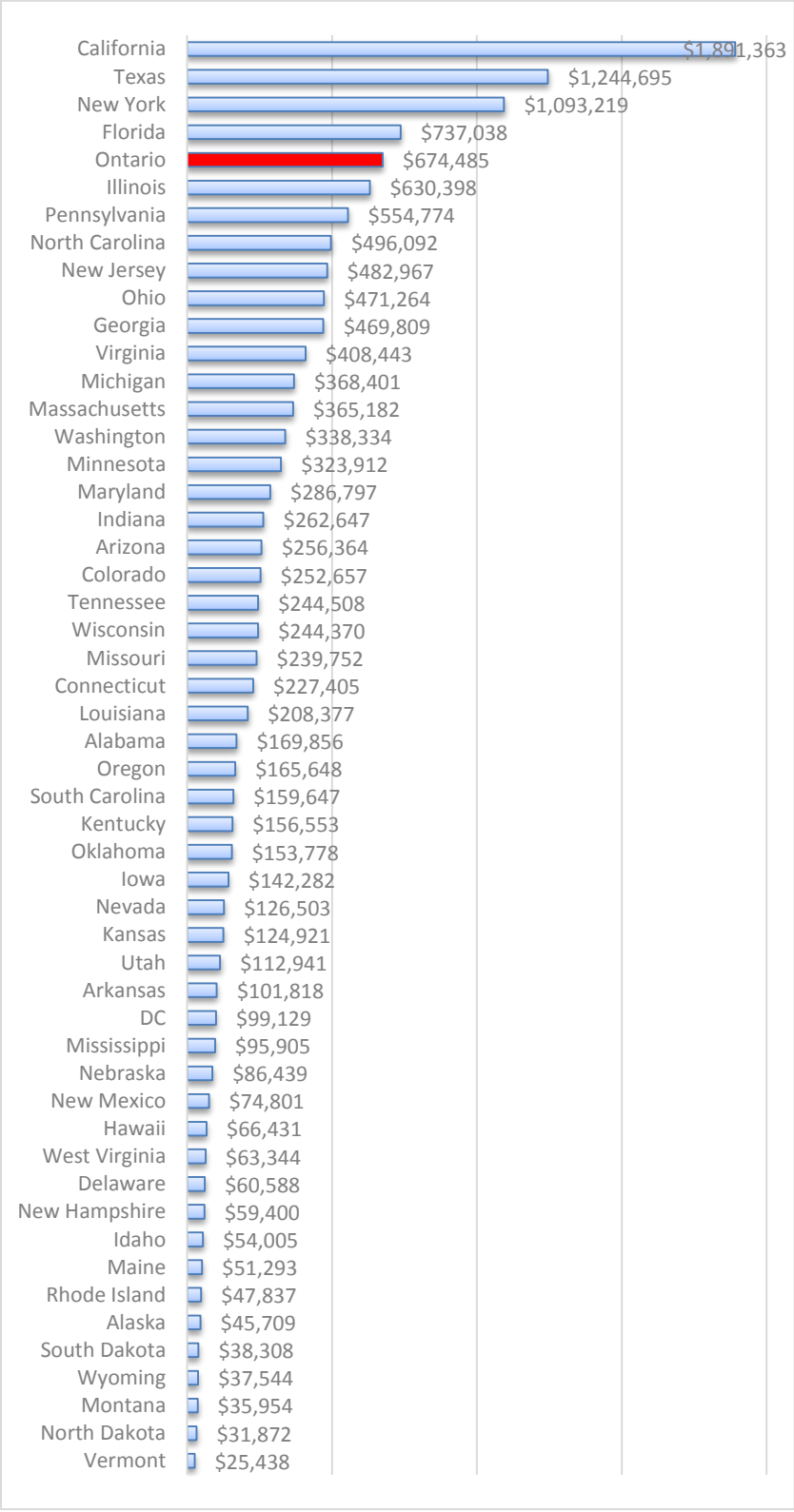
Graph 4: Kilometers of Roads (USA)



