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Testing for Canadian Distributional Change: Declining Middle Class, Rising Top Income Shares and Widening Income Gaps

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Abstract

This paper combines quantile-based disaggregative statistics and standard error formulas for the statistics to examine changes in the distribution of individuals' incomes in Canada within a standard statistical inference framework. Analysis focuses on decile means and income shares, Lorenz curves (as indicators of inequality change) and generalized Lorenz curves (as indicators of change in economic well-being). The analysis confirms major previous findings as highly statistically significant and reveals much new distributional detail. Significant and substantial inequality increases occurred over 1990-2015 for both men and women with much stronger increases for men. As a result, men's Lorenz curves have fallen sufficiently to change from being above women's Lorenz curves before 2000 to then lying uniformly and significantly below them. Generalized Lorenz curves for men are higher over all years than those for women. However, the two GLC curves have been converging, and the middle 80 percent of the curves are estimated to meet within roughly a generation. The study illustrates that it is straightforward to undertake distributional analysis within a standard framework of statistical inference.

1. Introduction

The general contours of distributional change since about 1980 in Canada, the United States and many other developed countries are now well known — a declining Middle Class and mid-range relative earnings, dramatically rising upper and top income shares, and rapidly widening income gaps between mid and upper income levels (eg., Guvenen, Pistaferri and Violante, 2022; Hoffman, Lee and Lemieux, 2020; and Beach, 2016). A substantial literature has examining leading causes of these historic changes, focusing on advances in automation and IT developments, globalization and shifting production patterns/supply chains, long-run demographic forces, and major policy changes (eg., Acemoglu et al., 2016; Autor, Dorn and Hanson, 2013; and Goos, Manning and Salomons, 2014). But this understanding is based on quantifying and describing the major distributional changes without a basis of formal statistical inference or testing of the observed changes.

Over the same timeframe, the perspective of empirical income distribution studies has essentially shifted from analysis of income inequality, especially in the form of summary measures of inequality such as the Gini coefficient, Atkinson's measure of inequality or the variance of the logs of incomes to distributional change in general, particularly over different persons and regions of the income distributions (eg., Jenkins, 1999; Lambert, 2001; and Cowell, 2011). Attention focused on how to measure resulting changes in overall social welfare across the distribution (eg., Saposnik, 1981; and Shorrocks, 1983) and the polarization of incomes (Wolfson, 1994; and Beach and Davidson 2025b). Public availability of large microdata sets also accommodated interest in differences in economic outcomes of specific income groups, and between various racial, demographic, regional and policy groups (eg., immigrants vs. native-born).

But recent econometric work by Beach and Davidson (2025a, c) develops the foundation for drawing statistical inferences on disaggregative distributional measures by deriving the (asymptotic normality and asymptotic) variance-covariance structure of the sample means and income shares of ordered quantile groups across a distribution (eg., for each decile group within an income distribution). This also informs corresponding results for a set of related quantile statistics such as Lorenz curve ordinates. The resulting explicit formulas for asymptotic variances, covariances and standard errors are all distribution-free and hence straightforward to implement, and do not require the programming of density-estimation algorithms such as a kernel estimation or computationally intensive bootstrap techniques.

The present paper applies the formulas of Beach and Davidson (2025a, c) and illustrates an empirical approach to examine detailed distributional change within a formal framework of statistical inference with Canadian census microdata files on the incomes of individuals over 1990-2020. It thus tests whether the observed major distributional changes over this period are indeed statistically significant with a high degree of confidence. It also illustrates the use of an extensive quantile toolbox of detailed distributional statistics that are very flexible and easy to use for such an analysis of the different aspects of distributional change.

The paper is organized as follows. Changes in decile mean incomes and decile income shares are examined in Sections 2 and 3 respectively. Corresponding changes in Lorenz curves and generalized Lorenz curves are then analyzed in Sections 4 and 5. Differences in decile means and income shares between men and women, and how these differences have changed, are reviewed in Section 6. Changes in income polarization rates, especially over the upper region of the income distribution, are examined in Section 7. The final section reviews the major findings of the paper and draws some conclusions for empirical analysts.

This is entirely an applied paper. All formulas for (asymptotic) variances, covariances and thus standard errors are simply referred to in their original sources of Beach and Davidson (2025a, c). It thus serves as an illustration and example of how empirical income distribution work can be done within a conventional framework of statistical inference.

2. Changes in Decile Mean Incomes

This paper examines distributional changes in the incomes of individual income recipients in Canada over the period 1990-2020. It makes use of public use microdata files (or PUMFs) on Individuals for the six Canadian censuses for the years 1991, 1996, 2001, 2006, 2016, and 2021 — in the 2011 Census, Statistics Canada changed their methodology, so its data are not completely comparable to the other years' data; consequently, results for the 2011 Census were not calculated. The income concept used is total income. Calculations are done separately for men and women since the labour market activity patterns and experiences for the two groups have considerable differences and these differences have changed over the period covered. Since income refers to that reported for the previous full calendar year, the income years are 1990, 1995, 2000, 2005, 2015 and 2020.

The estimation samples for the study consist of those records on the PUMF files for individuals age 18 or over who did not attend school (either full-time or part-time) in the income year and whose total income that year was at least $1000. Total income consists of wages and salaries (the largest component), net self-employment income, investment income, retirement pensions, and other money income (eg., disability or social assistance benefits). Summary statistics on mean income and sample size of each of the estimation samples are provided in appendix Table A1. Incomes are all in real 2020 Canadian dollars (adjusted by Statistics Canada's annual CPI series, Table 18-10-0005-01). As can be seen, the sample sizes are quite large and vary between 233,228 and 345,002 observations. Calculations were done using STATA, and all inference statistics are calculated in a stand-alone STATA program (Fassler, 2024) available from the author.

Table 1 presents the basic results on decile mean incomes, separably for women (1(a)) and men (1(b)), for each of the six census years. Figures in parentheses are standard errors. Given the large sample sizes, it is not surprising that the estimated decile means are highly statistically significant and thus quite reliably estimated. As expected, men's decile means are considerably higher than women's, and more so at the upper end of the distribution.

Changes in decile means over different intervals are presented in Tables 2(a) for women and 2(b) for men. In this table of estimated changes, the figures in parentheses are now (absolute values of asymptotic) t-ratios of the decile mean differences. As can be seen, almost all of the mean differences are individually highly statistically significant on the basis of standard normal critical values. Chi-square statistics for differences in the full set of decile means between years are found to be:

	Women	Men
1990-95	343.9	1825.1
1995-00	1199.5	761.0
1990-00	1511.1	1303.4
2000-05	2922.0	2483.9
2005-15	6481.2	1456.9
2015-20	8159.9	4570.6
1990-20	42,206	7390.8
2000-20	33,400	7417.5

All are highly statistically significant and indicate a surprising degree of heterogensity or changes in the cross-sectional income distributions between census years (even between adjacent census years).

Over the period as a whole — whether 1990 – 2020 or 2000 – 2020 — the incomes for both women and men rose substantially in real dollar terms across all deciles. The distributions for both men and women showed substantial declines in incomes over 1990-95 — reflecting the severe early 90s recession — except for the top three decile means for women. The 1995-2000 interval showed smaller increases and the 2005-15 period showed larger increases, followed by quite substantial increases over 2015-20 — reflecting the major (temporary) federal income support programs in response to the COVID epidemic — except at the very top end where top decile means fell. The interval 2000-05 experienced mixed results. Here women's incomes rose across the distribution, while the lower half of the men's distribution experienced slight declines along with rising decile means over the upper half of the distribution. From the results in the appendix Table A1, one can see that between 1990 and 1995 mean incomes for men as a whole fell by 6.3 percent, but for women fell by only 0.1 percent. Over the last twenty years 2000-20, mean incomes went up by 19.7 percent for men and by 40.4 percent for women. Clearly, the gender gap in mean incomes narrowed over this period.

One could also look at so-called Piketty lines (The Economist, 2021) or the growth rates of income levels across the various decile groups. These are presented in Tables 3(a) for women and 3(b) for men. The change intervals are the same as in the previous tables. But here the figures in parentheses are standard errors. Growth rates over each period are expressed in percentages.

Three results immediately stand out. First, one can see the quite severe fall in decile mean incomes — especially for men — over the recessionary 1990-95 period that for the lower 80 percent of men lasted for over a decade. Second, since 2000, decile mean growth rates have essentially been positive, with higher growth rates for women than for men. And third, since 2000, indeed since 1990 as a whole, growth rates were lowest over the middle ranges of the distributions and highest over the two ends. So lower incomes have moved up relative to the middle and upper incomes have widened their gap away from the middle. Rising inequality has been driven by a (relatively) declining middle and a rapidly stretching out of the top end.

3. Decile Income Shares and Relative Mean Income Ratios

Basic results on decile income shares (expressed as percentages) over the six censuses appear in Tables 4(a) and 4(b), again with standard errors in parentheses. And again, the large sample sizes ensure highly statistically significant estimates. One notes since 2000, that in 2005, 2015 and 2020 the lower nine decile shares are generally higher for women than for men, while the top share is distinctly higher for men than for women. This would suggest, at the simple level of inspection, that overall income inequality is more marked in the distribution of men's incomes than for women's incomes. This would seem to be a reversal from the more "traditional" finding of greater income inequality within the women's distribution — as illustrated in the 1990 results — because of their traditionally greater incidence of part-time work and lower labour market participation rates. Evidently, the income share distributions have experienced considerable change as well. Indeed, chi-square statistics for differences in the full set of decile income shares between years are also found to be jointly highly statistically significant (where the 99 percent confidence critical value with nine degrees of freedom is 21.67):

	Women	Men
1990-95 -	337.31	1115.8
1995-00 -	251.55	393.23
1990-00 -	418.64	1243.2
2000-05 -	2289.7	2989.9
2005-15 -	237.85	321.79
2015-20 -	4009.8	3976.6
1990-20 -	3361.0	5091.6
2000-20 -	4778.7	4066.7

The results highlight two periods of change as especially noticeable. First, between 2000 and 2005 for both women and men, the lower nine decile shares fell, while the top decile share rose quite

dramatically, suggesting a marked rise in income inequality over this period (which included the 2001 IT crash). The changes were more marked for men than for women. Second, between 2015 and 2020 and again for both men and women, the lower eight or nine decile shares rose quite substantially, while the top decile shares fell quite markedly, in turn suggesting a notable reduction in income inequality over this period, likely as a consequence of the large federal government payouts of income support payments in the face of the 2020-21 COVID pandemic.

Another way of looking at income shares is in terms of relative mean incomes. The income share of the i'th quantile group (IS_i) is the total income of this group relative to the total income in the distribution:

$$IS_i = N_i \, \mu_i \, / \, N\mu$$

where μ_i is the i'th group mean income, μ is the overall mean, N_i is the number of persons in the i'th group, and N is the total number of individuals in the whole distribution. Then

$$IS_i = (N_i \, / \, N) \, (\mu_i \, / \, \mu) \, .$$

In the case of decile groups, the first term is simply 0.1. So the relative mean income of the i'th decile group (RMI_i) is simply 10 times its income share value (and its standard error is scaled up by 10 as well). Thus an alternative and equivalent way of viewing decile income shares is in terms of decile relative mean income ratios (chi-square test statistics for changes in the full set of RMI_i ratios are identical to the corresponding chi-square values found for the income shares.)

Corresponding tables on relative mean income ratios for the six censuses covered in this study are included as Tables 5(a) and 5(b). As can be seen, the figures in these tables are simply ten times those in the previous Tables 4(a) and 4(b). But they lend themselves to perhaps more intuitive interpretation of changes in their values over time. As can be seen, the lower six decile $RMI_i's$ are all less than one and the upper four $RMI_i's$ exceed unity, with the top ratios exceeding two (and even three).

