Intergenerational Justice in Public Finance:
A Canadian case study

by Paul Kershaw

*A*bstract: *This study examines whether Canadian governments have adapted budgets for the ageing population in accordance with norms of intergenerational justice. Public finance data in 2016 are analysed compared to 1976 in light of three constructs: the elderly/non-elderly ratio of social spending change, intergenerational reciprocity, and ability to pay. Findings include that (i) governments increased per capita spending for seniors 4.2 times faster than for those under the age of 45; (ii) public finance requires younger Canadians to contribute 22%-62% more in income taxes for the elderly now by comparison with 1976; and (iii) the contemporary ageing population has a greater ability to pay than cohorts immediately before and after them.*

Keywords: *Taxes, Government Expenditures, Generational Equity, Housing Wealth, Public Reporting*

Canada, like many countries, is ageing. Seniors represent 16.5% of the population, up from 8.7% in 1976.[1] In countries experiencing such trends, there are worries about "bankruptcy for publicly funded health care and pension systems [...], unfair treatment of children vis-à-vis the elderly [...] and the burdening of future generations" (Lee/Mason 2011: 3). Canada is no exception. The federal government has made, and repealed, changes to the age of eligibility for Old Age Security. Provincial premiers launched a Task Force on Aging, and the national social science agency prioritised the research question "What are the future implications of state regulation from cradle to grave?" that arise from "Life cycle issues... challenging society."[2] This study helps to answer the question by reviewing the evolution of key age-related policies in Canadian public finance over the last four decades in light of norms of intergenerational justice.

Several recent comparative public finance studies about generational equity include Canada (Tepe/Vanhuysse 2010; Bradshaw/Holmes 2013). The most sophisticated is by Vanhuysse (2013), who finds that Canada is among the worst 9 of 29 nations for intergenerational justice. Generally, even the strongest comparative studies omit spending on medical care, tax expenditures, and sometimes even education, which undermine their utility.[3] In response, more scholars are producing country-specific analyses.[4] For example, the anthology by Lee and Mason features over 20 single country studies in recognition that "designing effective policy [...] is a complex, detailed, and inherently country-level task that is best carried out one country at a time" (Lee/Mason 2011: 30). I design this study accordingly.

Generational equity in public finance received substantial attention in the 1990s when funding for the Canada and Quebec Public Pensions (C/QPP) factored prominently in public debate. Much of this work responded to Oreopoulos and Kotlikoff (1996), who estimated that total government spending in 1995 required taxes of future generations that were twice what current generations were paying. Following government adaptations to the C/QPP, Statistics Canada published an anthology edited by Corak (1998). This included an updated study by Oreopoulos and Vaillaincourt (1998), who concluded that spending cuts, tax increases and revisions to C/QPP between 1995 and 1998 restored balance to tax collection between contemporary and future generations. By 1999, total government revenue collection was 43.6% of GDP, while total expenditure was 41.9%.[5] There has been little analysis of generational fairness in Canadian public finance since then, and no government routinely reports on this theme. Given that government revenue fell 4.7% of GDP in the subsequent years, while expenditure dropped only 1.7%,[6] it is timely to revisit questions about intergenerational justice.

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This article has five sections. I begin by summarising the theoretical framework and methods, focusing on three constructs that are common in the literature: the elderly/non-elderly spending ratio; intergenerational reciprocity; and the ability to pay of different age cohorts. Sections 2 to 4 apply the constructs to analysis of Canadian data. These data provide evidence that Canadian governments did not prioritise intergenerational justice over the last four decades and, as discussed in the final section, illuminate opportunities to rebalance public finance between the young and aged.

Theoretical framework and methods

Guided by the United Nations' vision of a society for all ages,[7] I focus on whether governments *budget for all ages*, drawing on population health scholarship. A robust scientific literature reveals that health does not start with health care. It starts with the social determinants of health where we are born, grow, live, work and age.[8] These include the distribution of wealth, income, education, employment, housing, human impact on the climate, and the government policies that shape these other determinants. Biological sensitivity to the social determinants is particularly strong during our earliest years (Commission on the Social Determinants of Health 2008: chapter 5; Keating/Hertzman 1999). As a result, budgeting for all ages requires legislators to promote "health in all policies" in recognition that health promotion is the domain of social, economic and environmental ministries, whereas medical ministries treat illness more than they prevent it (Commission on the Social Determinants of Health 2008: chapter 10; Kershaw 2018).

I operationalise the concept of budgeting for all ages in three stages. First, following the path-breaking scholarship of Lynch (2006: 20) and Vanhuysse (2013), I calculate the *elderly/non-elderly ratio of spending changes* over the last four decades. For the elderly, I

examine spending on retirement income and medical care. For non-elderly, I prioritise programmes that invest in generations raising young children, because epigenetics literature reveals opportunities to advance life-long health by investing in this demographic (Keating/Hertzman 1999; Boyce 2007). In accordance with Kershaw and Anderson (2016), I conceive of this age group as those under the age of 45,[9] and focus on childcare services, parental leave, cash supports for families with children, education and medical care. These represent major policies by which governments can adapt costs for younger generations, although it is not an exhaustive list.

> Canadian governments did not prioritise intergenerational justice over the last four decades.

I calculate changes in spending on programmes for 2016 compared to 1976, and interpret these in the light of revenue changes over the same period. Aggregate and per capita figures are assessed. All expenditures are adjusted for inflation and economic growth using consumer price index[10] and gross domestic product (GDP) data available at Statistics Canada. 1976 is selected for comparison, because it marks the beginning of the five-year period in which the largest part of the Baby Boom generation (born 1946-64) came of age as young adults. I thus examine government spending at two pivotal stages for Boomers: when raising children 40 years ago, to which I compare public finance now for Canadians under 45, a cohort that includes many of their children; and now at retirement, to which I compare spending 40 years ago for the cohort of seniors that included many of their parents.

The second stage of analysis digs further into revenue collection to explore the *intergenerational golden rule* recommended by Wolfson et al. (1998: 108). With roots in reciprocity theories of intergenerational justice (Gosseries 2009), this norm implies that "one generation, when it becomes old and frail, should not expect to be treated any better by its children than it treated its parents' generation in their old age" (Wolfson et al. 1998: 108). I examine this theme by calculating income taxes owed by representative 35 year-olds, measuring the amount of taxes paid to medical care and Old Age Security for contemporary seniors. I then repeat the tax calculations for inflation-adjusted incomes in 1976 to assess whether young taxpayers today pay more, or less, for programmes targeting the elderly by comparison with when today's elderly were young. I use Statistics Canada's Social Policy Simulation Database and Model (SPSD/M) to calculate taxes. It is widely used to analyse the financial interactions of governments and individuals in Canada.[11]

> [I]t may be appropriate for a generation to pay more in taxes or transfers than its predecessors, if that generation inherits more affluence than did its parents.