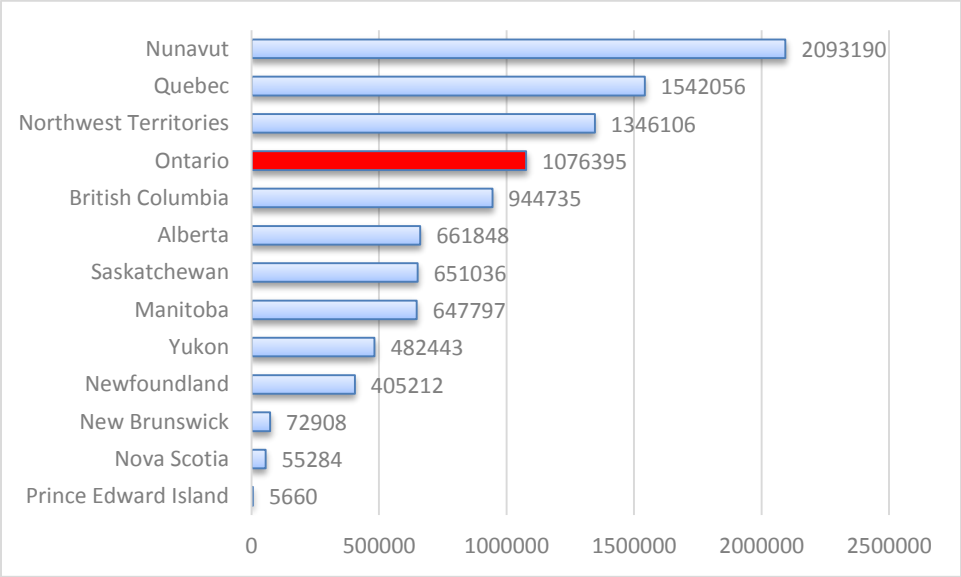
Graph 5: GDP (by Province), in Millions



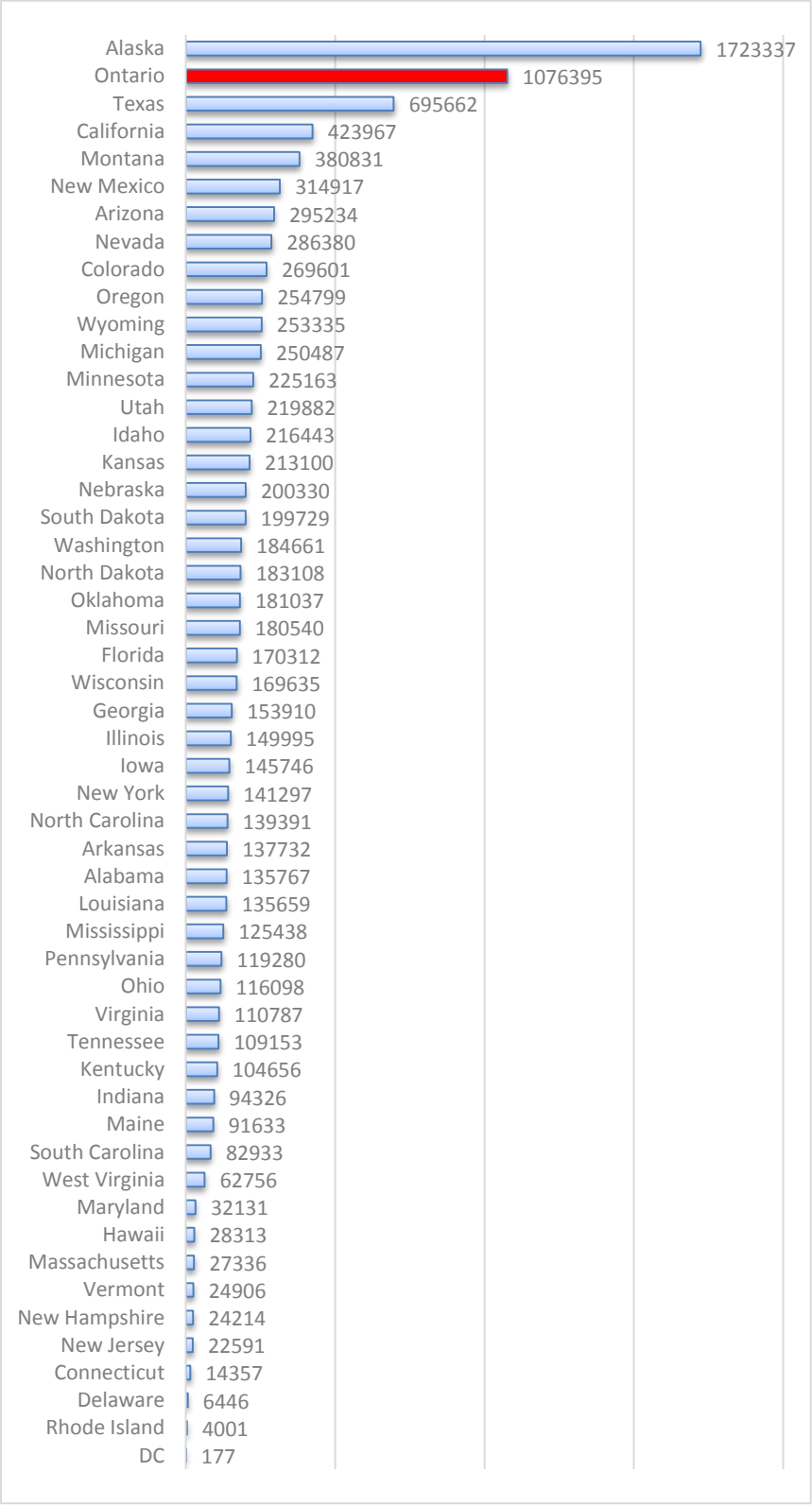
Graph 6: GDP (by State), in Millions



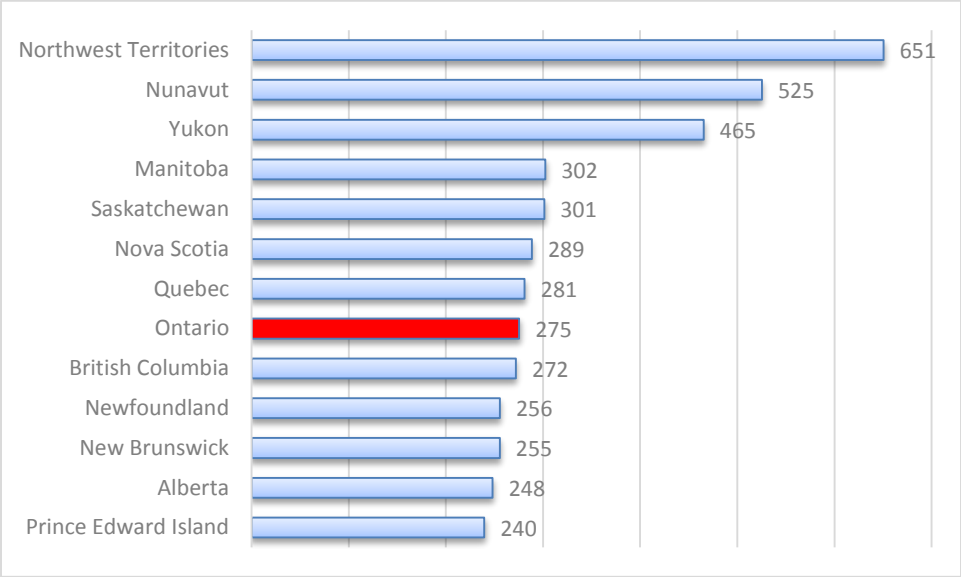
Graph 7: Area (Province), in Square Kilometers