Changes in relative mean income ratios are presented in Tables 6(a) and 6(b), with estimated "t-ratios" in parentheses. Interestingly, generally similar patterns of change appear for both men's and women's income distributions. That is, similarities rather than differences seem to be the watchword for changes in the RMIs. Between 1990 and 1995, for both men and women, declines occurred over the lower 6-7 decile ratios while gains occurred over the top 3-4 deciles in

the distribution. Then over 2000-05, for both genders, the recession saw big RMI declines for the lower 9 deciles accompanied by large gains for the top decile ratio (or income share). On the other hand, over 2015-20, big gains occurred — again for both men and women — over the lower 8-9 deciles, accompanied by a very large loss for the top decile group. Over the 2000-20 period as a whole, similar patterns of change occurred for men and women as well as the bottom 2-5 and top decile gained while the middle decile groups lost out relatively. All of these sets of changes are highly statistically significant.

4. Lorenz Curves and Income Inequality Changes

Cumulative income shares or Lorenz curve ordinates for the six census years are presented in Tables 7(a) and 7(b), with estimated standard errors in parentheses. Comparing the Lorenz curves for men and women, one immediately notes an historic change. For the years 1990 and 1995, women's Lorenz curves lie uniformly below those for men, illustrating the "traditional" patterns of a lower degree of income inequality associated with most men working full-time full-year in the labour market. But for the years 2005 and 2015 the pattern reverses with the Lorenz curves for women uniformly above those for men, consistent with a rather dramatic rise in overall income inequality in the men's income distribution over the last three decades[1].

When comparing Lorenz curve shifts over time (see Tables 8(a) and 8(b)), one notes that the chi-square statistics for changes between the full set of Lorenz curve ordinates between years are the same as those already calculated for the income shares themselves in the previous section (since cumulating income shares is a linear transformation). Their large values again indicate that the Lorenz curve changes jointly over time were indeed highly statistically significant.

Over different time periods, one observes remarkably different shifts in the Lorenz curves, and again qualitatively similar shift patterns for men and women, though generally much stronger shifts in the men's income distribution. Over the 1990-95 period for both men and women, Lorenz curves shifted uniformly moderately downward or outward (with highly statistically significant t-ratio differences between respective individual ordinates). Over 2000-05, the Lorenz curves for both groups again shifted uniformly and very strongly downward and typically individually highly

[1] Uniform shifts up or down of Lorenz curves will be taken as an indicator of decreased or increased income inequality (see Beach and Davidson 2025c, for references behind this criterion).

significantly so. Over 2005-15, this downward or outward uniform shift continued further, though at a much weaker pace for both groups. However, over the 2015-20 interval, both men's and women's Lorenz curves shifted uniformly and very strongly upward or inward with highly significant individual differences in respective ordinates as federal transfer increases sought to address the income losses from the COVID pandemic. As a result over the 2000-20 period as a whole, again for both women and men, one finds mixed changes in Lorenz curve ordinates and no uniform or individually statistically significant shifts. While lower Lorenz curve ordinates moved up (for both men and women) and middle Lorenz curve ordinates moved up just for women, upper ordinates shifted down for the men's distributions, and top ordinates for both men and women shifted down — and very strongly so for men. Evidently, major macroeconomic changes can have very marked income inequality effects as well. And the three-decade-long trend toward rising income inequality has hit a strong policy equalizing jolt over the most recent interval.

5. Generalized Lorenz Curves and Social Welfare Changes

Less well known than the Lorenz curve is the generalized Lorenz curve introduced by Shorrocks (1983). It is gotten by multiplying or scaling up the Lorenz curve ordinates by the overall mean of the income distribution. If mean income captures the efficiency dimension of a distribution and the Lorenz curve captures the equality or inequality dimension, then Shorrocks shows that, under specified conditions, the generalized Lorenz curve or product of the two dimensions represents the distribution of social welfare of the income recipients in the distribution. The basic idea is that, if the mean income in one distribution A is sufficiently higher than in another distribution B, this can compensate for some greater degree of inequality in A than in B, so that social welfare can be said to be greater in distribution A than in B. This rule can be very convenient for comparing changes in overall social welfare or general economic well-being between income distributions over time.[2]

Empirical estimates of generalized Lorenz curve ordinates for the six censuses are presented in Tables 9(a) and 9(b), with standard errors in parentheses. Comparing the two tables, one sees immediately that the generalized Lorenz curves for men are everywhere consistently

[2] Again, for references on use of this criterion, see Beach and Davidson (2025c).

higher than those for women. Even though men's Lorenz curves have generally been shifting down associated with strongly rising income inequality, their mean incomes are still substantially higher than women's mean incomes — enough to yield consistently higher generalized Lorenz curves each year over the period. To the extent that empirical social welfare can be based on individual incomes (a big reservation), one can see that estimated economic well-being from the income distribution for men everywhere exceeds that for women. However, for women's income distributions the generalized Lorenz curves rose consistently across all census years since 1995, suggesting an on-going improvement in overall economic well-being. This was not the case, though, for the men's income distributions.

Results for changes in generalized Lorenz curves (GLCs) are presented in Tables 10(a) and 10(b), with asymptotic "t-ratios" in parentheses. Clearly, between 1990 and 1995, generalized Lorenz curves took a big hit — especially for men — as the curves fell for both men and women, driven by both falling mean real incomes and rising inequality. As already noted, women's generalized Lorenz curves thereafter rose uniformly across all the census years as increases in mean incomes overcame any rising inequality effects. For men, generalized Lorenz curves rose uniformly over 1995-2000 and 2005-2015 (with the very strong 1990-95 decline swamping the much weaker recovery over 1995-2000), but they experienced mixed results over 2000-05 and 2015-20. Over the full 2000-20 or 1990-20 periods as a whole, however, both women's and men's generalized Lorenz curves rose uniformly with individual ordinate differences consistently highly statistically significant. Chi-square statistics for changes in the full set of GLC ordinates are the same as those already cited for the full sets of decile means[3] listed above in Section 2. So again, all these joint time period changes in the generalized Lorenz curves are highly statistically significant.

6. Changes in Distributional Differences Between Men and Women

Differences in average incomes between men and women are often cited and serve as social policy concerns. But individuals do not receive the means. This section uses statistical inference tools to examine how income differences or income gaps between the gender groups are

[3] This should not be surprising since income shares are proportional to the relative mean income ratios μ_i/μ. So multiplying them by μ simply yields the $\mu_i's$.

indeed distributed or spread across regions of the income distribution, and how there differences or income gaps have changed over time.

6.1 Differences in Mean Incomes

Consider first the mean income figures for men and women in appendix Table A1. To limit a profusion of results, we focus just on the years 1990, 2000, 2015, and 2020. For these years, the differences in mean incomes or income gaps (in 2020 dollars) are estimated to be:

	1990	2000	2015	2020
Dollar Gap -	$24, 087	$20, 946	$23, 049	$17, 774
Ptg Gap -	42.25%	37.23%	33.27%	26.38%

The second line expresses the dollar gap as a percent of men's mean incomes. As can be seen, the percentage gap declined throughout the period and the dollar gap also generally declined, although the large run-up of upper incomes of men between 2000 and 2015 leads to an increase in the dollar gap from 2000 to 2015.

If one examines further how the dollar and percentage gaps changed over time, one obtains:

1990 – 00 -	- $3141 (-5.02%)	1990 – 20 -	-$6313 (-15.87%)
2000 – 15 -	+$2103 (-3.96%)	2000 – 20 -	-$3172 (-10.85%)
2015 – 20 -	-$5275 (-6.89%)		

These changes in mean gaps provide a basis of comparison and a tabular format for how income gaps changed across the distribution. In what follows, we focus on examination of dollar income gaps.

Differences in respective decile mean incomes between men and women for 1990, 2000, 2015 and 2020 are presented in Table 11(a). Figures in parentheses are absolute "t-ratios", and it can be seen that these decile gaps are highly statistically significant. If one compares the decile

mean gaps to men's decile incomes in respective years (from Table 1(b)), one can calculate the corresponding percentage income gaps:

	1990	2000	2015	2020
D1 -	50.8%	42.9%	28.7%	27.2%
D5 -	48.0%	41.6%	30.2%	21.2%
D6 -	45.3%	39.1%	28.5%	21.5%
D10 -	40.7%	37.9%	42.0%	35.6%

Clearly, the percentage gaps have generally been declining across the entire income distribution. But the steepest declines seem to have occurred over the mid range of the distribution. The top decile's income gap before 2000 was the lowest in percentage terms, but shot up dramatically between 2000 and 2015, and by 2020 its decile income gap was still markedly the highest. The top income gap appears to be the most resistant to change. Lower decile income gaps reflect both the general downward trend as well as recession effects (between 1990 and 1995, and 2000-05) which hit men's incomes disproportionately more strongly.

Changes in the decile mean income gaps between men and women appear in Table 11(b). Again, these difference-in-difference effects are individually statistically highly significant. Almost all the decile gap changes are seen to be negative, indicating a broad downward trend or reduction in income differences between men and women over this period. One aberration stands out though: the dramatic increase in the income gap in the top income decile over 2000-15. Indeed, this increase in the gender income gap in D10 was so strong as to swamp any reductions that occurred over 1990-00 and 2015-20 and to drive the overall mean dollar gap for the distribution as a whole over 2000-15.

6.2 Differences in Decile Shares

A similar difference-in-difference analysis can also be done for the other main distributional measures in this study. Consider here difference in income shares between men and women in the Canadian income distribution. Recall that, for the i'th income decile,

$$IS_i = (0.1)\,(\mu_i/\mu) \qquad = (0.1)\,RMI_i \qquad i = 1, \ldots, 10\,.$$

So differences in income shares correspond equivalently to (rescaled) differences in relative mean incomes for men and women.

Table 12(a) presents differences in decile income shares between men and women between 1990 and 2020 (calculated from the results in Tables 4(a) and 4(b) in Section 3). All but one of the estimated differences are again highly statistically significant at conventional levels of confidence. The differences are calculated as

$$IS_i(M) - IS_i(W) \qquad\qquad i = 1, \ldots, 10\,.$$

So a positive value means that the men's income share is larger than the corresponding women's income share. The major result that is immediately noticeable is that in 1990 and 2000 over the lower six deciles $IS_i(M) > IS_i(W)$ while the reverse is the case over the upper three or four deciles. However, in 2015 and 2020, over the lower nine deciles $IS_i(M) < IS_i(W)$ while the opposite holds dramatically for the tenth or top decile (indeed the D10 difference switched signs significantly by 2000). This rather dramatic change illustrates the broad transition of income inequality over this period from income inequality being higher among women before 2000 to inequality becoming higher among men since 2000. Alternatively stated in terms of relative mean income differences, this transition corresponds to lower half RMI's falling faster among men than among women over this period while the top RMI rose dramatically faster again for men than for women.

This transition is illustrated in more detail in Table 12(b) which shows time changes in the decile share gaps over different periods. A negative value means that decile share difference have declined, a positive value that share differences have increased. Over the long-run change in the two right-hand columns of Table 12(b), one can clearly see this major distributional transition of income inequality within the women's income distribution exceeding that in the men's distribution

at the beginning of the period to a situation where the reverse is the case, by the end of the period, and these long-run changes are all highly statistically significant.

6.3 Differences in Lorenz Curves

This change in income inequality patterns is further examined in terms of Lorenz curves. Table 13(a) presents differences in Lorenz curve ordinates for the four years of interest. The figures reported are for the difference

$$LC_i\ (M)\ -\ LC_i\ (W) \qquad\qquad i = 1, \dots, 9,$$

so again positive values correspond to $LC_i(M)\ >\ LC_i(W)$, and again all but one of the entries are individually highly statistically significant. What the figures show is that in 1990, the Lorenz curve for men lies everywhere above that for women — corresponding to a lower degree of overall income inequality for the men's income distribution — but by 2015 this pattern has been completely reversed as the Lorenz curve for women lies everywhere above that for men.

The actual changes in the Lorenz curve differences are indeed provided in Table 13(b). In terms of magnitude of the shift, the big changes occur between 2000 and 2015, when the entire Lorenz curve differences decreased dramatically — compare the sizes of the column 2 results in Table 13(b) to the actual difference values for 2000 in column 2 of Table 13(a). Clearly, this was a period of quite dramatic, indeed historic, transition of income inequality in Canada.