The third stage of analysis examines whether generations come of age in more, or less, advantageous circumstances, with unearned implications for their relative need or ability to pay. I refer to this theme as the *lottery of timing*, which is important to scholars of intergenerational justice who build on the tradition of Rawls (Rawls 1971: section 44). Behind a veil of ignorance where parties do not know if they will inherit poor or affluent circumstances or to what generation they may belong, Rawls judges that the obligations of one generation to save on behalf of successors or invest in elders will vary in proportion to the epochal conditions in which they live. This insight anticipates that it may be appropriate for a generation to pay more in taxes or transfers than its predecessors, if that generation inherits more affluence than did its parents. I analyse this theme by reporting on indicators selected by Vanhuysse (2013) for his Intergenerational Justice Index. I pay additional attention to earnings relative to housing costs, and explore implications for wealth accumulation. Ultimately, the third stage invites evaluation of whether intergenerational adaptations in public finance are made in proportion to the social determinants of health faced contemporarily by different age cohorts, as well as relative to the advantages and disadvantages inherited by those cohorts.[12]

Spending on the elderly and on those under the age of 45: 1976 and 2016

This section describes changes in public spending by all levels of Canadian government for citizens aged 65+ and under the age of 45 in 2016 by comparison with 1976 (see Table 1). Almost all spending comes from general revenue, which grew by $11.3 billion in 2016.[13] The Canada and Quebec Public Pensions (C/QPP) are the exception, with separate revenue streams to which citizens prepay for later benefits. C/QPP revenue had increased $36.5 billion by 2016.

As general revenue hovered around 35% of GDP in both years, governments increased spending for seniors on medical care by $36.1 billion in 2016,[14] and Old Age Security (OAS) by $4.9 billion.[15] OAS spending grew little, because retirement income spending grew primarily in the C/QPP, which surged by $48.5 billion.[16] The $91.6 billion increase in spending (half from general revenue) partly reflects there are 4 million more seniors today than in 1976, as the population aged 65+ increased from 8.7% to 16.5%.

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Substantial demographic changes among younger Canadians, however, did not drive comparably large aggregate expenditure increases. For example, 4.6 million more Canadians under 45 now have post-secondary credentials than in 1976, as graduation from university, college or trades increased from 28% to 70% for people aged 25-44.[17] But post-secondary spending remained relatively flat over the two years, up $2.7 billion.[18] Similarly, 2.3 million more women aged 25-44 are in the labour force, as their participation increased from 54% in 1976 to 83% in 2016.[19] Despite the resulting increase in demand for child care, annual spending on this budget line grew just $3.6 billion.[20] Such comparisons reveal that substantial new spending on the ageing population reflects factors beyond demography,[21] since other comparable demographic changes did not motivate similarly-sized spending increases.[22]

As spending on seniors from general revenue increased four times more than revenue, governments dealt with resulting budget shortfalls in two ways. They increased the debt/GDP ratio by half a trillion dollars,[23] and reduced spending elsewhere. Reductions

	Aggregate spending					Major dem
	1976	2016	2016 minus 1976			19
			%GDP	$ millions		
GDP ($ millions, per capita)	205,123	2,027,544				
Revenue						
Total Gov't General Revenue	34.99%	35.55%	0.56%	**11,349**	*Population grows from*	23,
CPP/QPP Revenue	1.60%	3.39%	1.80%	**36,483**	*23.4 million to 36.3 million.*	23,
Total	36.59%	38.95%	2.36%	**47,832**	*GDP/person grows 54%*	23,
Spending 65+						
From general revenue						
Medical care to 65+	1.94%	3.82%	1.88%	**38,108**	*4.0 million more seniors, up*	1,
sensitivity analysis	1.79%		2.03%	41,089	*from from 8.7% to 16.5% of*	
OAS	2.10%	2.34%	0.24%	**4,947**	*population.*	1,
General revenue Subtotal	*4.03%*	*6.16%*	*2.12%*	*43,056*	*Consistent enrolment rate in*	
From C/QPP Revenue	0.54%	2.93%	2.39%	**48,501**	*programmes. Per capita use of*	1,
Total	4.57%	9.09%	4.52%	**91,556**	*medical spending up 55%*	1,
Spending <45						
Child care services	0.05%	0.23%	0.18%	**3,559**		16,
sensitivity analysis					*2.3 million more women <45 in*	4,
Parental leave	0.07%	0.19%	0.12%	**2,418**	*LF, up from 54% to 83%*	16,
sensitivity analysis						
Family income support	0.95%	1.04%	0.09%	**1,790**	*<age 45 from 72% to 56%* *Consistent enrolment rate*	16,
Elementary & Secondary	4.72%	3.30%	-1.41%	**-28,643**	*0.5 million fewer students*	16,
sensitivity analysis					*Consistent enrolment rate*	5,
Post-secondary	2.20%	2.33%	0.13%	**2,721**	*4.6 million more grads, from 28%*	16,
sensitivity analysis					*to 70% of 25-44 yrs*	9,
Medical care <45	2.29%	2.31%	0.01%	**297**	*<age 45 from 72% to 56%*	16,
sensitivity analysis	2.40%		-0.09%	-1,799	*Consistent enrolment rate. Per capita use up 102%*	
Total	10.27%	9.39%	-0.88%	**-17,857**		16,
Debt	19.20%	43.88%	24.68%	**500, 405**		23,

Sources: Population data from Statistics Canada (2017a): CANSIM Table 051-0001; Revenue, OAS, C/QPP, Family income from Statistics Canada (2018a): CANSIM Table 380-0080; GDP d
Friendly et al. 2015: 136; Parental leave from Canadian Tax Foundation (1979): Table 7-9; and Government of Canada (n.d.): Chart 2; Elementary & Secondary data from Statistics Canada (201
1976 data from Statistics Canada 1978a, 1978b; Female labour force data from Statistics Canada (2017c): CANSIM Table 282-0002; Debt data from Statistics Canada (n.d. a): CANSIM Table

Table 1: Change in the government spending on the elderly and on those under the age of 45: 1976 to 2016

				1976				Total $ to	
		Total Taxes		Taxes to medical for age 65+		Taxes to OAS for age 65+		*medical & OAS*	
Age 35 income percentile	2016 income	Average rate	$ amount	% of total taxes	$ amount	% of total taxes	$ amount		A
25th	24,797	9.2%	2,283	5.0%	114	5.4%	123	*237*	1
50th	45,570	17.6%	8,022	5.0%	400	5.4%	434	*834*	1
75th	71,274	23.1%	16,436	5.0%	820	5.4%	889	*1,709*	2
99th	203,506	38.1%	77,449	5.0%	3,863	5.4%	4,189	*8,052*	3

Sources: Income percentile data from Statistics Canada (n.d. b): Data Table, Total Income percentiles. Taxes are author calculations using Statistics Canada Social Policy Simulation Database an

Table 2: Income taxes paid, 1976 vs 2016, by 2016 income percentiles (2016$)