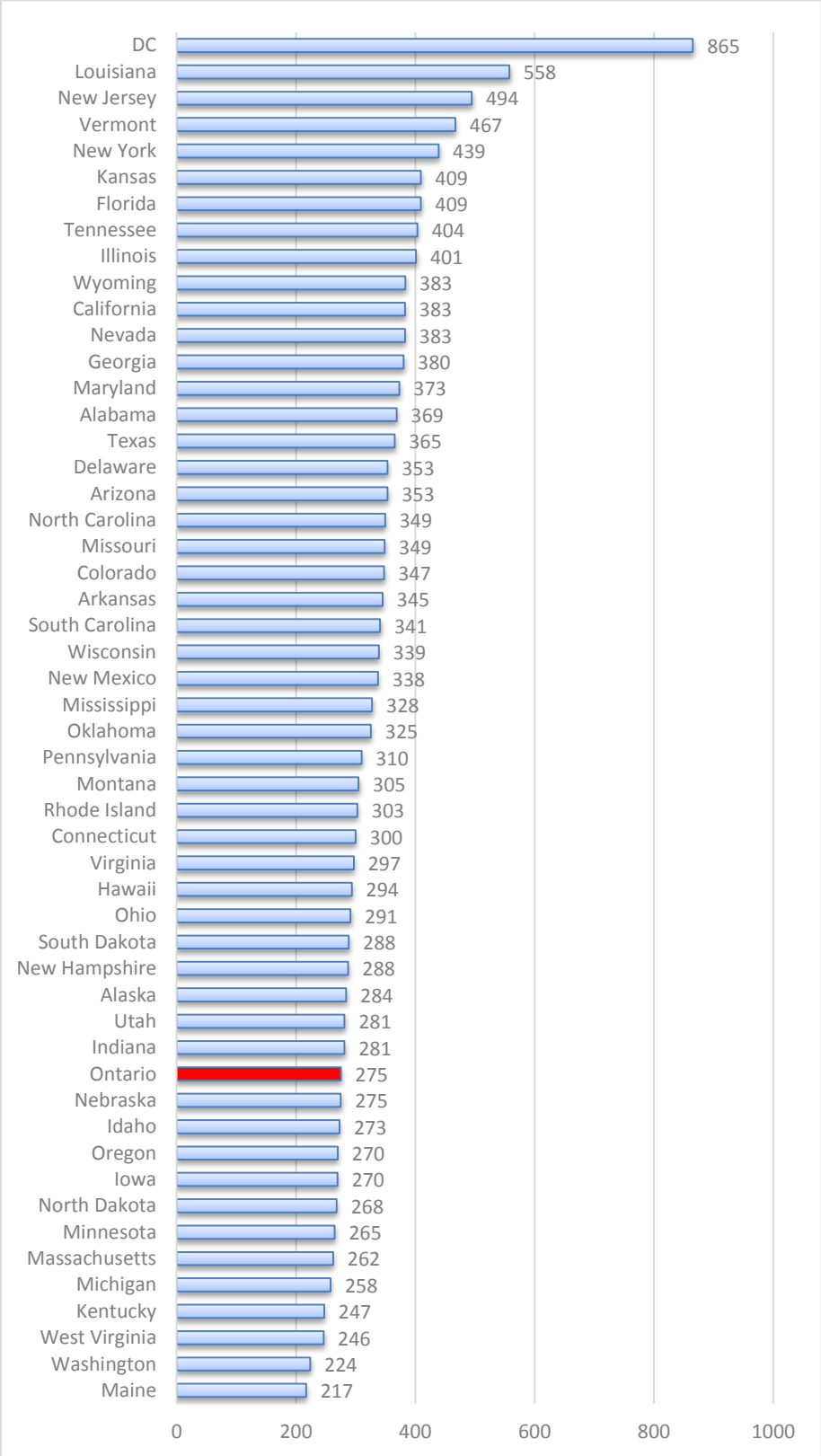
Graph 8: Area (State), in Square Kilometers



