RESEARCH BRIEF

to

House of Commons Standing Committee on Finance

INCOME INEQUALITY IN CANADA AND THE MITIGATING INFLUENCE OF PROVINCIAL TAX POLICIES: FINDINGS FROM THE 2006 CENSUS

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Background

One common focus in the study of income inequality is the equitable distribution of income. Developed countries generally aim to achieve a reasonable distribution of income and wealth among their citizenry, while agreeing that extreme equalities and extreme inequalities are both undesirable. In an effort to avoid these extremes, several indices have been developed to monitor the amount of economic inequality in societies.

Disagreement and contentions arise when trying to decide exactly how much variability in income and wealth is good for society. Ultimately this decision impacts on how many resources are redistributed from the 'rich' to the 'poor.' In modern societies taxation has become an important tool by which governments can manipulate and control income inequality in their own jurisdictions.

The Gini coefficient, and its associated index, is a well-established measure that has been commonly used to study and monitor income inequality between countries. It has a well understood meaning among scientists and an easy geometric interpretation. The coefficient is a numeric summary of differences between segments of the lower portion of the income distribution and the mean income of the population. It measures what portion of the population's total income is distributed among the poorest half of the population relative to the mean averaged population income.

The Gini index provides a metric by which societies are compared to each other, on a scale that ranges from perfect equality (0) to perfect inequality (1). Egalitarian countries with low levels of inequality, such as Sweden, would have a Gini score around 0.25 and less egalitarian countries like Portugal would have a Gini score around 0.37[1]. These scores may vary slightly from study to study.

In 2007, while thinking about measuring economic inequality, Zenga noted that the relative nature of 'poor' and 'rich' should be taken into account[2,3]. He ultimately introduced a new inequality measure, which incorporated comparisons between the lower and upper portions of the income distribution. This innovation includes a comparison of the whole income distribution as opposed to the Gini which only considers only the lower half of the income distribution. The Zenga index also ranges from perfect equality (0) to perfect inequality (1).

Using the findings from the same study cited above, the observed Zenga coefficient for Sweden was 0.57 and 0.71 for Portugal. The Zenga produces coefficients that are different from the Gini and the two should not be compared directly. In most cases, however, the Gini and Zenga agree in their ranking of income inequality among societies.

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[1] Greselin, F., Pasquazzi, L. & Zitikis, R. (2013). Contrasting the Gini and Zenga indices of economic inequality. *Journal of Applied Statistics, 40*(2), 282-297.

[2] Zenga, M (2007). Inequality curve and inequality index based on the ratios between lower and upper arithmetic means. *Statistica & Applicazioni, 5*, 3-27.

[3] Greselin, F., Pasquazzi, L. & Zitikis, R. (2010). Zenga's new index of economic inequality, its estimation, and an analysis of incomes in Italy. Journal of Probability and Statistics

Also in 2007, Frenette, Green & Milligan[4] raised concerns about the changing shape of the income distribution in Canada. They cautiously suggested a trend might be developing where a larger proportion of income was shifting to the richest people in the upper tail of the income distribution in Canada.

A potential problem in detecting income inequality with the Gini arises if a large portion of the population falls into the lower tail of the income distribution while the richest citizens increase their share of the wealth at the same time. Under the right circumstance the Gini may not identify these types of shifts in the income distribution when the population mean remains relatively unchanged.

Social scientists have been suggesting that this very trend is happening in developed countries. An OECD[5] study found the incomes of people in the upper portion of the income distribution were growing at twice the rate of those in the lower portions of income distribution. It would seem that as middle class employment disappears, a few individuals do better, while a majority of individuals find themselves falling behind.

In circumstances where this trend is observed the Zenga measure may provide a more balanced picture about inequality than the classical Gini index. Thus, we use both the Gini and Zenga indices together in our analysis to gain a broader understanding of income inequality in Canada.

This paper addresses two important questions about income inequality in Canada:

1) How does income inequality vary within Canada?
2) How does taxation mitigate income inequality in Canada?

Methodology

Population

2005 Income data were collected from all non-institutionalized individuals aged 15 years and older and living in Canada through the 2006 Census. A twenty percent sample from the Census data was used for analysis in an effort to establish a representative sample of the Canadian population.

Measures

Gini and Zenga coefficients were produced at the provincial and Census Division levels of geography. The territories were excluded from the provincial analysis but were included in the map of income inequality in Canada.

Incomes represent 2005 Economic Family incomes with adjustments for family size[6]. The income estimates include provincial/territorial and federal transfers. Both before tax and after tax incomes were

[4] Frenette, M., Green, D. A., & Milligan, K. (2007) The tale of the tails: Canadian income inequality in the 1980s and 1990s. *Canadian Journal of Economics 40*(3), 734-764.