6.4. Differences in Generalized Lorenz Curves

Generalized Lorenz curves seek to integrate inequality and mean income level dimensions into an indicator of economic well-being or overall social welfare of a group:

$$GLC_i\ =\ \mu\ .\ LC_i \qquad\qquad i = 1, \dots, 10.$$

To the extent that social welfare depends on many factors than just individual income per se we use generalized Lorenz curves as indicators of what may be termed individual income-based economic

well-being when comparing between different demographic or social groups of income recipients — in the present case, between men and women. Differences between group GLC's are thus taken as an indicator of the dollar size of the income-based economic well-bring gap between the two groups.

Generalized Lorenz curves differences for the two groups are presented in Table 14(a) for the years of interest. Again, the entries are defined as the differences

$$GLC_i\ (M)\ -GLC_i\ (W) \qquad\qquad i = 1, \dots, 10,$$

so a positive value indicates that the generalized Lorenz curve ordinate for men exceeds the corresponding ordinate for the women's income distribution, and all these differences can be seen to be highly statistically significant. They are also all positive, indicating an economic well-being gap favoring men throughout the period.

Two factors have already been identified as affecting how there GLC differences have evolved between 1990 and 2020. One is the rise of women's mean real incomes and a generally decreasing percentage mean income gap between men's and women's incomes over the period (the between-group contributor). The second is the general, but quite distinct, increase in men's income inequality, both absolutely and relative to inequality in the women's income distribution (the within-group contributor). This shifts down the Lorenz curve for the men's distribution relative to the women. The first factor operates through μ and shifts up the GLC for women relative to that for men. The second factor operates through the Lorenz curve ordinates and shifts down the GLC for men relative to that for women. Given that the GLC ordinate differences in Table 14(a) are all positive, these two factors operate together to reduce the economic well-being gap between the two groups.

Table 14(b) shows how the GLC differences have indeed changed over the different subperiods since 1990. As can be seen, for the period as a whole (in the last two columns of the table), the GLC gap favouring men has been quite dramatically narrowing as the generalized Lorenz curve for women has been strongly rising relative to the GLC for men. At the average rate of convergence of these curves over the 2000-20 period, one can estimate the length of time it would take for the two generalized Lorenz curves to indeed converge so the GLC differences become zero (figures in parentheses are asymptotic "t-ratios"):

Decile	Years to Converge (YTC)
1 -	106.7 (0.322)
2 -	23.1 (1.635)
3 -	17.2 (2.405)
4 -	15.4 (2.940)
5 -	14.2 (3.480)
6 -	14.4 (3.767)
7 -	15.7 (3.905)
8 -	17.4 (3.903)
9 -	19.6 (3.765)
10 -	56.0 (1.500)

For the middle 80 percent of the distribution, the differences in income-based economic well-being are estimated to disappear by 14-23 years (beyond 2020) or essentially a generation. Transition in the tails of the distribution are likely to be much slower, but are much less reliably estimated. Whether these trends continue, though, remains to be seen.[4]

Corresponding YTC estimates for decile means — perhaps a more conventional basis for evaluating gender differences and their estimated time to convergence — are presented in appendix Table A3. They show a very similar pattern of convergence to that for generalized Lorenz curves. While the YTC values for gender differences in decile means are much more reliably estimated than for GLC ordinate convergences, the latter reflect changes in both means (an efficiency indicator) and Lorenz curve ordinates (an equity indicator) and hence are the preferred or recommended basis for evaluating convergence of gender outcome differences.

[4] One could also calculate an average GLC value for each of the men's and women's income distributions and thence an average difference between their respective GLC curves. The estimated variance of each of the averages is (.01) times the sum of all the estimated GLC variances and covariances. The estimated variance of the difference is then the sum of the estimated variances of the respective averages' variances. Change in the difference between two years can also be calculated, with an estimated variance again equal to the sum of the two years' estimated variances of the difference. A years-to-convergence figure can then be calculated for this difference along with its estimated variance as well.

7. Changes in Income Polarization Rates

An additional aspect of distributional interest is a measure of the degree of polarization or the pulling apart of an income distribution. One way of capturing this concept is the quantile income gap separating lower or higher incomes from middle incomes in a distribution. We refer to this as income polarization, and it can be captured by the gaps

$$Gap\ H = \mu_K - \mu_M \qquad and\ Gap L = \mu_M - \mu_1,$$

where μ_1 is the first or lowest quantile mean income level, μ_K is the K'th or top quantile mean and μ_M is a measure of the middle income level. In the case of deciles, $\mu_K = \mu_{10}$. Perhaps the most natural choice for μ_M is the median of the distribution, but a statistical property of the estimated median is that it is not distribution-free as its (asymptotic) variance depends on the underlying (unknown) income density function. A convenient way around this is to use the mean of the middle-most quantile income interval, $\hat{\mu}_M = \hat{\mu}_3$ in the case of quintiles. In the case of deciles, simply use

$$\hat{\mu}_M = (0.5)\,(\hat{\mu}_5 + \hat{\mu}_6)$$

or the simple average of the decile means for the middle-most two deciles. Standard errors are thus straightforward to calculate from what is already available. Estimates of $\hat{\mu}_M$ so calculated are provided in appendix Table A2. Interestingly, while middle-decile real mean incomes (or "typical incomes") rose by 51.9 percent for women between 1990 and 2020, $\hat{\mu}_M$ for men went up by only 3.3 percent over the thirty-year period — barely increasing at all. (This is in contrast to the growth rates of the overall means of 50.6 percent for women and 18.2 percent for men over 1990-20.) Indeed, over the 1990-2015 period, $\hat{\mu}_M$ for men essentially showed no increase (+ 0.4 percent).

Estimates of the lower and higher income gaps for women and men are presented in Table 15. Standard errors are in parentheses, so all the gap estimates are highly statistically significant. The higher gap figures are obviously much greater than the lower gap estimates by a factor of three or even four because of the long right-hand tails of the distributions. They are also larger for men than for women. The lower income gap increased substantially (by 47.3 percent between 1990 and 2020) in the women's income distribution as middle incomes went up in tandem. In sharp contrast, the lower income gap for men remained virtually unchanged over this period (falling by 0.1 percent)

as middle incomes for men essentially stalled. The higher income gap, on the other hand, rose substantially for both women (by 77.3 percent between 1990 and 2015) and men (by 100.2 percent over the same period) as upper incomes experienced a dramatic run up over this interval. Rising income polarization, then, was essentially driven asymmetrically by the dramatic run-up of high incomes — particularly so in the men's income distribution. The COVID pandemic and the federal government's big (temporary) increase in income supports also had a quite noticeable effect of narrowing this rising polarization trend over the most recent 2015-20 period. We'll await the 2026 Census results to see if this reversal is only temporary.

The income gaps can also be expressed in proportional terms, as done in Table 16 in terms of these ratios

$$R = \mu_{10} / \mu_1$$

$$RH = \mu_{10} / \mu_M$$

and $$RL = \mu_1 / \mu_M$$

Again standard errors appear in parentheses, and all income polarization ratios are highly statistically significant. The results show the same general pattern of income polarization increases largely driven by rapidly rising top incomes. The lower income ratio (RL) shows not much change over the period up to 2015 for both men and women. But the higher income ratio (RH) shows a strong rise between 1990 and 2015, increasing by 23.7 percent in the women's distribution and by 67.2 percent for men. Also, while RH(W) exceeds RH(M) for 1990-2000, since then the reverse has been the case — again consistent with the relatively much stronger rise in inequality within the men's income distribution than in the women's distribution. The result has been a strong rise in the overall income polarization rate (R) between 1990 and 2015 for both women and men, but especially so for men.

8. Major Findings and Conclusions

This paper examines changes in the distribution of incomes of individuals in Canada over the period 1990-2020. It does so from two largely novel perspectives. One is that it makes use of a toolbox of quantile-based disaggregative statistics such as decile means and decile income shares covering the full range of the distribution. These give rise to Lorenz curves as indicators of how

income inequality has broadly changed, and to generalized Lorenz curves as indicators of how social welfare or economic well-being has generally changed over this period. The analysis uses large publicly available microdata files from Canadian censuses from 1991 to 2021 and looks at the income distribution for men and women separately. The other distinguishing factor is that it applies the recent econometric innovations in Beach and Davidson (2025a, c) on the asymptotic distributional properties (normality and variance-covariance structure) of sample estimates of these quantile-based statistics to report standard errors or "t-ratios" for all the above statistics. This allows for the application of standard statistical inference procedure to empirical income distribution analysis. The paper thus formally measures whether observed major distributional changes over this period are indeed statistically significant.

Since the analysis is based on decile breakdown of the distributions and on a variety of statistical tools, extensive empirical output is provided as a purposeful illustration of the ready application of a statistical inference approach to income distribution analysis. Three principle findings can be highlighted.

First, the analysis confirms major previous findings and reveals much new distributional detail. Previous empirical results of declining middle income shares and dramatically rising upper income shares (eg., Beach, 2016) have been shown to be highly statistically significant (Tables 6(a), 6(b)). The analysis has also revealed quite distinct and surprisingly strong distributional changes over just five-year intervals between adjacent censuses. The periods 1990-95 and 2000-05 show substantial and highly significant recessionary effects, and the 2015-20 period shows broad and again highly significant COVID- and policy-related effects on the distribution of Canadian incomes (Tables 2(a), 2(b)).

Second, substantial and highly statistically significant income inequality increases, as represented by uniform downward shifts of Lorenz curves have occurred over 1990-2015 (Tables 8(a), 8(b)). These shifts are much stronger in the men's income distribution than for the women's distribution. The shifts have also occurred over both periods of recessions and periods of economic growth, as the recessions reduced incomes at the lower end and middle of the distributions and the growth disproportionately benefited incomes at the top end of the distributions — a rising tide did not lift all boats at the same rate (Tables 2(a), 2(b)). As a result of there shifts, there has been an historic reversal of relative inequality in the men's and women's income distributions. Over 1990 and 1995, the Lorenz curve for women was everywhere lower than that for men as more women worked part-time or part-year and also had generally higher levels of

education. But for 2005 and 2015, the Lorenz curve for men had shifted down sufficiently strongly and uniformly to reverse this pattern and lie everywhere below that for women (Tables 13(a), 13(b)). In addition, as middle income growth stalled for men or went up relatively slowly for women and top incomes dramatically rose, polarization of incomes in the distributions increased markedly, driven by rising upper income gaps — entirely so for men and largely so for women (Tables 15, 16).

Third, generalized Lorenz curves, as the product of Lorenz curve ordinates and the distribution's mean income, can be used as indicators of income-based economic well-being or general social welfare for a distribution of income. It is found that the empirical GLC for men lies uniformly above that for women for all years over 1990-2020. However, for women they rose consistently across all census years, while for men they rose for the period as a whole (1990-20 and 2000-20) but not for all subperiods (Tables 9, 10). As the mean income gap narrowed between men and women with the rising relative incomes of women and as Lorenz curves for men shifted down with rising relative inequality of men, generalized Lorenz curves have been converging between men and women (Tables 14(a), 14(b)). At recent rates of convergences, the middle 80 percent of the curves are estimated to meet within roughly a generation.

The analysis and findings of this paper lead to several conclusions. First, the advent of new statistical tools of a variety of disaggregative distributional measures and explicit standard error formulas for their sample estimates means that it is now quite straightforward to undertake detailed statistical inference-based distributional analysis and distinguish between statistically reliable findings and non-statistically significant results. The paper illustrates how it is useful and feasible for statistical agencies to supplement their quantile mean and income share estimates with corresponding standard error information attached to these estimates. Second, disaggregative income inequality measures and income-based economic well-being criteria are useful complementary concepts to lead to a better understanding of distributional change. And third, major recessions and activist income support programs can have surprisingly strong distributional effects.