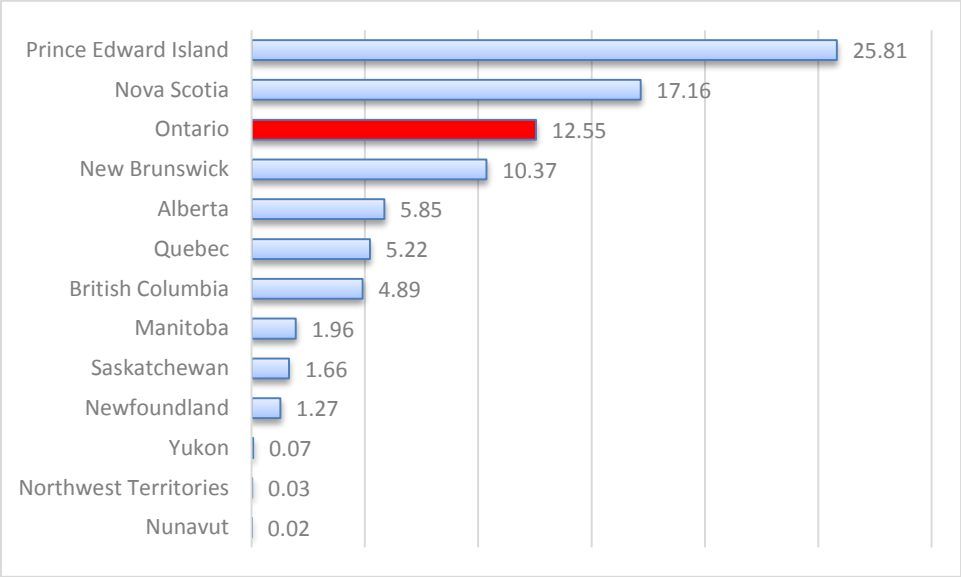
Graph 9: Law Enforcement Personnel per 100,000 Residents (Canada)



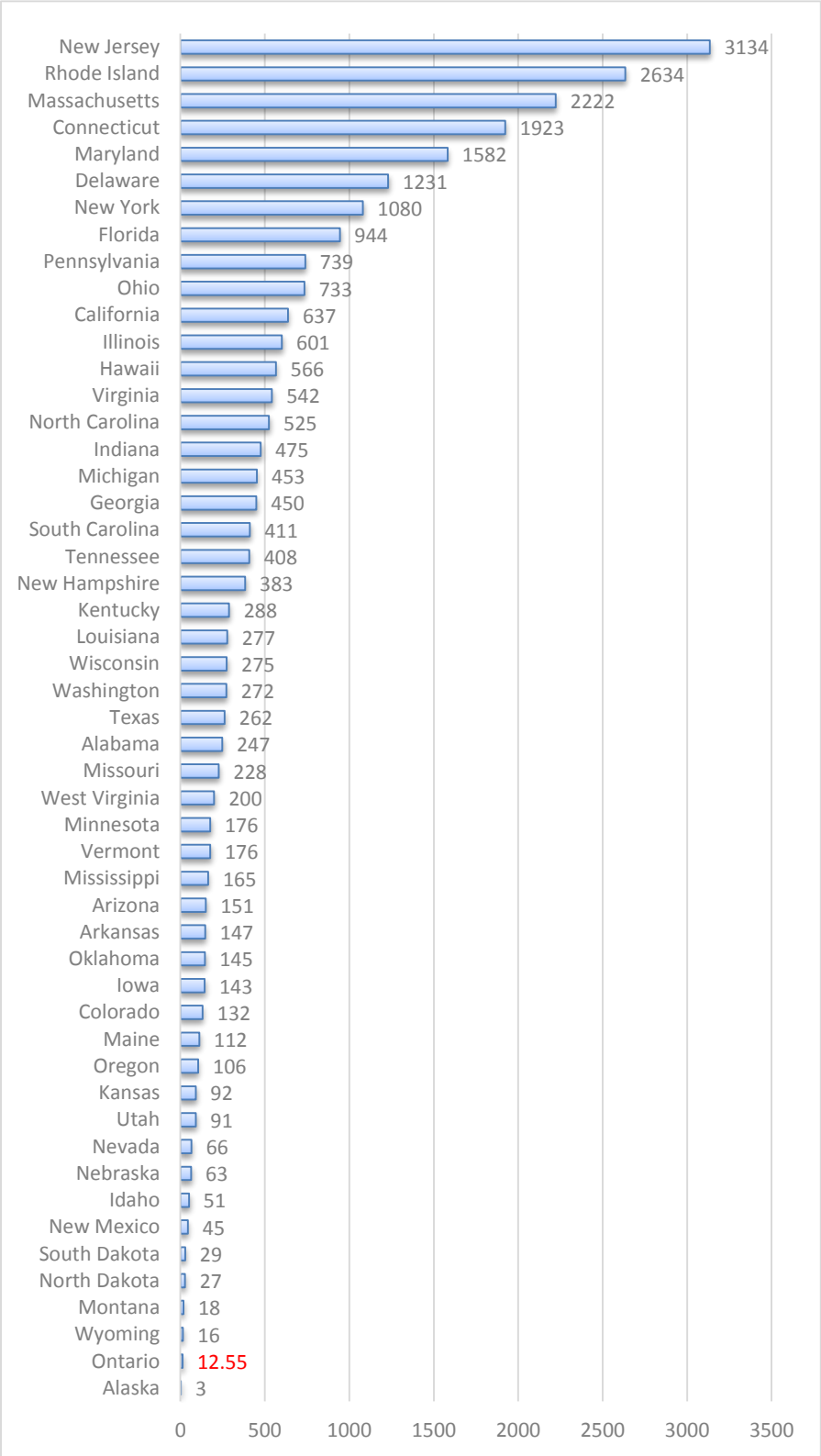
Graph 10: Law Enforcement Personnel per 100,000 Residents (USA)