[5] OECD (2011), An overview of growing income inequalities in OECD Countries: Main findings. URL: http://www.oecd.org/els/soc/49499779.pdf

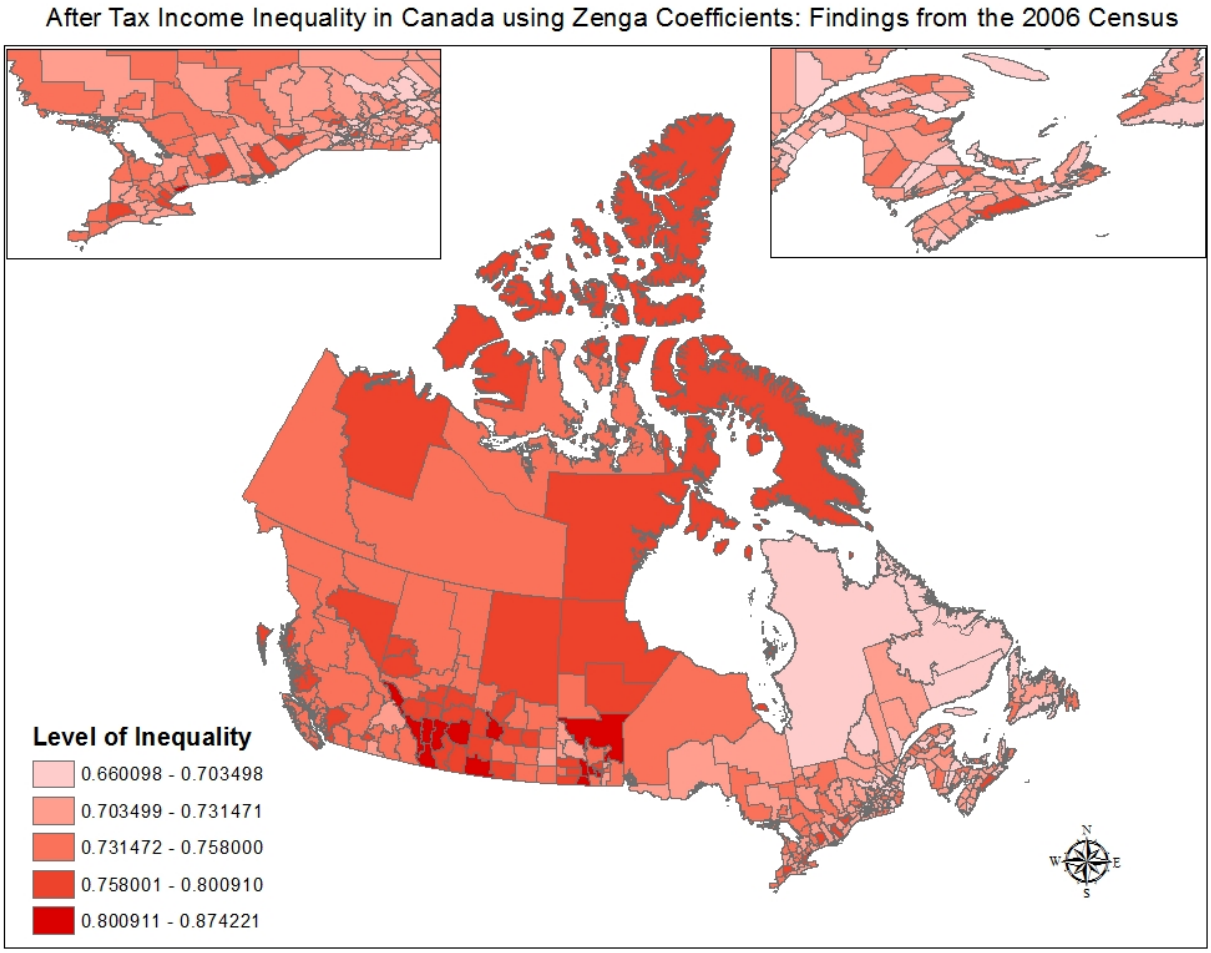
[6] Statistics Canada. URL: http://www12.statcan.ca/census-recensement/2006/as-sa/97-563/note-eng.cfm

used to calculate income inequality. A measure of the reduction in the Gini and Zenga coefficients due to taxation are also provided. These were calculated by subtracting the post-tax income from the pre-tax income for each of the respective measures.