Population 1976	Population 2016	Female LFP / Postsec Enrol 2016/1976 ratio	/pop	*LFP	*Postsec	Growth *1.54	2016	w/o Growth	* Growth
			36,196				55,876		
397,056	36,286,425		**12,666**			*19,553*	**19,866**	**7,200**	*313*
397,056	36,286,425		**577**			*891*	**1,897**	**1,319**	*1,005*
397,056	36,286,425		**13,243**			*20,444*	**21,762**	**8,519**	*1,318*
969,837	5,990,511		**8,322**			*12,847*	**12,913**	**4,591**	*66*
			7,690			*11,871*		5,223	*1,042*
969,837	5,990,511		**9,023**			*13,929*	**7,929**	**-1,094**	*-6,000*
			17,345			*26,776*	20,842	3,497	*-5,933*
969,837	5,990,511		**2,303**			*3,556*	**9,910**	**7,606**	*6,354*
969,837	5,990,511		**19,648**			*30,331*	**30,752**	**11,104**	*420*
987,225	20,216,021	1.54	25	**38**		*59*	**226**	**188**	*167*
585,620	4,700,034		92	141		*218*	972	831	*754*
987,225	20,216,021	1.54	35	**53**		*83*	**190**	**136**	*107*
705,802	784,192		837	1,287		*1,986*	4,887	3,601	*2,901*
987,225	20,216,021		**472**			*729*	**1,038**	**566**	*309*
987,225	20,216,021		**2,352**			*3,630*	**3,314**	**962**	*-316*
634,883	5,110,835		7,089			*10,944*	13,109	6,020	*2,165*
987,225	20,216,021	2.49	1,095		**2,725**	*4,207*	2,338	-387	*-1,869*
593,025	13,144,475		1,940		4,826	*7,450*	3,596	-1,230	*-3,854*
987,225	20,216,021		**1,143**			*1,764*	**2,314**	**1,171**	*550*
			1,194			*1,844*		1,120	*470*
987,225	20,216,021		5,122		**6,784**	*10,472*	9,420	2,637	*-1,052*
397,056	36,286,425		**6,951**			*10,730*	**24,521**	**17,570**	*13,790*

data from Statistics Canada (2018b): CANSIM Table 380-0063; Medical care data from CIHI 2017: Tables A.3.3.1, E.1.18.2 and E.1.1.2; Childcare from Government of BC 1977: D.41; and
17d): CANSIM Table 478-0014; Post-secondary spending data from Statistics Canada (2018d): CANSIM Table 380-0081; 2016 post-secondary utilisation data from Statistics Canada (2017b):
e 378-0073 and (2018e): CANSIM Table 378-0121; Inflation adjustment data from Statistics Canada (2018c): CANSIM Table 326-0021.

Average rate	$ amount	% of Total Taxes	$ amount	% of total taxes	$ amount	Total $ to medical & OAS	Total taxes	$ change	% change
0.3%	2,554	9.2%	236	5.8%	149	*385*	**271**	**147**	**62%**
4.9%	6,778	9.2%	626	5.8%	395	*1,021*	**-1,244**	**187**	**22%**
0.3%	14,437	9.2%	1,333	5.8%	840	*2,174*	**-1,999**	**465**	**27%**
5.8%	72,930	9.2%	6,736	5.8%	4,246	*10,982*	**-4,519**	**2,929**	**36%**

d Model (SPSD/M) versions 8.1 and 26.1. All assumptions and interpretations are the responsibility of the author.

include a $28 billion decline in spending on grade (elementary and secondary) school as the number of school-age children fell by half a million.[24] While some of this reduction may be interpreted to pay for the small spending increases for post-secondary and child care discussed above, as well as cash transfers to families (up $1.8 billion) (Statistics Canada 2018), parental leave (up $2.4 billion),[25] and medical care for those under 45 (up $297 million), most of the grade school reduction was reallocated elsewhere. In total, the suite of programmes on which younger Canadians rely fell by $17.9 billion.

> [S]ubstantial new spending on the ageing population reflects factors beyond demography, since other comparable demographic changes did not motivate similarly-sized spending increases.

Aggregate public finance trends need interpretation in light of per capita figures. Alas, Canadian governments do not publish age analyses of per capita spending. Kershaw and Anderson fill this gap, finding all levels of government combine to allocate over $33,000 per person aged 65+ by comparison with less than $12,000 per person for those under the age of 45 (Kershaw/ Anderson 2016). Unfortunately, data are not available to replicate their comprehensive analysis for 1976. To examine change over time, I instead analyse per capita budgeting for the policies featured above, adjusting first for inflation, and then economic growth. It is necessary to separate these factors to reveal how governments invested the proceeds from growth, with options including further investment in well-established programmes, like medical care or post-secondary; growing a nascent programme, like child care; or reducing tax rates.

The Canadian population increased from 23.4 million to 36.3 million since 1976.[26] Per capita general revenue increased $7,200 by 2016, while funds for C/QPP increased by $1,319.[27] Over the same period, GDP per person rose 54%, or nearly $20,000.[28] This means total general revenue per person increased by $313 beyond the rate of growth, as did C/QPP revenue by $1,005.

Per capita spending on medical care and retirement income for Canadians aged 65+ increased by $11,104 since 1976,[29] whereas per capita spending on programmes for Canadians under the age of 45 grew by $2,637. As a result, the elderly/non-elderly (under-age-45) ratio in change of spending is 4.2 to 1.[30] This ratio signals that Canadian governments prioritized per capita spending increases for the ageing population at a rate that is over four times faster than for citizens under 45.

The per capita increase for Canada's 6.0 million seniors is 57% higher than the $19,468 per capita spending in 1976, which represents an increase that is slightly faster than economic growth ($420/senior). The increase for each of the 20.2 million Canadians under the age of 45 is 39% higher than the $6,784 per capita spending in 1976, approximately 71% of economic growth. The slower rate of increase by comparison with economic growth represents $1,052 less per person for the under-45s as of 2016 – or $21.3 billion less when multiplied by all the people in the age group. This sum represents enough to fund, for example, a high-quality, universal childcare programme twice over (Ker-

shaw/Anderson 2009), or a 46% increase to the post-secondary budget.[31]

Of the new spending on seniors, the $4,591 increase in medical care spending per person aged 65+ is notable for two reasons. First, it is 74% larger than the entire increase per person under the age of 45 for child care, parental leave, family income support, education and medical spending. Second, additional medical spending comes from general revenue, whereas increases to retirement income come from C/QPP. Canadians prepay the latter, meaning that the larger benefits now enjoyed by seniors partly reflect their larger contributions than past generations. This is not the case for larger medical expenditures, which taxpayers fund in response to annual demand. Since Canadian data show demand rises as individuals age,[32] I explore the implication for taxes paid by younger Canadians now versus the past when examining the intergenerational golden rule.

Post-secondary expenditures represent the largest per capita decline for younger Canadians: down $387 from 1976 after inflation, and down $1,869 compared to economic growth projections.[33] Per capita medical care spending is also noteworthy, because it is the largest increase (up $1,171) for young people, rising $550 faster than economic growth would predict. Since social spending in Canada correlates with improvements in life expectancy and preventable mortality more so than medical spending (Dutton et al. 2018), this allocation likely compromises young people's wellbeing. Budgeting for all ages requires concern for the ratio between social and medical spending given the extensive scientific literature that finds health begins where we are born, grow, live, work and age – not with medical spending (Kershaw 2018).[34]

> As spending on seniors from general revenue increased four times more than revenue, governments dealt with resulting budget shortfalls in two ways. They increased the debt/GDP ratio by half a trillion dollars, and reduced spending elsewhere. Reductions include a $28 billion decline in spending on grade school as the number of school-age children fell by half a million.