Graph 11: Population Density (Canada), in People per Square Kilometer

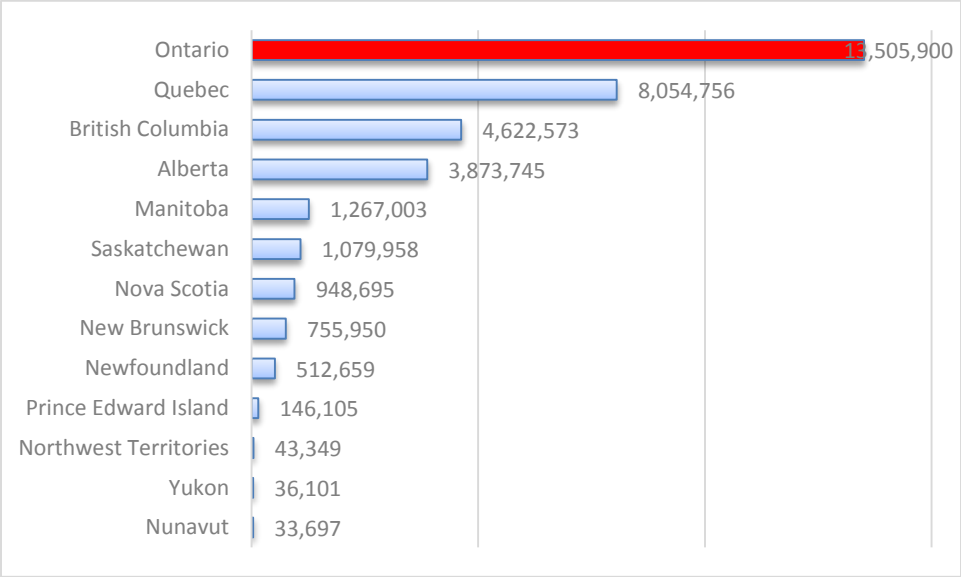


Graph 12: Population Density (USA), in People per Square Kilometer

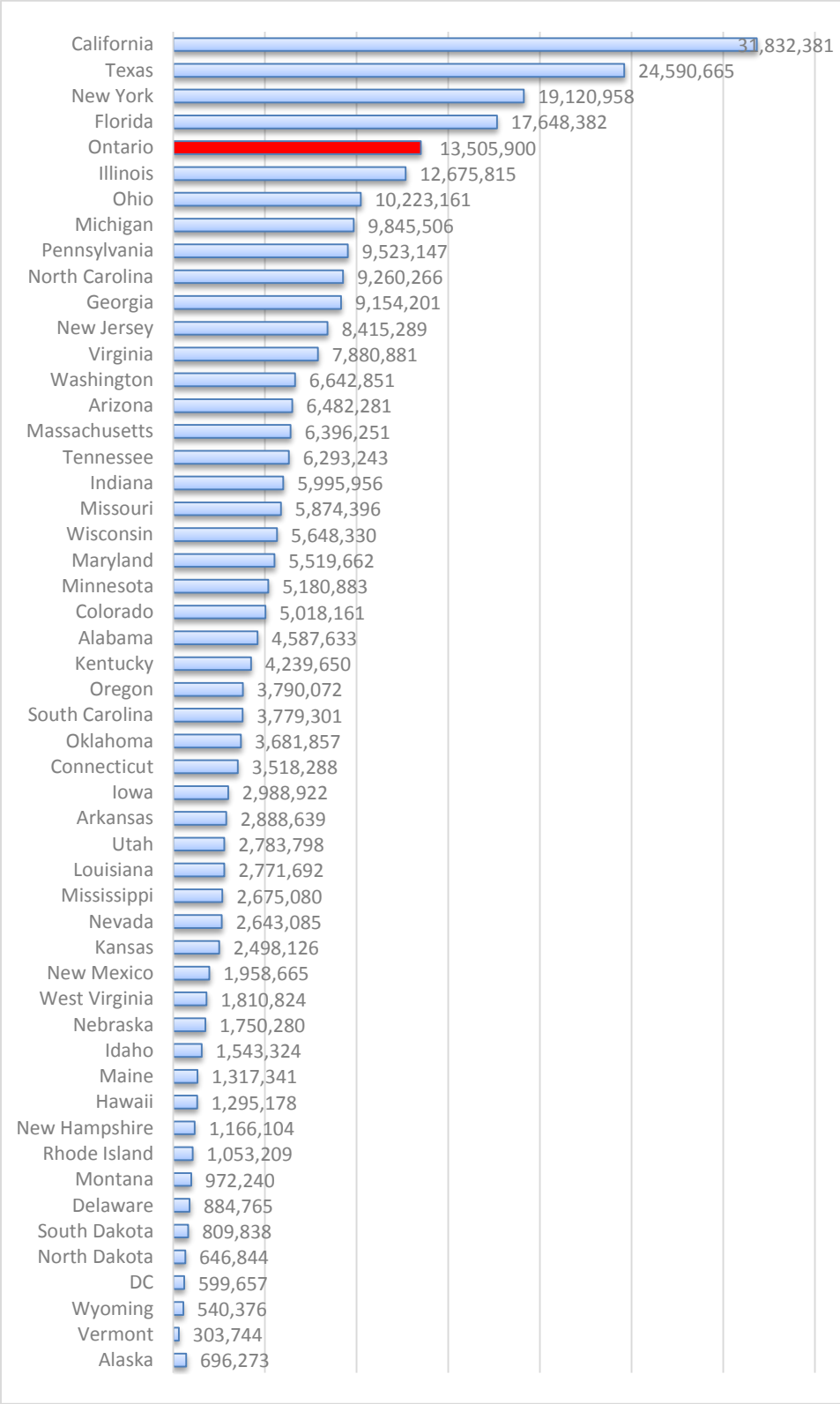


Note: DC was excluded from this graph as its extremely high density (33,770) skewed the graph and made it unreadable

Graph 13: Population (Canada)



Graph 14: Population (USA)



To continue the univariate analysis and to give a more accurate picture of the initial data, the mean and standard deviation were calculated. Some of the data covers such a large range that the mean and standard deviation are not relevant.