Table 1(a)
Women's Decile Mean Incomes
(Canada, 2020 $)

Decile	1990	1995	2000	2005	2015	2020
1	4417	3987	4212	4667	5414	7733
	(25.39)	(24.47)	(23.81)	(28.41)	(28.68)	(39.10)
2	10,574	9998	10,584	11,441	13,304	17,423
	(34.67)	(35.43)	(36.98)	(32.93)	(37.81)	(39.99)
3	15,254	14,782	15,701	16,482	18,991	23,568
	(37.81)	(37.58)	(35.92)	(40.55)	(39.93)	(35.21)
4	18,940	18,660	19,890	21,080	24,326	29,510
	(34.33)	(34.56)	(40.82)	(34.08)	(44.64)	(54.60)
5	23,340	22,918	24,847	26,430	31,046	36,309
	(52.31)	(46.56)	(54.00)	(58.65)	(64.97)	(57.34)
6	29,281	28,605	31,248	33,275	38,857	43,636
	(67.08)	(66.51)	(68.94)	(70.51)	(74.24)	(65.33)
7	36,392	36,130	39,150	41,082	47,493	52,028
	(68.76)	(79.31)	(74.14)	(67.68)	(71.19)	(70.23)
8	44,576	44,957	48,021	50,528	58,435	62,980
	(78.89)	(83.33)	(84.14)	(90.70)	(103.09)	(91.06)
9	56,237	57,008	61,366	65,082	76,066	80,464
	(103.55)	(106.28)	(116.62)	(127.12)	(133.23)	(128.70)
10	90,234	90,393	98,150	125,426	148,312	142,289
	(251.40)	(234.44)	(213.83)	(516.60)	(595.41)	(465.86)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors in parentheses.

Table 1(b)
Men's Decile Mean Incomes
(Canada, 2020 $)

Decile	1990	1995	2000	2005	2015	2020
1	8984	6975	7371	7205	7593	10,622
	(45.06)	(41.01)	(43.61)	(40.81)	(42.96)	(48.10)
2	19,031	16,536	17,634	17,356	18,068	21,657
	(52.82)	(51.02)	(53.56)	(57.34)	(45.57)	(39.85)
3	27,500	23,963	25,528	25,416	26,064	29,117
	(73.17)	(66.85)	(64.28)	(62.01)	(64.87)	(56.83)
4	36,263	32,264	33,979	34,012	35,363	37,499
	(80.94)	(79.15)	(79.33)	(79.62)	(80.85)	(70.95)
5	44,916	41,026	42,526	42,371	44,506	46,061
	(82.44)	(88.25)	(77.95)	(71.78)	(75.58)	(74.41)
6	53,503	49,765	51,293	51,436	54,348	55,566
	(81.60)	(87.93)	(94.19)	(95.19)	(94.25)	(82.66)
7	62,921	59,437	60,916	62,014	65,969	66,860
	(98.99)	(92.44)	(92.69)	(102.43)	(108.08)	(94.84)
8	74,242	71,232	73,462	75,425	81,039	81,352
	(104.30)	(115.42)	(120.27)	(123.01)	(136.91)	(120.67)
9	90,525	87,483	91,841	95,689	104,119	103,869
	(143.18)	(137.99)	(157.04)	(177.83)	(169.78)	(170.77)
10	152,233	145,290	158,080	231,264	255,668	221,073
	(487.25)	(454.66)	(467.66)	(1448.4)	(1505.8)	(1066.4)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors in parentheses.

Table 2(a)
Changes in Women's Decile Mean Incomes Between Censuses
(Canada, 2020 $)

Decile	1990-95	1995-00	1990-00	2000-05	2005-15	2015-20	1990-20	2000-20
1	-430.45	225.37	-205.08	455.22	746.49	2319.59	3316.22	3521.30
	(12.21)	(6.60)	(5.89)	(12.28)	(18.49)	(47.84)	(71.13)	(76.92)
2	-576.05	585.91	9.86	857.50	1862.90	4118.63	6848.90	6839.04
	(11.62)	(11.44)	(0.19)	(17.32)	(37.16)	(74.84)	(129.4)	(125.6)
3	-472.49	981.91	446.42	781.70	2508.45	4577.77	8314.35	7867.93
	(8.86)	(17.68)	(8.56)	(14.43)	(44.08)	(85.99)	(160.9)	(156.4)
4	-280.67	1230.55	949.88	1189.75	3246.19	5183.48	10,569	9619.42
	(5.76)	(23.01)	(17.81)	(22.37)	(57.80)	(73.50)	(163.9)	(141.1)
5	-422.30	1928.66	1506.36	1582.99	4616.21	5263.11	12,969	11,462
	(6.03)	(27.05)	(20.04)	(19.85)	(52.74)	(60.74)	(167.1)	(145.5)
6	-675.82	2642.96	1967.14	2027.21	5581.93	4779.12	14,355	12,388
	(7.15)	(27.59)	(20.45)	(20.56)	(54.52)	(48.33)	(153.3)	(130.4)
7	-261.69	3019.72	2758.03	1932.40	6411.17	4534.66	15,636	12,878
	(2.49)	(27.82)	(27.28)	(19.25)	(65.27)	(45.35)	(159.1)	(126.1)
8	380.92	3063.96	3444.88	2506.96	7907.97	4544.67	18,404	14,960
	(3.32)	(25.87)	(29.87)	(20.26)	(57.59)	(33.04)	(152.8)	(120.7)
9	771.01	4357.67	5128.68	3716.07	10,985	4397.59	24,227	19,098
	(5.20)	(27.62)	(32.88)	(21.54)	(59.65)	(23.74)	(146.7)	(109.9)
10	159.16	7757.44	7916.60	27,275	22,887	-6023.14	52,056	44,139
	(0.46)	(23.53)	(23.15)	(48.17)	(29.03)	(7.97)	(98.34)	(84.82)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses.

Table 2(b)
Changes in Men's Decile Mean Incomes Between Censuses
(Canada, 2020 $)

Decile	1990-95	1995-00	1990-00	2000-05	2005-15	2015-20	1990-20	2000-20
1	-2008.75	395.92	-1612.83	-166.89	388.81	3028.75	1637.83	3250.66
	(32.97)	(6.61)	(25.72)	(2.79)	(6.56)	(46.96)	(24.85)	(50.07)
2	-2495.48	1098.44	-1397.03	-278.62	712.16	3588.83	2625.34	4022.38
	(33.98)	(14.85)	(18.57)	(3.55)	(9.72)	(59.28)	(39.68)	(60.25)
3	-3537.12	1565.39	-1971.73	-122.00	648.10	3052.91	1617.29	3589.02
	(35.69)	(16.88)	(20.25)	(1.25)	(7.22)	(35.40)	(17.46)	(41.83)
4	-3998.36	1714.47	-2283.89	33.42	1351.14	2135.94	1236.60	3520.50
	(35.32)	(15.30)	(20.15)	(0.30)	(11.91)	(19.86)	(11.49)	(33.08)
5	-3890.35	1500.06	-2390.29	-155.02	2135.35	1554.56	1144.60	3534.89
	(32.21)	(12.74)	(21.07)	(1.46)	(20.49)	(14.66)	(10.31)	(32.80)
6	-3737.91	1527.64	-2210.27	142.59	2912.62	1217.96	2062.90	4273.17
	(31.16)	(11.86)	(17.74)	(1.06)	(21.74)	(9.72)	(17.76)	(34.10)
7	-3484.57	1479.59	-2004.98	1097.62	3954.89	891.28	3938.82	5943.80
	(25.73)	(11.30)	(14.78)	(7.95)	(26.56)	(6.20)	(28.73)	(44.82)
8	-3009.33	2229.46	-779.87	1963.15	5613.68	312.93	7109.89	7889.76
	(19.34)	(13.37)	(4.90)	(11.41)	(30.51)	(1.71)	(44.58)	(46.31)
9	-3042.13	4357.95	1315.82	3848.41	8429.32	-249.68	13,344	12,028
	(15.30)	(20.85)	(6.19)	(16.22)	(34.28)	(1.04)	(59.88)	(51.85)
10	-6942.41	12,790	5847.86	73,183	24,404	-34,595	68,841	62,993
	(10.42)	(19.61)	(8.66)	(48.08)	(11.68)	(18.75)	(58.72)	(54.10)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses.

Table 3(a)
Piketty Line Ordinates or Growth Rates of Decile Mean Incomes
(Women, 1990-2020)
(percentages)

Decile	1990-95	1995-00	1990-00	2000-05	2005-15	2015-20	1990-20	2000-20
1	-9.7452	5.6531	-4.6430	10.8078	15.9943	42.8469	75.0775	83.6022
	(0.7590)	(0.8817)	(0.7688)	(0.9204)	(0.9360)	(1.0461)	(1.3403)	(1.3925)
2	-5.4478	5.8604	0.0933	8.1020	16.2823	30.9573	64.7715	64.6179
	(0.4565)	(0.5269)	(0.4797)	(0.4894)	(0.4703)	(0.4784)	(0.6595)	(0.6882)
3	-3.0975	6.2166	2.9266	4.9788	15.2191	24.1053	54.5056	50.1125
	(0.3440)	(0.3633)	(0.3472)	(0.3527)	(0.3729)	(0.3201)	(0.4471)	(0.4102)
4	-1.4819	6.5948	5.0152	5.9816	15.3995	21.3084	55.8035	48.3629
	(0.2553)	(0.2947)	(0.2875)	(0.2769)	(0.2822)	(0.3161)	(0.4035)	(0.4100)
5	-1.8093	8.4154	6.4539	6.3710	17.4659	16.9526	55.5630	46.1318
	(0.2970)	(0.3225)	(0.3323)	(0.3304)	(0.3583)	(0.3066)	(0.4265)	(0.3926)
6	-2.3080	9.2395	6.7182	6.4875	16.7750	12.2992	49.0265	39.6449
	(0.3189)	(0.3501)	(0.3394)	(0.3257)	(0.3332)	(0.2726)	(0.4078)	(0.3723)
7	-0.7191	8.3579	7.5787	4.9359	15.6057	9.5480	42.9664	32.8947
	(0.2875)	(0.3141)	(0.2878)	(0.2634)	(0.2575)	(0.2210)	(0.3320)	(0.3090)
8	0.8546	6.8154	7.7282	5.2206	15.6508	7.7772	41.2882	31.1525
	(0.2585)	(0.2725)	(0.2683)	(0.2639)	(0.2911)	(0.2458)	(0.3229)	(0.2980)
9	1.3710	7.6440	9.1198	6.0556	16.8786	5.7813	43.0806	31.1225
	(0.2656)	(0.2866)	(0.2887)	(0.2890)	(0.3066)	(0.2509)	(0.3490)	(0.3257)
10	0.1764	8.5819	8.7734	27.7895	18.2471	-4.0611	57.6897	44.9707
	(0.3813	(0.3809)	(0.3973)	(0.6067)	(0.6801)	(0.4970)	(0.6779)	(0.5853)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors in parentheses.

Table 3(b)
Piketty Line Ordinates or Growth Rates of Decile Mean Incomes
(Men, 1990-2020)
(percentages)

Decile	1990-95	1995-00	1990-00	2000-05	2005-15	2015-20	1990-20	2000-20
1	-22.3586	5.6759	-17.9518	-2.2641	5.3967	39.8870	18.2300	44.0982
	(0.6000)	(0.8814)	(0.6363)	(0.8005)	(0.8438)	(1.0137)	(0.7989)	(1.0735)
2	-13.1125	6.6428	-7.3407	-1.5800	4.1033	19.8631	13.7948	22.8100
	(0.3606)	(0.4617)	(0.3812)	(0.4417)	(0.4327)	(0.3743)	(0.3789)	(0.4361)
3	-12.8624	6.5326	-7.1700	-0.4387	2.5500	11.7131	5.8811	14.0591
	(0.3359)	(0.4003)	(0.3401)	(0.3491)	(0.3574)	(0.3533)	(0.3494)	(0.3634)
4	-11.0261	5.3138	-6.2982	0.0983	3.9725	6.0400	3.4101	10.3609
	(0.2951)	(0.3566)	(0.3027)	(0.3309)	(0.3402)	(0.3147)	(0.3026)	(0.3316)
5	-8.6613	3.6564	-5.3216	-0.3645	5.0396	3.4929	2.5483	8.3123
	(0.2583)	(0.2930)	(0.2456)	(0.2487)	(0.2520)	(0.2426)	(0.2507)	(0.2646)
6	-6.9863	3.0697	-4.1311	0.2780	5.6627	2.2410	3.8557	8.3309
	(0.2171)	(0.2626)	(0.2288)	(0.2614)	(0.2680)	(0.2336)	(0.2213)	(0.2560)
7	-5.5380	2.4894	-3.1865	1.8019	6.3774	1.3511	6.2599	9.7573
	(0.2090)	(0.2230)	(0.2119)	(0.2286)	(0.2475)	(0.2196)	(0.2251)	(0.2283)
8	-4.0534	3.1298	-1.0504	2.6723	7.4427	0.3861	9.5767	10.7399
	(0.2058)	(0.2375)	(0.2135)	(0.2373)	(0.2523)	(0.2257)	(0.2239)	(0.2446)
9	-3.3605	4.9815	1.4535	4.1903	8.8090	-0.2398	14.7405	13.0966
	(0.2159)	(0.2442)	(0.2363)	(0.2631)	(0.2690)	(0.2310)	(0.2618)	(0.2683)
10	-4.5604	8.8033	3.8414	46.2950	10.5525	-13.5311	45.2207	39.8485
	(0.4272)	(0.4685)	(0.4526)	(1.0133)	(0.9505)	(0.6583)	(0.8407)	(0.7913)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors in parentheses.