Some may worry the population under the age of 45 is too large a denominator to provide adequate comparisons between spending on seniors and younger people. I therefore perform sensitivity analyses reported in Table 1, beginning by apportioning childcare spending entirely to those under the age of 12 to find a per capita increase of $831. When post-secondary spending is allocated only to those age 18-45, there is a per capita reduction of $1,230. If parental leave spending is assigned just to children under the age of 1 and a primary caregiver, the per capita increase is $3,601. If grade school spending is assumed to benefit only children aged 5-17, not parental labour force attachment, the per capita increase is $6,020.[35] This latter change is of the same magnitude as the $4,591 increase in medical care per senior, or $6,513 combined increased to C/QPP and OAS. As such, the $29 billion reduction to aggregate grade school funding (measured as %GDP) is smaller than would have been expected from the drop in school-age population.

Age	All earners				Full-time earners only			
	1976-80	2012-2016	2012-2016 minus 1976-1980	% change	1976-80	2012-2016	2012-2016 minus 1976-1980	% change
25-34	41,720	36,640	-5,080	-12%	53,040	49,200	-3,840	-7%
35-44	46,980	46,340	-640	-1%	60,140	59,740	-400	-1%
45-54	44,800	45,880	1,080	2%	57,740	59,880	2,140	4%
55-64	34,200	39,180	4,980	15%	53,400	56,920	3,520	7%
65-plus	14,420	26,900	12,480	87%	43,160	57,540	14,380	33%

Sources: All earners: Statistics Canada (2018g): CANSIM Table 206-0052; Full-time earners: Statistics Canada (n.d. d): Custom Table C856285.

Table 3: Median total income 2016$, by age, 1976 and 2016

Intergenerational golden rule: evolution in taxes paid by younger citizens

The previous section reveals that governments increased per capita spending for seniors 4.2 times faster than for Canadians under the age of 45, as spending increased beyond the rate of economic growth for seniors, but slower for young people. In this section, I examine implications for individual taxes owed by young people, guided by the intergenerational golden rule introduced in the methods section. All else being equal, it implies elderly Canadians today should expect transfers from their offspring that are on a par with transfers they made as young adults to their parents' generation when elderly (Wolfson et al. 1998: 108).

To explore this concept, I examine total income taxes paid by a young person in 2016 compared to 1976, along with the sub-total paid to medical care for seniors and OAS.[36] I refer to simulated 35-year-olds with incomes from employment that represent the 25th, 50th, 75th and 99th percentiles in 2016,[37] and adjust these for inflation to calculate federal and provincial taxes owed in 1976 and today.[38] From the diversity of provincial tax codes, I select Ontario because it is the largest province.

> [T]he elderly/non-elderly (under-age-45) ratio in change of spending is 4.2 to 1. This ratio signals that Canadian governments prioritised per capita spending increases for the ageing population at a rate that is over four times faster than for citizens under 45.

There are two broad findings, summarised in Table 2. First, income taxes owed in 2016 are generally lower than in 1976, with average tax rates down 2-3 percentage points. Low-income earners are the exception for whom the average tax rate is now one percentage point higher. Whereas an earner at the 25th percentile pays $271 more in income taxes today, the median earner pays $1,244 less, the 75th percentile pays $1,999 less, and the top one per cent pays $4,519 less. This finding signals there is less progressivity in Canada's income tax code now than four decades ago. Tax rates are lower for middle and higher earners today while still generating more revenue as a share of the economy, because GDP per capita increased 54% over the period.

Second, as taxes generally fell, the amount of taxes paid on behalf of seniors increased. 5% of total government revenue went to medical care for seniors in 1976; now 9.2% does. The revenue share for OAS rose more modestly from 5.4% to 5.8%.[39] Given these changes, a 35 year-old at the 25th percentile now pays $147 more a year to medical care for seniors and OAS than in 1976, equal to a 62% increase. A median earner adds $187 (up 22%); an earner at the 75th percentile contributes an extra $465 (up 27%); and a young person in the top one per cent pays an extra $2,929 (up 36%).[40]

These findings reveal that the cohort retiring today expects more in taxation from its children than it paid for its parents' generation when elderly. In addition, lower average tax rates permit some citizens aged 65+ to pay less in tax toward their offspring than their elderly parents contributed toward them in 1976. The two trends erode government fiscal capacity to invest in – or mitigate the risks facing – contemporary younger cohorts.

The lottery of timing: variations in ability to pay among age cohorts

The first two stages of analysis reveal that governments used the proceeds from economic growth to (i) raise per capita spending on Canadians aged 65+ over four times faster than for citizens under 45; and (ii) reduce tax rates, while requiring younger Canadians to contribute more in income taxes for elderly citizens now by comparison with 1976. The final stage of analysis invites questions about the fairness of these public finance patterns. Since some are born into favourable eras, and others are not, scholars of justice like Rawls (1971: section 44) signal it is important to examine intergenerational public finances by reference to the standard of living inherited by different age groups, and the socioeconomic circumstances they currently face. In response, I now consider how the standard of living for contemporary seniors compares with that of elderly Canadians four decades earlier; and how the standard of living four decades earlier when contemporary seniors were young adults compares with that of young people today.

I follow Vanhuysse's Intergenerational Justice Index to examine this theme, starting with his focus on child and elderly poverty rates (Vanhuysse 2013).

> This shift in economic insecurity aligns with other income and wealth changes that signal prosperity more generally shifted from younger to older Canadians.

Canada has two low-income measures that date back to 1976. The first is the low-income cut-off (LICO), which measures the share of residents who spend 20% more on food, shelter and clothing than the average size-adjusted family. The second is a low-income measure (LIM), which measures the proportion of residents who fall below 50% of median adjusted income.[41] The after-tax LICO shows reductions in low-income for both children (under 18) and the elderly (65+) since 1976: dropping from 13.4% to 7.3% for children in 2016, and from 29% to 4.7% for seniors. By contrast, the LIM shows little change in low-income for children: 14.3% in 1976 and 14.0% in 2016. For seniors, the LIM dropped from 30.6% to 14.2%. Both metrics convey a substantial shift in the ratio of child/elderly low-income. Whereas children had less than half the rate of low-income of elderly Canadians in 1976 on both

Housholds, by age of primary earner	1977 ($ adjusted to 2016)				2016			2016 minus 1977		
	Home ownership rate	Total market value minus total mortgage debt (millions $)	Share of total net value in principal residences		Home ownership rate	Total market value minus total mortgage debt (millions $)	Share of total net value in principal residences	% change in rate of home owners	Change in total market value minus total mortgage debt (millions $)	% change in share of total net value in principal residences
under 35	41%	92,604	15%		35%	223,080	7%	-14%	130,476	-55%
35-44	73%	130,182	22%		64%	439,867	14%	-12%	309,685	-37%
45-54	74%	146,923	24%		70%	757,038	24%	-6%	610,115	-3%
55-64	70%	119,951	20%		77%	832,780	26%	10%	712,829	30%
65+	63%	114,459	19%		67%	965,077	30%	7%	850,618	58%
Total		604,119				3,217,842			2,613,722	

Sources: 1977 data: Statistics Canada (1977): Survey of Consumer Finance Micro Data File; 2016 data: Statistics Canada (2017g): CANSIM Table 205-0002.