Mean:

$$\bar{X} = \frac{\sum X_i}{N}$$

Standard Deviation:

$$SD = \sqrt{\frac{\sum (X_i - \bar{X})^2}{N}}$$

Table 3: Analysis of Evaluative Factors

	Mean	St.Dev.	Median	Minimum	Maximum
Per Capita ($)	304	197	259	148	1265
KM Roads	118,681	87,758	118,691	300	497,360
GDP ($M)	261,237	321,765	156,553	2,198	1,891,363
Area (km^2)	321,455	426,053	170,312	177	2,093,190
Officers/100K	340	105	303	217	865
Dens. (p/km^2)	916	4155	165	0.02	33,770
Population	5,196,982	5,930,493	3,518,288	33,697	31,832,381

As mentioned previously, there is a wide variety in all quantitative characteristics of each province/state, which is reflected in Table 3. Therefore, further statistical analysis was required to determine what (and if) relationship existed between policing cost per capita and the indicators being studied.

From the original questions that were posed during the research phase (stated previously), six hypotheses were developed for further analysis:

1. The number of law enforcement personnel (expressed as officers per 100,000 residents) will have an effect on per capita cost.
2. The more kilometers of roads in a jurisdiction, the higher the police cost will be.
3. The higher the GDP of a state/province, the more it will be able to afford a strong police presence, and therefore will reflect a higher per capita cost.
4. The more people there are in a jurisdiction, the more police officers are required and therefore, a higher cost.
5. The higher the population density, the more police are required and therefore, a higher cost.
6. The larger the geographic area of a jurisdiction, the more police will be required to patrol, and therefore per capita cost will increase.

Consequently, the null hypotheses will be the reverse of the above statements.

To evaluate these hypotheses, a chi-square test was carried out to "compare the observations contained in a dataset with the observations expected if the relationship between variables is random in the population."[xi] The chi-square test should indicate the probability that the variables are related and thus prove (or disprove) the six hypotheses.

For the chi-square tests, per capita cost data was grouped into the following categories for each analysis:

- Below Average: $148-289
- Average (+/- 5%): $289-319
- Above Average: $319-1265

Table 4: Chi-Square Test for Number of Law Enforcement Personnel

$/CAPITA	LAW ENFORCEMENT PERSONNEL PER 100,000 CITIZENS			
	0-300	301-400	401+	
BELOW AVG	24	14	4	*42*
AVG (+/-5%)	2	4	1	*7*
ABOVE AVG	2	6	7	*15*
	28	*24*	*12*	

This data was then compared with a table of expected values (assuming no relationship). Expected values were found by multiplying the row marginal by the column marginal and dividing by N (the total number of samples: 64).

Expected Value

18.4	15.8	7.9
3.1	2.6	1.3
6.6	5.6	2.8

Chi-square was calculated as:

$$X^2 = \frac{\sum(f_o - f_e)^2}{f_e}$$

Then comparing with the Chi-Square Distribution table, along with the degrees of freedom (below), the probability of a relationship was determined.

Degrees of freedom

df = ((C-1)(R-1))

= ((3-1)(3-1)) = 2x2

= 4

Therefore, at a 95% confidence level and with a degrees of freedom of 4, using the chi-square distribution table, we need to have a chi-square value of 9.488 in order to reject the null hypothesis (that the number of law enforcement personnel per 100K citizens is not related to police cost per capita). Therefore, with a calculated value of 14.583, we can conclude that there is indeed a relationship between the number of law enforcement personnel and cost.

Table 5: Chi-Square Test for Kilometers of Road

KM OF ROADS

	0-100000	100001-200000	200001+	
BELOW AVG	15	22	5	*42*
AVG (+/-5%)	4	2	1	*7*
ABOVE AVG	10	3	2	*15*
	29	*27*	*8*	

Expected Value

19.0	17.7	5.25
3.2	3.0	0.9
6.8	6.3	1.9

Therefore, at a 95% confidence level and with a degrees of freedom of 4, using the chi-square distribution table, we need to have a chi-square value of 9.488 in order to reject the null hypothesis (that kilometers of roads is not related to police cost per capita). Therefore, with a calculated value of 5.683, we can conclude that there is no relationship between kilometers of roads and policing cost.

Table 6: Chi-Square Test for GDP

GDP (MILLIONS $)

$/CAPITA	0-200,000	200,001-400,000	400,001+	
BELOW AVG	24	12	6	*42*
AVG (+/-5%)	3	3	1	*7*
ABOVE AVG	9	1	5	*15*
	36	*16*	*12*	

Expected Value

23.6	10.5	7.9
3.9	1.8	1.3
8.4	3.8	2.8

Therefore, at a 95% confidence level and with a degrees of freedom of 4, using the chi-square distribution table, we need to have a chi-square value of 9.488 in order to reject the null hypothesis (that GDP of a state/province is not related to police cost per capita). Therefore, with

a calculated value of 5.589, we can conclude that there is no relationship between a state's/province's GDP and policing costs.