Table 4(a)
Decile Income Shares for Women
(percentages)

Decile	1990	1995	2000	2005	2015	2020
1	1.3415 (0.00731)	1.2175 (0.00708)	1.1926 (0.006388)	1.1801 (0.006957)	1.1712 (0.006072)	1.5593 (0.007575)
2	3.2116 (0.009376)	3.0533 (0.009584)	2.9968 (0.009271)	2.8929 (0.008188)	2.8781 (0.008057)	3.5131 (0.007668)
3	4.6331 (0.009636)	4.5143 (0.009555)	4.4456 (0.008521)	4.1675 (0.009831)	4.1083 (0.008734)	4.7522 (0.007261)
4	5.7526 (0.008544)	5.6986 (0.008516)	5.6319 (0.008939)	5.3299 (0.009585)	5.2627 (0.009779)	5.9501 (0.009634)
5	7.0891 (0.011353)	6.9995 (0.010167)	7.0354 (0.010684)	6.6828 (0.013033)	6.7163 (0.01260)	7.3214 (0.010037)
6	8.8930 (0.013427)	8.7359 (0.013164)	8.8479 (0.012515)	8.4137 (0.014970)	8.4060 (0.014087)	8.7986 (0.011002)
7	11.0532 (0.012949)	11.0341 (0.014469)	11.0854 (0.012496)	10.3873 (0.015709)	10.2747 (0.014977)	10.4907 (0.011864)
8	13.5388 (0.014420)	13.7297 (0.014568)	13.5971 (0.013596)	12.7759 (0.018591)	12.6415 (0.018082)	12.6990 (0.013900)
9	17.0806 (0.018831)	17.4101 (0.018963)	17.3758 (0.018770)	16.4559 (0.022993)	16.4556 (0.021894)	16.2243 (0.017707)
10	27.4064 (0.052593)	27.6070 (0.049462)	27.7914 (0.045172)	31.7140 (0.084147)	32.0857 (0.082610)	28.6913 (0.063352)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors in parentheses.

Table 4(b)
Decile Income Shares for Men
(percentages)

Decile	1990	1995	2000	2005	2015	2020
1	1.5758 (0.007509)	1.3063 (0.007290)	1.3101 (0.007364)	1.1218 (0.006540)	1.0961 (0.006349)	1.5767 (0.007208)
2	3.3381 (0.008279)	3.0967 (0.008505)	3.1343 (0.008509)	2.7026 (0.009887)	2.6082 (0.008116)	3.2147 (0.007355)
3	4.8234 (0.010688)	4.4877 (0.010346)	4.5373 (0.009594)	3.9577 (0.011790)	3.7624 (0.011103)	4.3221 (0.009634)
4	6.3607 (0.011142)	6.0422 (0.011456)	6.0391 (0.011083)	5.2963 (0.014928)	5.1049 (0.013949)	5.5664 (0.011651)
5	7.8783 (0.010985)	7.6833 (0.012023)	7.5585 (0.010558)	6.5979 (0.016565)	6.4246 (0.015610)	6.8373 (0.012912)
6	9.3844 (0.011006)	9.3196 (0.011692)	9.1167 (0.011859)	8.0094 (0.019735)	7.8455 (0.018502)	8.2482 (0.014666)
7	11.0368 (0.012479)	11.1308 (0.012408)	10.8267 (0.011853)	9.6567 (0.022678)	9.5227 (0.021517)	9.9247 (0.016835)
8	13.0219 (0.013563)	13.3404 (0.014599)	13.0569 (0.013871)	11.7450 (0.026547)	11.6985 (0.025371)	12.0758 (0.019674)
9	15.8781 (0.016718)	16.3831 (0.017387)	16.3236 (0.016977)	14.9006 (0.031589)	15.0297 (0.030612)	15.4183 (0.023889)
10	26.7025 (0.058932)	27.2099 (0.058439)	28.0968 (0.055288)	36.0119 (0.138202)	36.9073 (0.131164)	32.8160 (0.101537)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors in parentheses.

Table 5(a)
Relative Mean Income Ratios for Women's Income
(proportions)

Decile	1990	1995	2000	2005	2015	2020
1	0.13416	0.12175	0.11926	0.11801	0.11712	0.15593
	(0.07310)	(0.07080)	(0.06387)	(0.06957)	(0.06072)	(0.07575)
2	0.32116	0.30534	0.29968	0.28929	0.28781	0.35131
	(0.09376)	(0.09584)	(0.09271)	(0.08188)	(0.08057)	(0.07668)
3	0.46330	0.45143	0.44456	0.41675	0.41083	0.47523
	(0.09636)	(0.09555)	(0.08521)	(0.09831)	(0.08734)	(0.07261)
4	0.57526	0.56986	0.56319	0.53300	0.52626	0.59502
	(0.08544)	(0.085164)	(0.08939)	(0.09585)	(0.09779)	(0.09634)
5	0.70891	0.69992	0.70354	0.66827	0.67163	0.73212
	(0.11353)	(0.10167)	(0.10684)	(0.13033)	(0.12600)	(0.10037)
6	0.88933	0.87360	0.88479	0.84136	0.84061	0.87987
	(0.13426)	(0.13164)	(0.12515)	(0.14970)	(0.14087)	(0.11002)
7	1.10531	1.10342	1.10853	1.03876	1.02745	1.04907
	(0.12949)	(0.14469)	(0.12496)	(0.15709)	(0.14977)	(0.11864)
8	1.35387	1.37298	1.35971	1.27758	1.26416	1.26991
	(0.14420)	(0.14568)	(0.13596)	(0.18591)	(0.18082)	(0.13900)
9	1.70805	1.74103	1.73757	1.64557	1.64558	1.62244
	(0.18832)	(0.18963)	(0.18770)	(0.22993)	(0.21894)	(0.17707)
10	2.74061	2.76061	2.77913	3.17136	3.20850	2.86906
	(0.52593)	(0.49462)	(0.45172	(0.84147)	(0.82610)	(0.63352)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors x 100 in parentheses.

Table 5(b)
Relative Mean Income Ratios for Men's Incomes
(proportions)

Decile	1990	1995	2000	2005	2015	2020
1	0.15759	0.13063	0.13102	0.11219	0.10961	0.15767
	(0.07509)	(0.07290)	(0.07364)	(0.06540)	(0.06349)	(0.07208)
2	0.33381	0.30968	0.31342	0.27026	0.26082	0.32147
	(0.08278)	(0.08506)	(0.08509)	(0.09887)	(0.08116)	(0.07355)
3	0.48235	0.44876	0.45372	0.39577	0.37625	0.43221
	(0.10688)	(0.10346)	(0.09594)	(0.11790)	(0.11103)	(0.09634)
4	0.63605	0.60423	0.60392	0.52963	0.51048	0.55663
	(0.11142)	(0.11456)	(0.11083)	(0.14928)	(0.13949)	(0.11651)
5	0.78784	0.76831	0.75584	0.65979	0.64247	0.68372
	(0.10985)	(0.12023)	(0.10558)	(0.16565)	(0.15610)	(0.12912)
6	0.93845	0.93198	0.91166	0.80094	0.78454	0.82482
	(0.11006)	(0.11692)	(0.11859)	(0.19735)	(0.18502)	(0.14667)
7	1.10365	1.11310	1.08270	0.96566	0.95229	0.99246
	(0.12479)	(0.12408)	(0.11853)	(0.22678)	(0.21517)	(0.16835)
8	1.30221	1.33400	1.30568	1.17450	1.16983	1.20758
	(0.13563)	(0.14599)	(0.13871)	(0.26547)	(0.25371)	(0.19674)
9	1.58783	1.63834	1.63234	1.49005	1.50300	1.54182
	(0.16718)	(0.17387)	(0.16977)	(0.31589)	(0.30612)	(0.23889)
10	2.67018	2.72092	2.80965	3.60118	3.69067	3.28159
	(0.58932)	(0.58439)	(0.55288)	(1.38202)	(1.31165)	(1.01537)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors x 100 in parentheses.

Table 6(a)
Changes in Relative Mean Income Ratios for Women's Income Between Censuses
(proportions)

Decile	1990-95	1995-00	1990-00	2000-05	2005-15	2015-20	1990-20	2000-20
1	-0.01241	-0.00249	-0.01489	-0.00125	-0.00089	0.03881	0.02177	0.03667
	(12.190)	(2.610)	(15.34)	(1.327)	(0.967)	(39.98)	(20.68)	(37.01)
2	-0.01582	-0.00566	-0.02148	-0.01039	-0.00148	0.06349	0.03015	0.05163
	(11.799)	(4.241)	(16.29)	(8.400)	(1.285)	(57.08)	(24.89)	(42.91)
3	-0.01187	-0.00687	-0.01874	-0.02781	-0.00592	0.06439	0.01192	0.03066
	(8.749)	(5.366)	(14.57)	(21.38)	(4.499)	(56.69)	(9.880)	(27.39)
4	-0.00540	-0.00688	-0.01207	-0.03019	-0.00674	0.06876	0.01976	0.03183
	(4.473)	(5.406)	(9.761)	(23.03)	(4.925)	(50.09)	(15.34)	(24.22)
5	-0.00898	0.00362	-0.00537	-0.03527	0.00336	0.06049	0.02322	0.02858
	(5.894)	(2.452)	(3.442)	(20.93)	(1.853)	(37.55)	(15.32)	(19.50)
6	-0.01573	0.01119	-0.00454	-0.04343	-0.00075	0.03925	-0.00947	-0.00493
	(8.365)	(6.160)	(2.474)	(22.26)	(0.362)	(21.96)	(5.45)	(2.956)
7	-0.00189	0.00511	0.00322	-0.06978	-0.01131	0.02163	-0.05624	-0.05949
	(0.973)	(2.675)	(1.791)	(34.76)	(5.212)	(11.32)	(32.02)	(34.51)
8	0.01911	-0.01327	0.00584	-0.08213	-0.01342	0.00575	-0.08397	-0.08980
	(9.322)	(6.661)	(2.944)	(35.66)	(5.174)	(2.520)	(41.92)	(46.19)
9	0.03298	-0.00346	0.02952	-0.09199	0.00000	-0.02313	-0.08560	-0.11513
	(12.339)	(1.295)	(11.10)	(30.99)	(0.000)	(8.215)	(33.12)	(44.62)
10	0.01999	0.01853	0.03852	0.39223	0.03714	-0.33944	0.12845	0.08993
	(2.769)	(2.766)	(5.556)	(41.07)	(3.149)	(32.61)	(15.60)	(11.56)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute value of asymptotic "t-ratios" in parentheses.