Table 4: Total net value in Canadian principal residences, by age: 1977 vs 2016

measures, now they have the same rate when measured by the LIM, and 155% of the rate when measured by the LICO.[42]

This shift in economic insecurity aligns with other income and wealth changes that signal prosperity more generally shifted from younger to older Canadians. Table 3 shows that median income fell $5,080 (-12%) for Canadians age 25-34 since 1976-80, and down $640 (-1%) for those age 35-44.[43] The decline persists after controlling for the evolution in part-time work and post-secondary enrolment by measuring only full-time, full-year earners, for whom median income is down $3,840 and $400 respectively.[44] Over the same period, median income rose over $12,000 for Canadians aged 65+ (up 87% for all earners, and 33% for full-time earners).[45]

As earnings fell for young Canadians, their primary cost of living surged. Whereas an average home cost $210,089 in 1976, the price had reached $490,495 by 2016.[46] The ratio of median full-time income for a 25-34 year-old relative to average home cost therefore increased from 4:1 to 10:1.[47] This young person must now work 13.4 years to save a 20% down payment on an average home, up from five years in 1976-80.[48] Even with historically low interest rates, the typical 25-34 year-old must make mortgage payments that are 15% higher now than in 1976-1980.[49] Average rents have also increased in large urban centres.[50]

While escalating home prices require more work of young people (and all renters), they shift housing wealth from younger to older Canadians. Price escalation increased net wealth in owner-occupied principal residences by $2.6 trillion since 1976.[51] Table 4 shows that 5% of the additional wealth is owned by households under the age of 35, which represent 29% of the adult population. One-third of the additional wealth is owned by Canadians aged 65+, who make up 21% of the adult population. Given lower ownership rates for younger Canadians,[52] the typical household headed by an adult under 35 faces higher rents without reaping wealth gains from rising prices. By contrast, Table 5 shows that

the typical senior household reports an increase of $277,903 in net housing wealth by comparison with the same age group in 1977.[53]

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Vanhuysse (2013) supplements metrics about private income trends for different age cohorts with two metrics for public space. The first is debt per younger person,[54] which increased from $14,779 per person under the age of 45 in 1976 to $44,013.[55] The second is the ecological footprint per capita, which measures how much demand human consumption places on the biosphere. At present, a footprint of 1.7 global hectares per person is necessary if each global citizen is to live within the means of our planet's resources (Global Footprint Network 2018). In 1976, the Canadian ecological footprint per person was 10.3 global hectares. As of 2014, it was 8.0 global hectares, the seventh largest on the planet (Global Footprint Network 2018). This change signals that Canadians reduced our footprint on average by 0.06 hectares per year since 1976. To achieve 1.7 global hectares by mid-century, a key time commitment in the Paris Agreement (United Nations 2015), Canadians must now accelerate threefold the pace at which we reduce our footprint to 0.18 hectares per year.[56]

In sum, findings from this third analysis suggest today's ageing population has "lucked out" in the lottery of timing by comparison with those who preceded and follow them, and thus enjoy a greater ability to pay, or lesser need. Seniors today have more prosperity on average than did elderly Canadians four decades ago. They have lower levels of poverty, higher median earnings, and more wealth in their homes.

Older Canadians today also generally faced more favourable socioeconomic circumstances as younger adults in 1976 than do

Housholds, by age of primary earner	1977 (all $ adjusted to 2016)			2016			2016 minus 1977		
	% home owners	Market value minus mortgage ($)	Mortgage debt ($)	% home owners	Market value minus mortgage ($)	Mortgage debt ($)	Change in % home owners	Change in market value minus mortgage	Change in mortgage debt ($)	Change in debt for extra $1 of net value ($)
under 35	41%	81,219	76,468	35%	185,552	214,248	-14%	104,333	137,780	1.32
35-44	73%	130,164	51,131	64%	255,975	204,025	-12%	125,811	152,895	1.22
45-54	74%	156,785	29,471	70%	377,000	143,900	-6%	220,215	114,429	0.52
55-64	70%	151,297	12,579	77%	381,852	76,348	10%	230,555	63,769	0.28
65+	63%	131,568	3,194	67%	409,471	22,529	7%	277,903	19,335	0.07

Sources: 1977 data: Statistics Canada (1977): Survey of Consumer Finance Micro Data File; 2016 data: Statistics Canada (2017g): CANSIM Table 205-0002.

Table 5: Mean change in individual household net housing value and mortgage debt, by age: 1977 vs 2016

younger Canadians now. Older Canadians started with higher median earnings, which could stretch further when paying for rent, saving for a down payment, and paying a mortgage. Today's seniors also inherited smaller government debts as young people, and reduced their ecological footprint at just one-third of the rate that young adults must now do. As a counterpoint to this general trend, 1976 witnessed higher rates of low-income among children when measured by the LICO, but not the LIM.

It is relative to this lottery of timing that the justness of public finance trends can begin to be assessed. Three findings give reason to worry that Canadian governments strayed from norms of intergenerational justice since 1976. First, governments invested in later life course stages at a rate that is 4.2 times faster than for earlier life course stages, and did so on behalf of a cohort that enjoyed more affluence by comparison with cohorts that preceded and followed them. Second, governments violated the intergenerational golden rule. Younger Canadians now transfer 22%-62% more in income taxes to elderly citizens than today's seniors contributed to their forebears, even though contemporary young people have a lesser ability to pay. Third, the interaction of the first two trends crowd out resources to support younger people to adapt to new risks, including lower earnings, higher costs, less time at home when children are young, and climate change.

> Older Canadians today [...] generally faced more favourable socioeconomic circumstances as younger adults in 1976 than do younger Canadians now. Older Canadians started with higher median earnings, which could stretch further when paying for rent, saving a down payment, and paying a mortgage. Today's seniors also inherited smaller government debts as young people, and reduced their ecological footprint at just one-third of the rate that young adults must now do.

Since life expectancy at birth for Canadians aged 25 in 1976 is 7 to 10 years higher than for Canadians aged 65 in 1976,[57] time comparisons of spending on seniors are difficult to interpret. Some may judge that contemporary older Canadians must financially manage more birthdays than did seniors in the past, and thus have greater need. Some may judge that additional birthdays ahead of contemporary seniors mean they are "younger," less frail, and thus have a greater ability to pay (Sanderson/Scherbov 2008). However one aligns with these perspectives, the data from this study invite public dialogue about whether Canadian public finance has found the right balance in adapting for older Canadians in proportion to the initial circumstances they inherited, and to new realities now facing them and younger citizens. This dialogue will be shaped by values as much as by empirical data.