Table 7: Chi-Square Test for Population

POPULATION

$/CAPITA	0-5M	5M-10M	10M+	
BELOW AVG	27	13	2	*42*
AVG (+/-5%)	4	2	1	*7*
ABOVE AVG	9	2	4	*15*
	40	*17*	*7*	

Expected Value

26.3	11.2	4.6
4.4	1.9	0.8
9.4	4.0	1.6

Therefore, at a 95% confidence level and with a degrees of freedom of 4, using the chi-square distribution table, we need to have a chi-square value of 9.488 in order to reject the null hypothesis (that population is not related to police cost per capita). Therefore, with a calculated value of 6.486, we can conclude that there is no relationship between population and policing cost.

Table 8: Chi-Square Test for Population Density

POPULATION DENSITY (P/KM^2)

$/CAPITA	0-400	401-1000	1001+	
BELOW AVG	30	10	2	*42*
AVG (+/-5%)	4	1	2	*7*
ABOVE AVG	9	2	4	*15*
	43	*13*	*8*	

Expected Value

28.2	8.5	5.3
4.7	1.4	0.9
10.1	3.0	1.9

Therefore, at a 95% confidence level and with a degrees of freedom of 4, using the chi-square distribution table, we need to have a chi-square value of 9.488 in order to reject the null hypothesis (that population density is not related to police cost per capita). Therefore, with a calculated value of 6.771, we can conclude that there is no relationship between population density and policing cost.

Table 9: Chi-Square Test for Geographic Area

GEOGRAPHIC AREA (KM^2)

$/CAPITA	0-500000	500001-1,000,000	1,000,001+	
BELOW AVG	40	2	0	*42*
AVG (+/-5%)	4	2	1	*7*
ABOVE AVG	10	1	4	*15*
	54	*5*	*5*	

Expected Value

35.4	3.3	3.3
5.9	0.5	0.5
12.7	1.2	1.2

Therefore, at a 95% confidence level and with a degrees of freedom of 4, using the chi-square distribution table, we need to have a chi-square value of 9.488 in order to reject the null hypothesis (that geographic area is not related to police cost per capita). Therefore, with a calculated value of 17.162, we can conclude that there is a relationship between geographic area and policing cost.

Therefore, based on an initial statistical analysis using chi-square tests, the following two hypotheses were proved correct, in that there was a statistically relevant relationship between the indicator and per capita police costs.

1. The number of law enforcement personnel (expressed as officers per 100,000 residents) does indeed have an effect on per capita cost.
2. The geographic area of a jurisdiction has an impact on per capita cost.

As is typical with many organizations, human resource costs (salaries) comprise a large portion of budgets (for example, 85% of the OPP operating budget is salaries), so perhaps it was to be expected that the number of law enforcement personnel would indeed have an impact on per capita cost. So while this answers the hypothesis, it does not provide any information or real insight into the research topic about cost drivers for police services aside from concluding that

human resource and salary costs have a large impact on overall police budgets. Therefore, a further chi-square analysis was carried out with the number of law enforcement officers per 100,000 residents as the constant instead of per capita costs in an effort to determine if there were any relationships between the remaining four indicators (excluding number of law enforcement officers and geographic area) and staffing levels. In theory, knowing what contributes towards the number of law enforcement officers should provide insights into overall budget impacts.

The following four hypotheses were developed for analysis:

1. The more kilometers of roads in a jurisdiction, the more officers there will be.
2. The higher the GDP of a state/province, the more officers there will be.
3. The more people there are in a jurisdiction, the more officers there will be.
4. The higher the population density, the more police there will be.

For the next set of chi-square tests, the following values were used to set the below average/average/above average categories:

- Below Average: less than 324 (officers per 100,000 residents)
- Average (+/- 5%): 324-358
- Above Average: greater than 358

Table 10: Chi-Square Test for Kilometers of Roads

Officers/100K	KM OF ROADS: 0-100000	100001-200000	200001+	
BELOW AVG	17	14	3	*34*
AVG (+/-5%)	2	8	1	*11*
ABOVE AVG	10	5	4	*19*
	29	*27*	*8*	

Expected Value

23.6	10.5	7.9
3.9	1.8	1.3
8.4	3.8	2.8

Therefore, at a 95% confidence level and with a degrees of freedom of 4, using the chi-square distribution table, we need to have a chi-square value of 9.488 in order to reject the null hypothesis (that kilometers of roads is not related to the number of law enforcement personnel).

Therefore, with a calculated value of 14.838, we can conclude that there is a relationship between kilometers of roads and the number of law enforcement personnel.

Table 11: Chi-Square Test for GDP

Officers/100K	GDP (MILLIONS) 0-200,000	200,001-400,000	400,001+	
BELOW AVG	21	9	4	*34*
AVG (+/-5%)	6	4	1	*11*
ABOVE AVG	9	3	7	*19*
	36	*16*	*12*	

Expected Value

23.6	10.5	7.9
3.9	1.8	1.3
8.4	3.8	2.8

Therefore, at a 95% confidence level and with a degrees of freedom of 4, using the chi-square distribution table, we need to have a chi-square value of 9.488 in order to reject the null hypothesis (that GDP of a state/province is not related to the number of law enforcement personnel). Therefore, with a calculated value of 12.826, we can conclude that there is a relationship between a state's/province's GDP and the number of law enforcement personnel.

Table 12: Chi-Square Test for Population

POPULATION

Officers/100K	0-5M	5M-10M	10M+	
BELOW AVG	24	8	2	*34*
AVG (+/-5%)	6	5	0	*11*
ABOVE AVG	10	4	5	*19*
	40	*17*	*7*	

Expected Value

26.3	11.2	4.6
4.4	1.9	0.8
9.4	4.0	1.6

Therefore, at a 95% confidence level and with a degrees of freedom of 4, using the chi-square distribution table, we need to have a chi-square value of 9.488 in order to reject the null hypothesis (that population is not related to the number of law enforcement personnel). Therefore, with a calculated value of 16.288, we can conclude that there is a relationship between population and the number of law enforcement personnel.