Findings

The map below provides a visual overview of income inequality in Canada using the Zenga index. The coefficients were calculated for Census Divisions or counties and ranged from a high of 0.87 to a low of 0.66. These findings suggest substantial variations in income inequality scores within Canada. A comparison of maps using Gini and Zenga shows some minor changes but the general pattern holds across the different measures for the analyses. As a result only the map for the Zenga is provided.

Census Divisions were divided into quintiles based on the Zenga score. The darkest red represents the highest levels of income inequality and the lightest red represents the lowest levels of income inequality. The highest inequalities occur primarily in large metropolitan areas and some counties in the Western provinces. Relatively high levels are also seen in the north. Quebec and the eastern provinces have demonstrated comparably lower levels of income inequality on average.



Provincial Comparisons

The table below provides Gini and Zenga coefficients of income inequality for Canada's ten provinces. Alberta has the highest level of income inequality with Gini coefficients of 0.436 and 0.394 before and after tax respectively. The Zenga coefficients concur with the findings of the Gini coefficients on this measure, ranking Alberta with the highest level of income inequality among the ten provinces. Prince Edward Island ranked the lowest in income inequality on both scales as well. The Gini coefficient for Prince Edward Island was 0.348 before tax and 0.308 after tax.

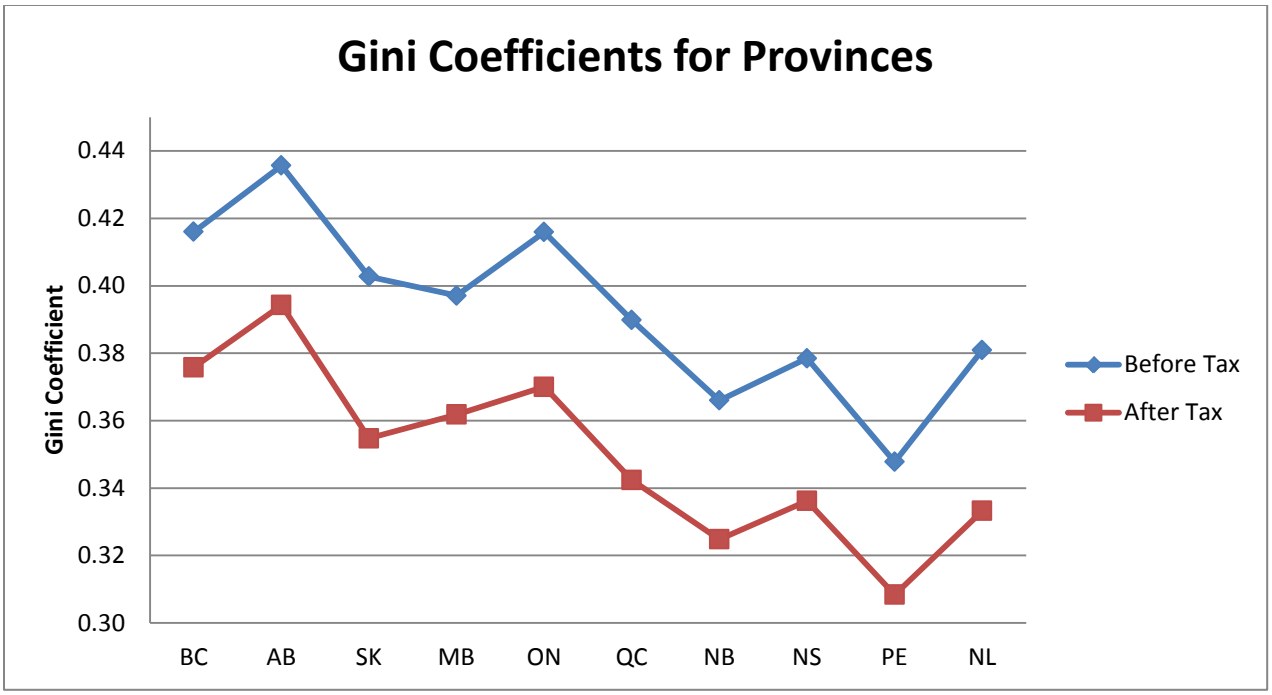
The table below demonstrates that taxation reduces income inequality in all provinces. This finding was consistent for both the Gini coefficients and the Zenga coefficients.