Policy recommendations

Generational inequities in public finance are more likely to be ignored if not monitored. It is time for Canadian governments to publish routine reports that feature data about the elderly/non-elderly ratio of spending changes; trends in tax rates, and taxes paid in allegiance to the golden rule; along with metrics that assess the relative ability to pay of various age cohorts. Because of concerns about government deficit and debt as metrics of fiscal sustainability, offices of Parliament should also perform fiscal gap and generational accounting every three years as the European Union now does for member countries (Kotlikoff 2017:59).

When evidence emerges of intergenerational imbalance, the search for public finance responses should target cleavages between age groups. A current cleavage is the gap between home prices and earnings, which reduces the ability to pay among young adults, while driving wealth accumulation for many seniors. An extensive international literature observes that residential property often enjoys favourable tax treatment (Freebairn 2016; O'Sullivan/Gibb 2012; Cho/Francis 2011), including in Canada (Boadway 2015: 261). For example, capital gains from the sale of principal residences are not counted as income for tax purposes, representing a federal tax expenditure of $7 billion annually (Government of Canada 2017:39), and corresponding reductions for provincial coffers. Simultaneously, annual revenue from municipal property taxation is down $4.4 billion as a share of GDP compared to 1976.[58]

> It is time for Canadian governments to publish routine reports that feature data about the elderly/non-elderly ratio of spending changes; trends in tax rates, and taxes paid in allegiance to the golden rule; along with metrics that assess the relative ability to pay of various age cohorts.

Since all provinces have infrastructure to assess annually the market value of homes, shifting the balance of revenue generation toward housing wealth is an optimal starting point for renewing commitment to intergenerational justice in Canadian public finance.[59] This tax shift would target the primary trend creating a socio-economic fissure between older and younger citizens. It also taps older Canadians with financial means for additional taxation in recognition that they disproportionately accumulated housing wealth over the last four decades; and their generation passes down larger public medical care bills to their children than their parents passed down to them. Tax deferment could accommodate "home-rich but income-poor" citizens by postponing collection of new annual taxes on high-value homes until the sale of the property. On top of funding medical care for the ageing population, additional taxation of housing wealth would preserve fiscal capacity for governments to address new social risks for younger Canadians, and reduce incentives for speculative demand on real estate to cool down housing prices. That could be a win-win-win for all generations.

Notes

1 Statistics Canada (2017a): CANSIM Table 051-0001.
2 Social Sciences and Humanities Research Council (n.d.).
3 Such omissions undermine the utility of comparative projects, because medical care spending is consumed disproportionately in later life, while education is consumed earlier. Likewise, the omission of tax expenditures means one country's baby bonus will be counted as a traditional budget expense when another country's child tax credit will not, although the two are functionally equivalent.
4 For example, Bradshaw/Holmes 2013.
5 Revenue data from Statistics Canada (2018a): CANSIM Table 380-0080. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.
6 Revenue data from Statistics Canada (2018a): CANSIM Table 380-0080. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.
7 United Nations (2002) assemblies on ageing emphasise the rights of older persons to independence, participation, care,

self-fulfilment and dignity, while the United Nations (1989) convention on the rights of the child invokes special protections for children, and implies investment in their guardians.

8 For a summary of this literature, see the Commission on the Social Determinants of Health 2008.

9 By examining spending on Canadians under the age of 45, I largely avoid the problem of apportioning benefits between parents and children. Tenuous assumptions would otherwise be required when calculating the portion of cash transfers to families from which parents benefit apart from their children, or what quantity of childcare and school expenditures provide early development opportunities for children by comparison with the portion that supports parents to connect to the labour market, etc. As Lynch (2006:20) observes, there is "considerable overlap between the wellbeing of children and non-elderly adults, and the scant similarity between the wellbeing of seniors and of their children's and grandchildren's age groups."

10 The CPI figure for 1976 is 31.1 The CPI figure for 2016 is 128.4. See Statistics Canada (2018c): CANSIM Table 326-0021.

11 2016 tax calculations rely on SPSD/M version 26.1 and 1976 calculations rely on version 8.1. Since the released version of the latter only included years 1984 to 2005, Statistics Canada staff updated the parameters for this study to reflect the 1976 tax structure for federal and provincial taxes. The updates were provided by Laurie Plager (laurie.plager@canada.ca) on 19 January 2018. The assumptions and calculations underlying the simulations were prepared by the author, and the responsibility for the use and interpretation of these data is entirely that of the author.

12 Some may lament that this study does not perform generational accounting (GA). Developed by Auerbach, Gokhale, Kotlikoff (1991) and colleagues, it is a methodology widely used among economists to study whether a government's current fiscal policy is balanced in terms of taxes owed and benefits received between contemporary and future generations, assuming current policy persists indefinitely. If there is imbalance, GA permits estimation of the scale of revenue and/or expenditure adaptations needed to restore balance. The method is motivated by critique that conventional concepts of deficit and debt "do not constitute meaningful measurements of the fiscal burden being foisted on young and future generations" because of arbitrary accounting practices that keep some liabilities off government books (Kotlikoff 2017: 60).

In their recent GA study of pension reform in Norway, Germany and Poland, Laub and Hagist (2017: 72) observe that the success of policy adaptations to promote intergenerational justice "is highly dependent on whether people accept them, and adapt to them or not. Thus a transparent reform process and a broad approval of reform steps taken" are necessary for the revisions to be politically viable. While GA can contribute to this process by providing a measure of the fiscal gap between contemporary and future generations, they conclude "it has to be complemented by other assessments" that help to bring along the public and decision-makers. This study falls in the "other" category, by focusing on a retrospective, descriptive analysis of changes to public finance so that Canadians can better understand trends that produced the current suite of intergenerational policies. As Kotlikoff (2017: 57) acknowledges in his review of GA scholarship over recent decades, "how well current generations fared in the past may matter for assessing the justice of current generation policy."

13 Revenue data from Statistics Canada (2018a): CANSIM Table 380-0080. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

14 2016 age estimates for medical spending are calculated in three steps. The Canadian Institute for Health Information (CIHI) provides per capita data about provincial medical spending reported for five-year age ranges (2017: Table E.1.18.2). The most recent are for 2015. I first apply 2015 per capita data to the Canadian population in 2016 to estimate total projected spending. Second, I calculate the percentage of this projected spending for Canadians under the age of 45 (29.2%) and aged 65+ (46.7%). Third, I attribute these percentages to the $163.3 billion actually forecasted as total public spending on medical care for Canada in 2016 (CIHI 2017: Table A.3.3.1). These calculations reflect average per capita figures of $2,314 per person under 45 and $12,913 per person aged 65+ (See Table 1). GDP data are from Statistics Canada (2018b): CANSIM Table 380-0063.

I calculate the age distribution of medical spending in 1976 in the same way, with one exception. CIHI data about per capita use of medical care date back to 1998 (2017: Table E.1.1.2). To estimate per capita spending in 1976, I calculate the average annual change between 1998 and 2014 for each five-year age group, and attribute that average change to each year between 1976 and 1997. These figures are applied as step 1 to the population in 1976 to estimate total projected spending. I calculate in step 2 the percentage of projected spending on Canadians under the age of 45 (43.5%) and 65+ (36.7%). I then apply these percentages to the total spending of $10.8 billion in 1976 reported by CIHI (2017: Table A.3.3.1). These calculations reflect average per capita assumptions of $1,143 per person under 45 and $8,322 per person aged 65+ after adjusting for inflation into 2016 dollars (See Table 1).