Table 13: Chi-Square Test for Population Density

POP DENSITY

Officers/100K	0-400	401-1000	1001+	
BELOW AVG	25	6	3	*34*
AVG (+/-5%)	8	2	1	*11*
ABOVE AVG	10	5	4	*19*
	43	*13*	*8*	

Expected Value

28.2	8.5	5.3
4.7	1.4	0.9
10.1	3.0	1.9

Therefore, at a 95% confidence level and with a degrees of freedom of 4, using the chi-square distribution table, we need to have a chi-square value of 9.488 in order to reject the null hypothesis (that population density is not related to the number of law enforcement personnel). Therefore, with a calculated value of 6.771, we can conclude that there is no relationship between population density and the number of law enforcement personnel.

Therefore, based on a further statistical analysis using chi-square tests, the following three hypotheses were proved correct, in that there was a statistically relevant relationship between the indicator and number of law enforcement personnel (and therefore on cost).

1. The number of kilometers of roads in a jurisdiction has an impact on the number of law enforcement officers.
2. The GDP of a province/state has an impact on the number of law enforcement officers.
3. The population of a province/state has an impact on the number of law enforcement officers.

7.0 Generalizations

From the data analysis, the factors or indicators which proved to have statistical relevance to per capita policing costs were:

1. The number of law enforcement officers
2. The geographic area of a jurisdiction

Upon further analysis, the following factors were observed to have statistical relevance to the number of law enforcement officers:

1. The length of roads (kilometers) within a jurisdiction
2. The GDP of a province/state
3. The population of a province/state

All of these factors are applicable to the province of Ontario; it ranks high on each of the graphs shown previously for GDP, population, length of roads and large geographic size. From the limited scope of the research contained in this report, it would appear that many of the indicators having an effect on the number of law enforcement officers are fixed by nature of the province's geography, demographics and industry.

Certainly there are exceptions and variations within in each jurisdiction and within Ontario, especially with municipal police services that may not have to deal with the factors above (large geography, population, GDP, etc.) but on average, it would seem that this applies to Ontario.

This leaves one factor or indicator that is within the control of police services (including the OPP) in Ontario: the number of law enforcement officers and the cost to provide those officers.

8.0 Implications for Theory

"It is critical not to confuse what the police ended up actually doing with the reasons why they were actually founded. The fact that they "may" have been effective against social disorder, crime, migrant workers, and working class people does not of itself prove that that was why they were created."[xii]

In light of the conclusions and results of this research paper (and others), it appears as if the number of officers and the cost to employ those officers is critical to the cost of policing. And while it is beyond the scope and purpose of this paper, society needs to reexamine what role it expects police to play. "We need to reexamine police processes to determine just what requires the armed authority of the state in your living room."[xiii] It would seem apparent that the current system is broken and unsustainable and that governments at all levels are fiddling while "Rome burns around them". Returning to the Ontario example, the current funding model for police services is broken at many levels and needs to change to be more reflective of the reality faced by the province and 444 municipal governments contained therein.

The manner in which society polices itself must evolve. Police departments (and society) must reexamine what will best provide public safety, crime prevention, and a just society. The issue of skyrocketing costs cannot be solved through traditional methods alone. Similar to restructuring being discussed and planned in health care (for example, keeping people out of hospitals, focusing on prevention and health promotion, home care, etc.) and in fire services (for example, increased building standards, fire retardant materials, fire prevention vs. firefighting), police departments (and society) need to reexamine their service delivery model and organizational structure to look for new and more efficient means of providing a safe society.

More efforts need to be made to reduce labour costs, either through automation of key tasks, other replacements for human labour, through increased use of civilians (for example, call centers, crime scene analysts, accident reconstruction, social workers, etc.) or other agencies instead of (more costly) uniformed officers. Technology has increased productivity in many other fields, perhaps police departments need to examine (if they are not already doing so) increased use of technology in an effort to boost productivity. Opportunities also exist for other government agencies and businesses to be more proactive in security of property and crime prevention through system design and policy change. Police departments (or municipalities/states/provinces) could examine the increased use of private security firms to provide certain services. Murphy and Clarke[xiv] refer to their research in Nova Scotia where private security agencies provide many services that might typically fall under the role of a public police force:

- Mobile and foot patrol
- Property protection
- Calls for service
- Medical/emergency response
- Arrest
- Criminal investigations
- Crime prevention consulting
- Security surveillance
- Personal protection
- Public order policing
- Traffic policing
- Law enforcement
- Court and case preparation
- Armed force (armoured car security)

In an argument that has been used in health care reform discussions, it is important to recall that in any move towards increased privatization however that "the state [does not act] necessarily as the exclusive purveyor of policing services but as the guarantor that such services are provided in a manner that protects core democratic values, impartially, independently, and accountably. Adopting the language of 'steering' and 'rowing', if the state through its governance system, steers properly, rowing may be safely devolved to both public and private agencies."[xv]

"The central question for police leadership then should not be whether major changes will occur, but rather whether those changes will be prompted thoughtfully by police professionals or forced on the profession by external forces and driven by agendas less concerned with public safety and professional development. The former can lead to a professional renaissance where new, invigorating business models are developed, leading to major improvements in public safety."[xvi]

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