Table 6(b)
Changes in Relative Mean Income Ratios for Men's Income Between Censuses
(proportions)

Decile	1990-95	1995-00	1990-00	2000-05	2005-15	2015-20	1990-20	2000-20
1	-0.02695 (25.75)	0.00038 (0.369)	-0.02657 (25.26)	-0.01883 (19.12)	-0.00257 (2.824)	0.04806 (50.03)	0.00009 (0.085)	0.02666 (25.87)
2	-0.02414 (20.34)	0.00375 (3.116)	-0.02039 (17.17)	-0.04317 (33.09)	-0.00944 (7.381)	0.06065 (55.38)	-0.01234 (11.15)	0.00804 (7.153)
3	-0.03359 (22.58)	0.00496 (3.518)	-0.02863 (19.93)	-0.05795 (38.13)	-0.01953 (12.06)	0.05596 (38.07)	-0.05014 (34.84)	-0.02151 (15.82)
4	-0.03182 (19.91)	-0.00031 (0.192)	-0.03218 (20.44)	-0.07429 (39.96)	-0.01914 (9.370)	0.04615 (25.39)	-0.07942 (49.26)	-0.04729 (29.41)
5	-0.01953 (11.99)	-0.01247 (7.796)	-0.03200 (21.00)	-0.09605 (48.90)	-0.01732 (7.610)	0.04126 (20.36)	-0.10411 (61.41)	-0.07212 (43.24)
6	-0.00647 (4.032)	-0.02032 (12.20)	-0.02680 (16.56)	-0.11072 (48.09)	-0.01640 (6.063)	0.04028 (17.06)	-0.11364 (61.97)	-0.08684 (46.04)
7	0.00945 (5.372)	-0.03040 (17.72)	-0.02095 (12.17)	-0.11704 (45.74)	-0.01338 (4.279)	0.04018 (14.71)	-0.11118 (53.06)	-0.09024 (43.83)
8	0.03179 (15.96)	-0.02833 (14.07)	0.00347 (1.788)	-0.13118 (43.80)	-0.00467 (1.272)	0.03775 (11.76)	-0.09463 (39.60)	-0.09810 (40.75)
9	0.05052 (20.94)	-0.00600 (2.467)	0.04452 (18.68)	-0.14229 (39.68)	0.01295 (2.943)	0.03882 (9.998)	-0.04600 (15.78)	-0.09052 (30.89)
10	0.05074 (6.114)	0.08873 (11.03)	0.13947 (17.26)	0.79153 (53.18)	0.08949 (4.697)	-0.40909 (24.66)	0.61141 (52.08)	0.47194 (40.82)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute value of asymptotic "t-ratios" in parentheses.

Table 7(a)
Lorenz Curve Ordinates for Women's Income
(percentages)

Decile	1990	1995	2000	2005	2015	2020
1	1.3415 (0.007310)	1.2175 (0.007080)	1.1926 (0.006388)	1.1801 (0.006957)	1.1712 (0.006072)	1.5593 (0.007575)
2	4.5531 (0.01535)	4.2708 (0.01535)	4.1894 (0.01443)	4.0730 (0.01392)	4.0493 (0.01299)	5.0723 (0.01380)
3	9.1862 (0.02289)	8.7851 (0.02284)	8.6350 (0.02108)	8.2405 (0.02197)	8.1576 (0.02013)	9.8246 (0.01928)
4	14.9388 (0.02871)	14.4837 (0.02868)	14.2670 (0.02735)	13.5704 (0.02938)	13.4202 (0.02796)	15.7747 (0.02657)
5	22.0280 (0.03593)	21.4832 (0.03516)	21.3024 (0.03416)	20.2532 (0.03940)	20.1365 (0.03785)	23.0961 (0.03398)
6	30.9210 (0.04348)	30.2191 (0.04229)	30.1503 (0.04104)	28.6669 (0.05051)	28.5425 (0.04858)	31.8947 (0.04166)
7	41.9742 (0.04942)	41.2532 (0.04847)	41.2357 (0.04629)	39.0542 (0.06190)	38.8172 (0.05964)	42.3854 (0.04938)
8	55.5130 (0.05321)	54.9829 (0.05160)	54.8328 (0.04862)	51.8301 (0.07375)	51.4587 (0.07123)	55.0844 (0.05704)
9	72.5936 (0.05259)	72.3930 (0.04946)	72.2086 (0.04517)	68.2860 (0.08415)	67.9143 (0.08261)	71.3087 (0.06335)
10	100.	100.	100.	100.	100.	100.

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors in parentheses.

Table 7(b)
Lorenz Curve Ordinates for Men's Income
(percentages)

Decile	1990	1995	2000	2005	2015	2020
1	1.5758 (0.007509)	1.3063 (0.007290)	1.3101 (0.007364)	1.1218 (0.006540)	1.0961 (0.006349)	1.5767 (0.007208)
2	4.9139 (0.01433)	4.4030 (0.01446)	4.4444 (0.01451)	3.8244 (0.01521)	3.7043 (0.01332)	4.7914 (0.01322)
3	9.7373 (0.02280)	8.8907 (0.02258)	8.9817 (0.02202)	7.7822 (0.02545)	7.4667 (0.02306)	9.1135 (0.02142)
4	16.0980 (0.03112)	14.9329 (0.03112)	15.0208 (0.03026)	13.0785 (0.03857)	12.5716 (0.03540)	14.6799 (0.03141)
5	23.9763 (0.03852)	22.6162 (0.03928)	22.5792 (0.03740)	19.6764 (0.05306)	18.9962 (0.04919)	21.5171 (0.04243)
6	33.3607 (0.04497)	31.9359 (0.04594)	31.6959 (0.04439)	27.6858 (0.07035)	26.8417 (0.06550)	29.7653 (0.05486)
7	44.3975 (0.05115)	43.0667 (0.05165)	42.5226 (0.05001)	37.3425 (0.09015)	36.3644 (0.08432)	39.6900 (0.06894)
8	57.4194 (0.05638)	56.4070 (0.05641)	55.5795 (0.05457)	49.0875 (0.11300)	48.0629 (0.10594)	51.7658 (0.08469)
9	73.2975 (0.05893)	72.7901 (0.05844)	71.9032 (0.05529)	63.9881 (0.13820)	63.0927 (0.13117)	67.1840 (0.10154)
10	100.	100.	100.	100.	100.	100.

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors in parentheses.

Table 8(a)
Changes in Women's Lorenz Curve Ordinates Between Censuses
(percentage points)

Decile	1990-95	1995-00	1990-00	2000-05	2005-15	2015-20	1990-20	2000-20
1	-0.1240	-0.0249	-0.1489	-0.0125	-0.0089	0.3881	0.2178	0.3667
	(12.19)	(2.613)	(15.34)	(1.326)	(0.965)	(39.98)	(20.69)	(37.01)
2	-0.2823	-0.0814	-0.3637	-0.1164	-0.0237	1.0231	0.5192	0.8829
	(13.00)	(3.865)	(17.26)	(5.806)	(1.246)	(53.98)	(25.15)	(44.22)
3	-0.4011	-0.1501	-0.5512	-0.3945	-0.0830	1.6670	0.6384	1.1895
	(12.40)	(4.829)	(17.71)	(12.96)	(2.785)	(59.80)	(21.33)	(41.63)
4	-0.4551	-0.2168	-0.6719	-0.6966	-0.1502	2.3545	0.8359	1.5078
	(11.22)	(5.469)	(16.94)	(17.35)	(3.702)	(61.04)	(21.37)	(39.54)
5	-0.5448	-0.1808	-0.7256	-1.0492	-0.1167	2.9596	1.0681	1.7937
	(10.84)	(3.688)	(14.64)	(20.12)	(2.136)	(58.19)	(21.60)	(37.23)
6	-0.7018	-0.0688	-0.7706	-1.4835	-0.1243	3.3522	09737	1.7444
	(11.57)	(1.168)	(12.89)	(22.79)	(1.774)	(52.38)	(16.17)	(29.83)
7	-0.7209	-0.0175	-0.7385	-2.1815	-0.2370	3.5682	0.4112	1.1497
	(10.41)	(0.262)	(10.91)	(28.22)	(2.757)	(46.08)	(5.886)	(16.98)
8	-0.5301	-0.1501	-0.6802	-3.0027	-0.3714	3.6257	-0.4286	0.2516
	(7.152)	(2.117)	(9.44)	(33.99)	(3.622)	(39.73)	(5.495)	(3.36)
9	-0.2006	-0.1844	-0.3851	-3.9226	-0.3717	3.3944	-1.2849	-0.8999
	(2.779)	(2.753)	(5.55)	(41.07)	(3.152)	(32.61)	(15.61)	(11.57)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses.

Table 8(b)
Changes in Men's Lorenz Curve Ordinates Between Censuses
(percentage points)

Decile	1990-95	1995-00	1990-00	2000-05	2005-15	2015-20	1990-20	2000-20
1	-0.2695	0.0038	-0.2657	-0.1883	-0.0257	0.4806	0.0009	0.2666
	(25.75)	(0.368)	(25.26)	(19.12)	(2.822)	(50.03)	(0.083)	(25.87)
2	-0.5109	0.0414	-0.4695	-0.6200	-0.1201	1.0871	-0.1225	0.3470
	(25.10)	(2.021)	(23.02)	(29.49)	(5.940)	(57.93)	(6.284)	(17.67)
3	-0.8466	0.0910	-0.7556	-1.1995	-0.3154	1.6468	-0.6238	0.1318
	(26.38)	(2.884)	(23.84)	(35.65)	(9.185)	(52.33)	(19.94)	(4.291)
4	-1.1651	0.0879	-1.0773	-1.9423	-0.5068	2.1082	-1.4182	-0.3409
	(26.48)	(2.024)	(24.82)	(39.62)	(9.681)	(44.55)	(32.08)	(7.816)
5	-1.3601	-0.0370	-1.3971	-2.9029	-0.6802	2.5209	-2.4592	-1.0621
	(24.72)	(0.682)	(26.02)	(44.72)	(9.400)	(38.81)	(42.91)	(18.78)
6	-1.4249	-0.2399	-1.6648	-4.0101	-0.8441	2.9236	-3.5954	-1.9306
	(22.16)	(3.756)	(26.35)	(48.21)	(8.782)	(34.22)	(50.69)	(27.36)
7	-1.3308	-0.5441	-1.8749	-5.1801	-0.9780	3.3255	-4.7075	-2.8326
	(18.31)	(7.567)	(26.21)	(50.25)	(7.923)	(30.53)	(54.84)	(33.26)
8	-1.0124	-0.8275	-1.8399	-6.4920	-1.0246	3.7029	-5.6536	-3.8138
	(12.69)	(10.54)	(23.45)	(51.74)	(6.615)	(27.30)	(55.57)	(37.85)
9	-0.5073	-0.8870	-1.3943	-7.9151	-0.8954	4.0914	-6.1134	-4.7191
	(6.113)	(11.03)	(17.25)	(53.17)	(4.699)	(24.67)	(52.07)	(40.82)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses.

Table 9(a)
Generalized Lorenz Curve Ordinates for Women's Income
(Canada, 2020 $)

Decile	1990	1995	2000	2005	2015	2020
1	441.69	398.66	421.18	466.71	541.36	773.32
	(25.389)	(24.474)	(23.810)	(28.406)	(28.682)	(39.099)
2	1499.1	1398.4	1479.6	1601.9	1871.8	2515.6
	(55.948)	(55.867)	(56.697)	(57.033)	(61.531)	(72.710)
3	3024.5	2876.6	3049.6	3259.1	3770.8	4872.4
	(87.638)	(87.507)	(86.971)	(90.896)	(94.599)	(101.00)
4	4918.6	4742.5	5038.6	5367.0	6203.5	7823.4
	(114.84)	(115.25)	(119.86)	(118.21)	(130.60)	(144.57)
5	7252.6	7034.4	7523.3	8010.0	9308.1	11,454
	(156.30)	(152.08)	(167.07)	(165.40)	(183.37)	(190.07)
6	10,181	9894.9	10,648	11,338	13,194	15,818
	(209.74)	(204.78)	(218.12)	(221.94)	(242.93)	(240.94)
7	13,820	13,508	14,563	15,446	17,943	21,021
	(263.48)	(267.18)	(276.20)	(274.60)	(297.85)	(293.82)
8	18,277	18,004	19,365	20,499	23,787	27,319
	(322.12)	(329.87)	(338.54)	(342.08)	(374.28)	(360.03)
9	23,901	23,704	25,502	27,007	31,393	36,365
	(393.42)	(403.55)	(419.31)	(430.79)	(467.56)	(449.25)
10	32,925	32,744	35,317	39,549	46,225	49,594
	(541.39)	(541.10)	(556.82)	(775.79)	(870.41)	(746.31)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors in parentheses.