As a sensitivity analysis for the 1976 calculation, I change step 1 by attributing the per capita spending values in 1998 to the population distribution in 1976. This sensitivity analysis predicts 45.4% of spending in 1976 went to those under the age of 45, and 33.9% went to those aged 65+. These predictions reflect assumptions of $1,194 per person under 45 and $7,690 per person aged 65+. (See Table 1).

The sensitivity analysis suggests that primary figures underestimate the annual increase in medical care spending for Canadian seniors by $3 billion in aggregate, and over $600 per capita. Similarly, the sensitivity analysis suggests that primary figures underestimate a decline in spending for the under-45 population by approximately $2 billion in aggregate, and overestimate the resulting per capita increase by around $50.

15 Old Age Security data from Statistics Canada (2018a): CANSIM Table 380-0080. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

16 Canada and Quebec public pension data from Statistics Canada (2018a): CANSIM Table 380-0080. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063. Legislation requires that C/QPP revenues remain separate from other taxation so that arms-length boards invest prepayments to fill the gap between contributions and projected expenditures.

17 2016 data about post-secondary credentials are from Statistics Canada (2017b). 1976 data are from two sources. Statistics Canada (1978a): "Table 30. Population 15 years and older not attending school full time by age groups and sex, showing level of schooling, for Canada and provinces 1976." Statistics Canada

(1978b): "Table 14. Population 15 Years and Over by Age Groups and School Attendance, Showing Labour Force Activity and Sex, for Canada and Provinces, 1976." Due to data limitations, note that the 1976 calculations assume (i) all people in post-secondary in that year have a certificate/degree, and (ii) all people over the age of 35 in post-secondary fall in the under-age-45 cohort. These assumptions overestimate the percentage of people under the age of 45 who had post-secondary credentials in 1976, and thus underestimate the increase in the proportion of people under 45 with post-secondary credentials as of 2016. The latter underestimation means the per capita decrease in spending on post-secondary as of 2016 is likely larger than reported in Table 1.

18 Post-secondary spending data from Statistics Canada (2018d): CANSIM Table 380-0081. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

19 Labour force data from Statistics Canada (2017c): CANSIM Table 282-0002.

20 Childcare expenditure data are from Friendly/Grady/Macdonald/et al. (2015: 136). GDP data are from Statistics Canada (2018b): CANSIM Table 380-0063. Since comprehensive data on childcare spending do not exist for 1976, I estimate spending based on the province of British Columbia, and then adjust for the portion of the national population represented by BC in 1976 to generate a national estimate. BC data are from Government of British Columbia 1977: D.41. The $3.6 billion increase is approximately $10 billion less than Kershaw and Anderson (2009) estimate is required to build a high-quality system, and why Canada ranks among the bottom of OECD countries for investment in early childhood education (Petersson/Mariscal/Ishi 2017: 19).

21 The data reviewed in this study are in keeping with Barer, Evans and Hertzman (1995: 194), who find that population ageing alone accounts for little of the increased utilisation of health care by seniors in Canada. Utilisation is driven more by the fact that the health system is doing more to and for seniors than in the past, "suggesting that the appropriate care of elderly people should be a central issue for health care policy and management."

22 These findings are consistent with Tepe and Vanhuysse (2010), who report that dramatic demand-side demographic trends influence public finance relatively little in advanced democracies, although the historical timing of when governments begin addressing social risks shapes spending patterns.

23 Debt data from Statistics Canada (n.d. a): CANSIM Table 378-0073 and Statistics Canada (2018e): CANSIM Table 378-0121. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

24 Elementary and secondary school spending data from Statistics Canada (2017d): CANSIM Table 478-0014. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

25 Parental leave spending data in 2016 from Government of Canada (n.d.): Chart 2. Parental leave data in 1976 from Canadian Tax Foundation 1979: Table 7-9. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

26 Statistics Canada (2017a): CANSIM Table 051-0001. There are 3.2 million more people under the age of 45, 5.6 million more people age 45-64, and 4 million more seniors.

27 Revenue data from Statistics Canada (2018a): CANSIM Table 380-0080. Population data from Statistics Canada (2017a): CANSIM Table 051-0001.

28 GDP data from Statistics Canada (2018b): CANSIM Table 380-0063. Population data from Statistics Canada (2017a): CANSIM Table 051-0001.

29 Medical care calculations are based on Canadian Institute of Health Information (2017) data about total health spending by governments, and analysis of per capita health spending by age group. See note 32 for further detail. The per capita figures account for an estimated 55% increase in use of publicly-paid medical care services per person aged 65+ between 1976 and 2016 (from $8,322 to $12,913); and an estimated increase of 102% per person under the age of 45 (from $1,143 to $2,314).

30 Per capita figures for childcare and parental leave in Table 1 account for the increased demographic demand for these programmes as a result of the 54% increase in labour force participation among women age 25-44 between 1976 and 2016. Similarly, the figure for post-secondary accounts for the 149% increase in the share of Canadians age 25-44 who earned post-secondary credentials by comparison with 1976. Even if these adjustments to per capita spending on younger Canadians are not made, the elderly/non-elderly (under the age of 45) ratio of change in social spending is 2.6 to 1; and the $4,591 rise in medical care spending per senior is on its own larger than the $4,299 increase in spending on the entire suite of programmes for younger generations ($4,299 = $9,420 - $5,122). See Table 1 for further detail.

31 Post-secondary spending data from Statistics Canada (2018d): CANSIM Table 380-0081. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

32 The Canadian Institute for Health Information has reported the age pattern in health care consumption from 1998 onward (with a 2-3 year data lag). These data consistently reveal escalation in medical spending over the life course. For example, the 2015 figures reveal less than $2,000 in spending per person age 1-24, and $2,000 to $3,000 per person age 25-49. By aged 65-69, the figure is around $6,600, and rises to over $29,000 for Canadians 90+. The one exception to this trend is spending on infants, approximately $11,000, reflecting the costs associated with birthing. For further discussion of the age pattern in Canada, see also Forget et al. (2008).

33 In keeping with per capita reductions in government spending on university, college and the trades, annual undergraduate tuition rose from $2,332 in 1976 to $6,373 in 2016 (Statistics Canada (2017e): CANSIM Table 477-0077; and Statistics Canada (n.d. g): Tuition Living Accommodation Costs (TLAC) Standard Table 8E.1a) Weighted average tuition fees for full-time Canadian Undergraduate students by province and Canada total, in current dollars, 1972-2006). This finding is consistent with Cheung et al. (2012) who report that tuition fees in Canada increased 40% between 1997 and 2011, and that Canadian public investment in tertiary education provides a low level of grant funding, and a high level of loan funding, by comparison with the OECD average.

34 This observation is especially important in Canada, where public funding for medical care is relatively high by international standards, but purchases below-average access to doctors and diagnostics, along with well-remunerated physicians (OECD 2017: 156, 168, 170).