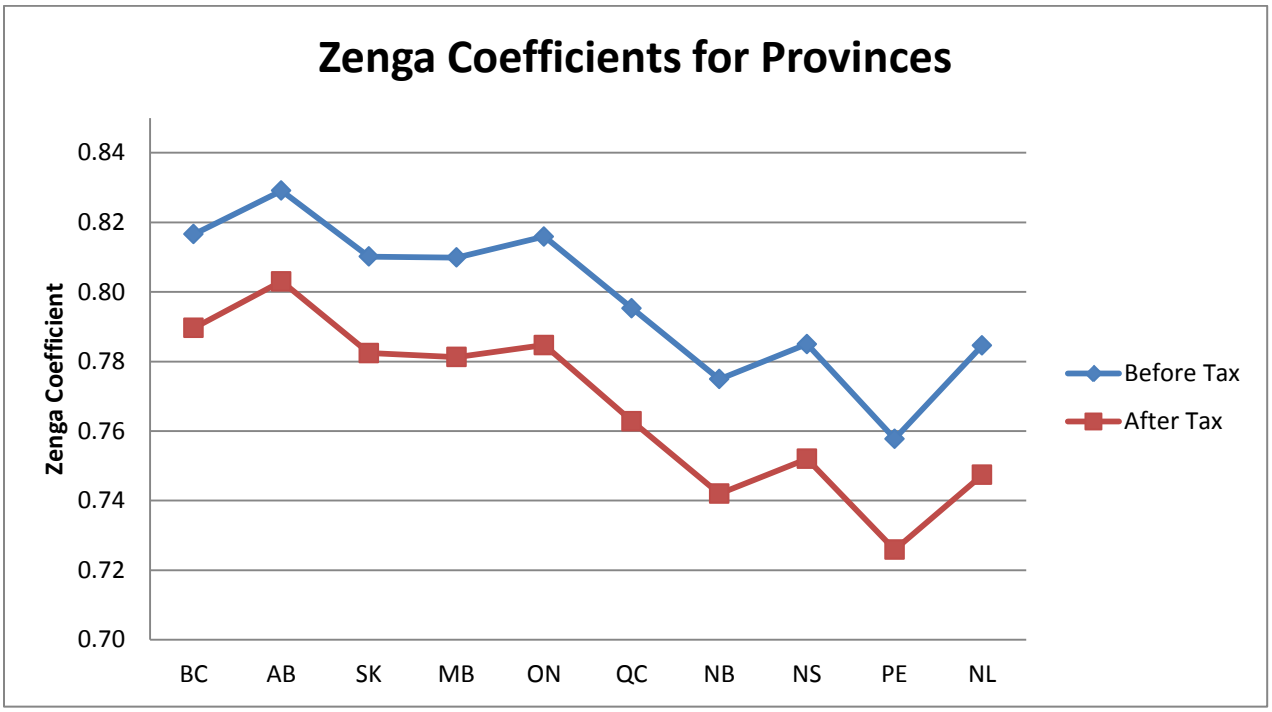
Gini and Zenga Coefficients for Canada's Ten Provinces, Economic Families, Before and After Tax, Adjusted for Family Size: 2006 Census.

	Gini Coefficient before Tax	Gini Coefficient after Tax	Reduction in Gini Coefficient due to Tax	Zenga Coefficient before Tax	Zenga Coefficient after Tax	Reduction in Zenga Coefficient due to tax
British Columbia	0.41603	0.37584	0.040185	0.81659	0.78964	0.02695
Alberta	0.43568	0.39430	0.041381	0.82909	0.80305	0.02604
Saskatchewan	0.40275	0.35478	0.047975	0.81014	0.78242	0.02772
Manitoba	0.39709	0.36183	0.035255	0.80986	0.78128	0.02858
Ontario	0.41592	0.37004	0.045881	0.81591	0.78472	0.03119
Quebec	0.38983	0.34236	0.047471	0.79529	0.76281	0.03248
New Brunswick	0.36600	0.32483	0.041161	0.77493	0.74199	0.03294
Nova Scotia	0.37850	0.33618	0.042316	0.78498	0.75203	0.03295
Prince Edward Island	0.34777	0.30838	0.039387	0.75779	0.72588	0.03191
Newfoundland & Labrador	0.38094	0.33326	0.047682	0.78461	0.74742	0.03719

The table also indicates that the reduction in income inequality mitigated by taxation is not equal between the provinces. Reduction in Gini coefficients due to taxes ranged from a high of 0.048 in Saskatchewan to a low of 0.039 in Prince Edward Island.

A similar trend was found in the Zenga analysis, however, the highest reduction was found in Newfoundland and Labrador at 0.037. The lowest reduction using the Zenga index was 0.026 in Alberta. The graphs below demonstrate provincial differences in the Gini and the Zenga coefficients in regards to the impact of taxation on income inequality between the provinces.





Discussion

This study demonstrates the existence of significant and important differences in income inequality within Canada. Although not directly comparable the variations are similar to those seen in comparisons of countries within the European Union. Taxation mitigates the effects of income inequality in all provinces but not equally. This is likely due to variations in provincial tax policies and political ideologies.