Table 9(b)
Generalized Lorenz Curve Ordinates for Men's Income
(Canada, 2020 $)

Decile	1990	1995	2000	2005	2015	2020
1	898.41	697.54	737.12	720.43	759.32	1062.2
	(45.055)	(41.012)	(46.605)	(40.810)	(42.959)	(48.102)
2	2801.5	2351.1	2500.6	2456.0	2566.1	3227.9
	(90.097)	(85.372)	(90.077)	(90.319)	(81.682)	(80.653)
3	5551.5	4747.4	5053.4	4997.6	5172.5	6139.6
	(151.88)	(141.53)	(143.78)	(142.05)	(135.70)	(126.63)
4	9177.8	7973.8	8451.2	8398.8	8708.9	9889.5
	(219.18)	(207.52)	(209.48)	(208.12)	(203.23)	(184.60)
5	13,669	12,076	12,704	12,636	13,159	14,496
	(285.72)	(279.65)	(272.55)	(265.73)	(264.49)	(244.25)
6	19,020	17,053	17,833	17,780	18,594	20,052
	(349.16)	(348.75)	(346.20)	(340.37)	(338.87)	(309.02)
7	25,312	22,996	23,925	23,981	25,191	26,738
	(422.89)	(418.34)	(415.41)	(418.00)	(421.43)	(381.38)
8	32,736	30,120	31,271	31,523	33,295	34,873
	(496.24)	(500.96)	(501.97)	(507.39)	(522.03)	(470.13)
9	41,788	38,868	40,455	41,092	43,707	45,260
	(589.96)	(591.98)	(607.65)	(629.24)	(639.15)	(588.64)
10	57,012	53,397	56,263	64,219	69,274	67,368
	(887.24)	(865.74)	(901.63)	(1739.5)	(1801.6)	(1363.3)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors in parentheses.

Table 10(a)
Changes in Women's Generalized Lorenz Curve Ordinates Between Censuses
(Canada, 2020 $)

Decile	1990-95	1995-00	1990-00	2000-05	2005-15	2015-20	1990-20	2000-20
1	-43.03	22.525	-20.508	45.525	74.655	231.96	331.63	352.14
	(1.220)	(0.660)	(0.589)	(1.228)	(1.849)	(4.784)	(7.114)	(7.692)
2	-100.66	81.129	-19.527	131.28	260.92	643.83	1016.5	1036.0
	(1.273)	(1.019)	(0.245)	(1.632)	(3.110)	(6.759)	(11.08)	(11.24)
3	-147.93	173.04	25.108	209.47	511.73	1101.6	1847.9	1822.8
	(1.194)	(1.403)	(0.203)	(1.665)	(3.901)	(7.962)	(13.82)	(13.68)
4	-176.03	296.12	120.09	328.38	836.46	1619.9	2904.8	2784.7
	(1.082)	(1.781)	(0.723)	(1.951)	(4.749)	(8.315)	(15.73)	(14.83)
5	-218.20	488.92	270.71	486.70	1298.0	2146.3	4201.7	3931.0
	(1.001)	(2.193)	(1.198)	(2.095)	(5.256)	(8.127)	(17.07)	(15.70)
6	-285.71	753.25	467.54	689.44	1856.1	2624.2	5637.4	5169.8
	(0.975)	(2.518)	(1.545)	(2.216)	(5.641)	(7.670)	(17.65)	(15.91)
7	-311.94	1055.3	743.33	882.56	2497.5	3077.6	7200.9	6457.6
	(0.831)	(2.746)	(1.947)	(2.266)	(6.165)	(7.356)	(18.25)	(16.01)
8	-273.92	1361.7	1087.8	1133.3	3288.2	3532.0	9041.3	7953.5
	(0.594)	(2.881)	(2.328)	(2.355)	(6.485)	(6.801)	(18.72)	(16.09)
9	-196.92	1797.6	1600.6	1504.9	4386.5	3971.8	11,464	9863.3
	(0.349)	(3.089)	(2.784)	(2.503)	(6.900)	(6.125)	(19.20)	(16.05)
10	-180.77	2573.0	2392.3	4232.6	6675.3	3369.5	16,670	14,277
	(0.236)	(3.314)	(3.080)	(4.432)	(5.725)	(2.939)	(18.08)	(15.33)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses.

Table 10(b)
Changes in Men's Generalized Lorenz Curve Ordinates Between Censuses
(Canada, 2020 $)

Decile	1990-95	1995-00	1990-00	2000-05	2005-15	2015-20	1990-20	2000-20
1	-200.88	39.583	-161.29	-16.693	38.892	302.86	163.77	325.06
	(3.297)	(0.661)	(2.572)	(0.280)	(0.656)	(4.696)	(2.485)	(5.007)
2	-450.43	149.48	-300.95	-44.569	110.13	661.72	426.33	727.28
	(3.629)	(1.204)	(2.362)	(0.349)	(0.904)	(5.765)	(3.526)	(6.015)
3	-804.05	305.99	-498.06	-55.790	174.89	967.06	588.10	1086.2
	(3.873)	(1.517)	(2.381)	(0.276)	(0.890)	(5.210)	(2.974)	(5.669)
4	-1204.0	477.39	-726.65	-52.342	310.05	1180.6	711.67	1438.3
	(3.989)	(1.619)	(2.397)	(0.177)	(1.066)	(4.300)	(2.484)	(5.151)
5	-1592.9	627.35	-965.57	-67.878	523.50	1336.2	826.20	1791.8
	(3.984)	(1.607)	(2.445)	(0.178)	(1.396)	(3.711)	(2.197)	(4.896)
6	-1966.7	780.25	-1186.5	-53.658	814.83	1457.9	1032.6	2219.0
	(3.985)	(1.588)	(2.413)	(0.111)	(1.697)	(3.179)	(2.215)	(4.782)
7	-2315.4	928.14	-1387.3	56.293	1210.2	1547.1	1426.3	2813.6
	(3.893)	(1.574)	(2.340)	(0.096)	(2.039)	(2.722)	(2.505)	(4.989)
8	-2616.1	1151.0	-1465.1	252.55	1771.7	1578.3	2137.4	3602.5
	(3.710)	(1.623)	(2.076)	(0.354)	(2.434)	(2.247)	(3.127)	(5.238)
9	-2920.4	1587.0	-1333.3	637.32	2614.4	1553.5	3471.9	4805.3
	(3.494)	(1.871)	(1.574)	(0.729)	(2.915)	(1.788)	(4.166)	(5.680)
10	-3614.7	2865.9	-748.79	7955.6	5055.1	-1906.3	10,356	11,104
	(2.916)	(2.293)	(0.592)	(4.060)	(2.019)	(0.844)	(6.366)	(6.794)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses.

Table 11(a)
Differences in Decile Means Between Women and Men
(Canada, 1990-2020)
(2020 $)

Decile	1990	2000	2015	2020
1	4567 (88.31)	3159 (63.59)	2180 (42.20)	2889 (46.60)
2	8457 (133.86)	7050 (108.32)	4764 (80.45)	4234 (74.99)
3	12,246 (148.68)	9827 (133.46)	7073 (92.86)	5549 (83.00)
4	17,322 (197.03)	14,089 (157.91)	11,037 (119.51)	7990 (89.25)
5	21,576 (220.98)	17,679 (186.43)	13,460 (135.05)	9752 (103.81)
6	24,222 (229.31)	20,045 (171.73)	15,491 (129.12)	11,930 (113.23)
7	26,529 (220.12)	21,766 (183.38)	18,475 (142.75)	14,832 (125.68)
8	29,666 (226.85)	25,441 (173.33)	22,603 (131.89)	18,371 (121.53)
9	34,288 (194.05)	30,476 (155.80)	28,052 (129.98)	23,405 (109.45)
10	61,999 (133.08)	59,930 (114.82)	107,355 (66.30)	78,784 (67.70)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses. All incomes are in constant 2020 dollars.

Table 11(b)
Changes in Decile Mean Differences Between Women and Men
(Canada, 1990-2020)
(2020 $)

Decile	1990-00	2000-15	2015-20	1990-20	2000-20
1	-1408	-979	709	-1678	-270
	(19.63)	(13.66)	(8.786)	(20.79)	(3.399)
2	-1407	-2286	-530	-4223	-2816
	(15.51)	(25.98)	(6.478)	(49.84)	(32.68)
3	-2419	-2754	-1524	-6697	-4278
	(21.90)	(26.00)	(15.04)	(63.13)	(42.96)
4	-3233	-3052	-3047	-9332	-6099
	(25.81)	(23.77)	(23.69)	(74.38)	(48.26)
5	-3897	-4219	-3708	-11,824	-7927
	(28.63)	(30.67)	(27.07)	(87.27)	(59.39)
6	-4177	-4554	-3561	-12,292	-8115
	(26.53)	(27.21)	(22.30)	(82.39)	(51.61)
7	-4763	-3291	-3643	-11,697	-6934
	(28.16)	(18.74)	(20.81)	(69.34)	(41.43)
8	-4225	-2838	-4232	-11,295	-7070
	(21.49)	(12.58)	(18.52)	(56.51)	(33.55)
9	-3812	-2424	-4647	-10,883	-7071
	(14.46)	(8.321)	(15.30)	(30.54)	(23.66)
10	-2069	47,425	-28,571	16,785	18,854
	(2.733)	(27.88)	(14.93)	(13.05)	(14.78)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses.

Table 12(a)
Differences in Decile Shares Between Women and Men
(Canada, 1990-2020)
(percentage points)

Decile	1990	2000	2015	2020
1	0.2343 (22.36)	0.1175 (12.06)	-0.0750 (8.542)	0.0174 (1.663)
2	0.1265 (10.11)	0.1375 (10.92)	-0.2699 (23.60)	-0.2983 (28.08)
3	0.1903 (13.23)	0.0917 (7.143)	-0.3459 (24.48)	-0.4301 (35.65)
4	0.6080 (43.30)	0.4071 (28.59)	-0.1577 (9.260)	-0.3838 (25.39)
5	0.7892 (49.95)	0.5231 (34.82)	-0.2917 (14.54)	-0.4841 (29.60)
6	0.4914 (28.30)	0.2687 (15.59)	-0.5605 (24.10)	-0.5504 (30.02)
7	-0.0164 (0.913)	-0.2587 (15.02)	-0.7520 (28.68)	-0.5660 (27.48)
8	-0.5169 (26.11)	-0.5402 (27.81)	-0.9430 (30.27)	-0.6232 (25.87)
9	-1.2026 (47.76)	-1.0521 (41.57)	-1.4259 (37.89)	-0.8061 (27.11)
10	-0.7038 (8.911)	0.3054 (4.278)	4.8216 (31.10)	4.1247 (34.46)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses.

Table 12(b)
Changes in Decile Share Differences Between Women and Men
(Canada, 1990-2020)
(percentage points)

Decile	1990-00	2000-15	2015-20	1990-20	2000-20
1	-0.1168 (8.163)	-0.1925 (14.68)	0.0924 (6.765)	-0.2169 (14.65)	-0.1001 (7.002)
2	0.0110 (0.620)	-0.4074 (23.95)	-0.0284 (1.819)	-0.4248 (25.88)	-0.4358 (26.45)
3	-0.0986 (5.114)	-0.4376 (22.92)	-0.0842 (4.532)	-0.6204 (33.05)	-0.5218 (29.62)
4	-0.2009 (10.05)	-0.5648 (25.44)	-0.2261 (9.929)	-0.9918 (48.07)	-0.7909 (38.09)
5	-0.2661 (12.21)	-0.8148 (32.51)	-0.1924 (7.433)	-1.2733 (55.99)	-1.0072 (45.35)
6	-0.2227 (9.103)	-0.8292 (28.64)	0.0101 (0.341)	-1.0418 (41.26)	-0.8191 (32.55)
7	-0.2423 (9.736)	-0.4933 (15.72)	0.1860 (5.578)	-0.5496 (20.11)	-0.3073 (11.45)
8	-0.0233 (0.840)	-0.4028 (10.97)	0.3198 (8.121)	-0.1063 (3.409)	-0.0830 (2.682)
9	0.1505 (4.216)	-0.3738 (8.242)	0.6198 (12.92)	0.3965 (10.18)	0.2460 (6.300)
10	1.0092 (9.479)	4.5162 (26.46)	-0.6969 (3.558)	4.8285 (33.67)	3.8193 (27.40)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses.