35 All population estimates are from Statistics Canada (2017a): CANSIM Table 051-0001.

36 An optimal analysis would examine age patterns in revenue from taxation of individual income and goods/services. Canadian

data do not permit age analyses of the latter. However, it is likely that goods/services taxation is down for most or all age groups, because the tax mix has shifted away from taxes on goods/services in favour of additional income taxation. Income taxes represented 28.5% of total government revenue in 1976 and 30.3% of total revenue in 2016. By contrast, taxes on goods/services represented 33.8% of total revenue in 1976 and 30.9% in 2016. This shift represents a $27.4 billion increase in taxation of individual income (measured as a share of GDP), compared to a $7.2 billion reduction in taxation of goods/services. (Revenue data from Statistics Canada (2018a): CANSIM Table 380-0080. Population data from Statistics Canada (2017a): CANSIM Table 051-0001). GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

37 Statistics Canada (n.d. b): Data Table, Total Income percentiles.

38 Taxes owed are calculated using versions 8.1 and 26.1 of Statistics Canada's Social Policy Simulation Database and Model (SPSD/M). See note 27 for further information.

39 These findings are consistent with Evans, Hertzman and Morgan (2007: 302-303), who report that "several provincial governments have in the last decade made significant cuts to their income tax rates, and then cut expenditures to restore budget balance. Since cutting health spending is so politically charged, they have chosen to cut other programs more."

40 Larger income tax transfers from young people to seniors reflect in part that there were nearly seven workers for every Canadian aged 65+ in 1976, while there are now fewer than four, and projections anticipate fewer than three in the decades ahead (Statistics Canada 2014).

41 Statistics Canada (n.d. c).

42 Low income data from Statistics Canada (2018f): CANSIM Table 206-0041.

43 Median income data from Statistics Canada (2018g): CANSIM Table 206-0052. I examine five-year time periods from 1976-1981 and the first half of the current decade to dampen the influence of the business cycle on time comparisons.

44 Full-time, full-year median income data from Statistics Canada (n.d. d): Custom Table C856285. Younger Canadians who work full-time, full-year earn less today despite the trend toward more education discussed earlier. 70% of 25-44 year-olds now have post-secondary credentials compared to 28% four decades ago. While people with post-secondary still earn more on average than those without, more recent labour market entrants do not enjoy as large a return for their post-secondary investments as did graduates in the past (see Beaudry/Green 2000. Moos 2014).

45 Lower median income for Canadians under the age of 45 coupled with higher median income for those over 45 are consistent with the stagnation in Canadian earnings reported by Rouillard and Rouillard (2015) since 1980. These age patterns are also in line with evidence from Chen, Ostrovsky and Piraino (2017) who find that research from the late 1990s overestimated intergenerational income mobility in Canada.

46 Canadian Real Estate Association (n.d.): Custom Table. Average home prices today reflect the fact that many more young people now purchase homes in condominiums or apartments without yards, or in suburbs that require longer commutes than the past (Kershaw/Minh 2016).

47 The ratio increases from 4:1 to 9:1 when mean full-time, full-year earnings are swapped for the median figures reported in this section.

48 Guided by Rea et al. (2008) and Statistics Canada, I assume that the typical Canadian trying to buy into the housing market can save 15% of their income for a down payment on top of rent or other shelter payment. This rate of saving is more aggressive than the 10% rate assumed by CityLab (2012) when making similar calculations for US cities. My findings are consistent with Moos (2014: 2096), who reports for younger Canadians that "Housing costs are higher and more income is required to attain a similar kind of housing status to those of previous cohorts." See also Cheung (2014), who reports that housing prices have increased significantly over the past decade, requiring first-time home-buyers to spend more of their income to purchase homes, and coinciding with a shortage in rental housing in several cities.

49 Building on the analysis of work required to save a 20% down payment, I calculate mortgage payments for a loan that equals 80% of the value of an average-priced home. Average home price data from Canadian Real Estate Association (n.d.): Custom Table. Interest rate data from Statistics Canada (n.d. e): CANSIM Table 176-0043. Interest payments calculated using the Vancity Credit Union (n.d.) Mortgage Calculator.

50 Rental data from Statistics Canada (2017f): CANSIM Table 027-0040.

51 Housing wealth data for 1977 from Statistics Canada 1977. Data for 2016 from Statistics Canada (2017g): CANSIM Table 205-0002.

52 Home ownership is down 12%-14% for people under 45 today by comparison with 1977, while ownership is up 7%-10% for Canadians aged 55 and older. Home ownership data for 1977 from Statistics Canada 1977. Data for 2016 from Statistics Canada (2017g): CANSIM Table 205-0002.

53 These findings about wealth accumulation via increased housing capital are in line with Lemieux and Riddell (2016), who report that the share of national income in Canada received by workers has dropped when compared to income received by owners of capital.

54 Vanhuysse (2013) calculates the debt per child. Consistent with my focus on the generations raising children, I calculate the debt per person under the age of 45. As Kotlikoff (2017) rightly critiques, public debt suffers from arbitrary accounting decisions that limit its accuracy as a metric of fiscal sustainability. Still, as the dominant fiscal debt measure of which the public is aware, an increasing level of debt per capita signals lesser prioritization of fiscal sustainability among decision-makers accountable to the public. It is therefore meaningful to examine if lesser priority is given to sustainability, even if the metric may not be an accurate measure of the actual level of (un)sustainability.

55 Debt data from Statistics Canada (n.d. a): CANSIM Table 378-0073 and Statistics Canada (2018e): CANSIM Table 378-0121. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063. Population data from Statistics Canada (2017a): CANSIM Table 051-0001.

56 Similarly, the Intergovernmental Panel on Climate Change Working Group III (2001: 89) reports that greenhouse gas emissions must fall below two tonnes per person to avoid severe damage to the climate. In order to achieve this reduction by 2050, decarbonisation plans could have been phased in more gradually in 1976 than today. At that time, the International Energy Association (2017: CO_2/population) estimated Canada emitted 16.59 tonnes per person, which required annual reductions of 0.2 tonnes per

year. By this logic, per capita emissions should now be under nine tonnes – not the 15.32 tonnes recorded by the IEA in 2015. Given the slow pace of adaptation in previous decades, carbon-reduction must now occur at twice the pace, dropping 0.4 tonnes per year.

57 Statistics Canada (n.d. f): CANSIM Table 102-0512.

58 Property tax data from Statistics Canada (2018a): CANSIM Table 380-0080. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

59 Support for including home wealth more in calculations of taxes owed or fees required to pay for the costs of population ageing is also growing in Australia (Ong 2016) and the UK (Searle/McCollum 2014, O'Sullivan/Gibb 2012), given the substantial escalation in home prices experienced in those countries in recent decades. In addition, several commentators speak of the value of recurrent taxation of property wealth for efficiency reasons (Wood/Ong/Cigdem 2016, Eerola/Maattanen 2013, Evans 2012), observing that sheltering of housing wealth accelerates investment in real estate at the expense of capital investment in more productive sectors.

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Dr Paul Kershaw received the award for Academic of the Year in 2016 from the Confederation of University Faculty Associations of British Columbia for his work on generational equity. The Canadian Political Science Association has twice honoured Kershaw with national prizes for his research.

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