Table 13(a)
Differences in Lorenz Curve Ordinates Between Women and Men
(Canada, 1990-2020)
(percentage points)

Decile	1990	2000	2015	2020
1	0.2343 (22.36)	0.1175 (12.06)	-0.0750 (8.542)	0.0174 (1.663)
2	0.3608 (17.18)	0.2550 (12.46)	-0.3450 (18.54)	-0.2810 (14.70)
3	0.5511 (17.06)	0.3467 (11.37)	-0.6908 (22.57)	-0.7111 (24.67)
4	1.1592 (27.38)	0.7538 (18.48)	-0.8486 (18.81)	-1.0948 (26.62)
5	1.9483 (36.99)	1.2768 (25.21)	-1.1403 (18.37)	-1.5790 (29.05)
6	2.4397 (39.00)	1.5456 (25.57)	-1.7008 (20.86)	-2.1294 (30.91)
7	2.4233 (34.07)	1.2869 (18.88)	-2.4528 (23.75)	-2.6954 (31.78)
8	1.9064 (24.59)	0.7467 (10.22)	-3.8958 (26.60)	-3.3186 (32.50)
9	0.7038 (8.910)	-0.3054 (4.278)	-4.8216 (31.10)	-4.1247 (34.46)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses.

Table 13(b)
Changes in Lorenz Curve Differences Between Women and Men
(Canada, 1990-2020)
(percentage points)

Decile	1990-00	2000-15	2015-20	1990-20	2000-20
1	-0.1168 (8.163)	-0.1925 (14.68)	0.0924 (6.765)	-0.2169 (14.65)	-0.1001 (7.002)
2	-0.1058 (3.608)	-0.6000 (21.69)	0.0640 (2.399)	-0.6418 (22.60)	-0.5360 (19.14)
3	-0.2044 (4.601)	-1.0375 (24.01)	-0.0203 (0.483)	-1.2622 (29.15)	-1.0578 (25.21)
4	-0.4054 (6.896)	-1.6024 (26.35)	-0.2462 (4.033)	-2.2540 (38.19)	-1.8486 (31.91)
5	-0.6715 (9.190)	-2.4171 (30.17)	-0.4387 (5.317)	-3.5273 (46.60)	-2.8558 (38.44)
6	-0.8941 (10.28)	-3.2464 (31.99)	-0.4286 (4.015)	-4.5691 (49.10)	-3.6750 (40.10)
7	-1.1364 (11.54)	-3.7397 (30.22)	-0.2426 (1.815)	-5.1187 (46.24)	-3.9823 (36.60)
8	-1.1597 (10.89)	-4.6425 (28.36)	0.5772 (3.233)	-5.2250 (63.90)	-4.0653 (32.38)
9	1.0092 (9.479)	-4.5162 (26.46)	0.6969 (3.558)	-4.8255 (33.67)	-3.8193 (27.40)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses.

Table 14(a)
Differences in Generalized Lorenz Curve Ordinates Between Women and Men
(Canada, 1990-2020)
(2020 $)

Decile	1990	2000	2015	2020
1	456.72 (8.831)	315.94 (6.359)	217.96 (4.220)	288.86 (4.660)
2	1302.4 (12.28)	1021.0 (9.593)	694.36 (6.790)	712.26 (6.559)
3	2526.9 (14.41)	2003.8 (11.92)	1401.7 (8.474)	1267.1 (7.824)
4	4259.3 (17.21)	3412.5 (14.14)	2505.4 (10.37)	2066.1 (8.812)
5	6416.8 (19.70)	5180.5 (16.31)	3851.4 (11.97)	3041.2 (9.826)
6	8839.0 (21.70)	7185.0 (17.56)	5400.6 (12.95)	4234.3 (10.81)
7	11,492 (23.06)	9361.5 (18.77)	7247.9 (14.04)	5717.5 (11.88)
8	14,459 (24.44)	11,906 (19.66)	9508.4 (14.80)	7554.7 (12.76)
9	17,887 (25.22)	14,953 (20.25)	12,314 (15.55)	9895.3 (13.36)
10	24,088 (23.18)	20,946 (19.77)	23,049 (11.52)	17,773 (11.44)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses.

Table 14(b)
Changes in GLC Differences Between Women and Men
(Canada, 1990-2020)
(2020 $)

Decile	1990-00	2000-15	2015-20	1990-20	2000-20
1	-140.78 (1.963)	-97.98 (1.367)	70.91 (0.879)	-167.86 (2.079)	-27.08 (0.341)
2	-281.4 (1.873)	-326.64 (2.213)	17.89 (0.120)	-590.14 (3.888)	-308.74 (2.031)
3	-523.1 (2.1530	-602.1 (2.553)	-134.6 (0.581)	-1259.8 (5.278)	-736.72 (3.156)
4	-846.8 (2.450)	-907.1 (2.656)	-439.3 (1.305)	-2193.2 (6.433)	-1346.4 (4.001)
5	-1236.3 (2.717)	-1329.1 (2.940)	-810.2 (1.815)	-3375.6 (7.513)	-2139.3 (4.824)
6	-1654.0 (2.865)	-1784.4 (3.054)	-1166.3 (2.038)	-4604.7 (8.148)	-2950.7 (5.209)
7	-2130.5 (3.022)	-2113.6 (2.945)	-1530.4 (2.168)	-5774.5 (8.335)	-3644.0 (5.258)
8	-2552.8 (3.016)	-2398.1 (2.716)	-1953.7 (2.236)	-6904.3 (8.249)	-4351.3 (5.138)
9	-2934. (2.866)	-2639. (2.437)	-2419. (2.231)	-7992. (7.793)	-5058. (4.836)
10	-3142. (2.117)	2103. (0.929)	-5276. (2.083)	-6315. (3.379)	-3173. (1.687)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Absolute values of asymptotic "t-ratios" in parentheses.

Table 15
Lower and Higher Income Gaps
(Canada, 1990-2020)
(2020 $)

	Women	
	$Gap\ L\ (\hat{\mu}_M\ -\ \hat{\mu}_1)$	$Gap\ H\ (\hat{\mu}_{10}\ -\ \hat{\mu}_M)$
1990	$ 21,893.6 (55.870)	$ 63,922.9 (244.66)
1995	$ 21,775.1 (52.886)	$ 64,631.1 (227.72)
2000	$ 23,835.4 (57.220)	$ 70,102.8 (224.74)
2005	$ 25,185.3 (60.150)	$ 95,573.2 (507.95)
2015	$ 29,537.9 (65.140)	$ 113,361 (586.11)
2020	$ 32,239.5 (60.920)	$ 102,316 (457.92)
	Men	
	$Gap\ L\ (\hat{\mu}_M\ -\ \hat{\mu}_1)$	$Gap\ H\ (\hat{\mu}_{10}\ -\ \hat{\mu}_M)$
1990	$ 40,225.6 (79.152)	$ 103,023 (476.35)
1995	$ 38,420.2 (82.855)	$ 99,894 (443.40)
2000	$ 39,538.1 (81.696)	$ 111,171 (454.82)
2005	$ 39,698.8 (79.680)	$ 184,360 (419.05)
2015	$ 41,834.0 (80.985)	$ 206,240 (435.28)
2020	$ 40,191.4 (77.852)	$ 170,260 (1055.5)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors in parentheses.

Table 16
Income Polarization Ratios
(Canada, 1990-2020)

	Women		
	$(\hat{\mu}_{10} \,/\, \hat{\mu}_1)$ (R)	$(\hat{\mu}_{10} \,/\, \hat{\mu}_M)$ (RH)	$(\hat{\mu}_1 \,/\, \hat{\mu}_M)$ (RL)
1990	20.428 (0.1274)	3.4295 (0.01072)	.167881 (.0009259)
1995	22.674 (0.1477)	3.5088 (0.01031)	.154749 (.0009072)
2000	23.303 (0.1395)	3.4994 (0.009663)	.150173 (.0008135)
2005	26.874 (0.1927)	4.2015 (0.01782)	.156342 (.0009057)
2015	27.396 (0.1778)	4.2434 (0.01741)	.154891 (.0007880)
2020	18.400 (0.1083)	3.5596 (0.01181)	.193464 (.0009363)
	Men		
	$(\hat{\mu}_{10} \,/\, \hat{\mu}_1)$ (R)	$(\hat{\mu}_{10} \,/\, \hat{\mu}_M)$ (RH)	$(\hat{\mu}_1 \,/\, \hat{\mu}_M)$ (RL)
1990	16.944 (0.0983)	3.0935 (0.01008)	.182570 (.0008762)
1995	20.829 (0.1354)	3.2005 (0.01046)	.153660 (.0008626)
2000	21.445 (0.1383)	3.3699 (0.01032)	.157141 (.0008871)
2005	32.100 (0.1844)	4.9306 (0.008742)	.153604 (.0008350)
2015	33.670 (0.1919)	5.1726 (0.0085844)	.153626 (.0008315)
2020	20.813 (0.1347)	4.3507 (0.02084)	.209040 (.0009104)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors in parentheses.

Table A1
Summary Statistics
(Individual Censuses - 2020 $)

a) Women

	1990	1995	2000	2005	2015	2020
Mean Income -	$32,925	$32,744	$35,317	$39,549	$46,225	$49,594
NOBS -	233,228	233,412	256,129	274,147	313,063	345,002

b) Men

	1990	1995	2000	2005	2015	2020
Mean Income -	$57,012	$53,397	$56,263	$64,219	$69,274	$67,368
NOBS -	248,473	241,824	254,607	266,549	304,245	338,219

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Table A2
Mean Middle-Quantile Income ($\hat{\mu}_M$)
(Canada, 1990-2020)
(2020 $)

	Women	Men
1990	$ 26,310.7 (57.816)	$ 49,209.8 (79.533)
1995	$ 25,761.7 (54.810)	$ 45,395.7 (85.242)
2000	$ 28,047.4 (59.571)	$ 46,909.5 (83.333)
2005	$ 29,852.5 (62.506)	$ 46,903.3 (80.910)
2015	$ 34,951.6 (67.249)	$ 49,427.3 (82.285)
2020	$ 39,972.8 (59.377)	$ 50,813.5 (76.089)

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

Standard errors in parentheses.

Table A3
Estimated Years to Convergence for Decile Means Between Women and Men

Decile	$\widehat{YTC}$ (years)	t-stat
1 -	107.0	3.212
2 -	15.04	24.62
3 -	12.97	30.69
4 -	13.10	33.64
5 -	12.30	40.67
6 -	14.70	38.27
7 -	21.39	33.03
8 -	25.98	27.66
9 -	33.10	20.79
10 -	41.79	18.35

Note: $\widehat{YTC}$ = $\frac{\text{10 (2020 Dif.)}}{\text{2020 Dif. – 2000 Dif.}}$ = $\frac{10\ x_1}{x_1 - x_0}$

So $SE\left(\widehat{YTC}\right) = (.10)\left(\widehat{YTC}^2\right) \cdot \left[\left(\frac{1}{x_1}\right)^2 \cdot \widehat{Var}\,(x_0) + \left(\frac{x_o}{{x_1}^2}\right)^2 \cdot \widehat{Var}\,(x_1)\right]^{1/2}$

calculated from the delta method.

Then t-stat = $\widehat{YTC}\ /\ SE\left(\widehat{YTC}\right)$.

Source: Author's calculations from Statistics Canada's Public Use Microdata Files for Canadian censuses.

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