

Cigarette Taxes and Smoking Participation: Evidence from Canadian Tax Increases

Policy Brief No. 8



Summary

Although cigarette taxes are a popular anti-smoking measure with policy-makers, we find evidence of a varied response to cigarette taxes among different groups of smokers in Canada. In particular, contrary to other studies, we find that the middle age group--the largest group of smokers in our sample--is largely unresponsive to taxes. Our results show there is no "one-size fits all" anti-smoking policy. Knowing socio-demographic characteristics of smokers who respond differently to tax increases will help in designing supplementary anti-smoking measures.

Key Findings

We examined the impact of the recent upward trend in Canadian cigarette taxes on smoking participation and discovered that if there is a 10% increase in cigarette taxes, smoking participation for the whole population will fall by about 2.3%. However, this finding is not a generalized response outcome for all socio-demographic groups.

In analyzing 1998-2008 longitudinal data for specific socio-demographic groups, we found that:

- Males are more responsive to cigarette taxes than females
- The low income group and low education group are more tax-sensitive than the high income and high education group
- The 45-65 age group are more responsive to taxes than age groups 12-24 and 25-44
- The 25-44 age group is largely unresponsive to taxes
- Those with self-assessed high health status are more sensitive to cigarette taxes than those with self-assessed low health status

Additionally, our data showed that the average smoking prevalence rate in Canada has been declining for more than two decades. Percentage of smokers is lower for those who are females, married, older, more educated, and who have high income.

Background

Cigarette taxes exist in Canada at both the federal and provincial levels. Though a large reduction in cigarette taxes occurred in the mid-90s to fight smuggling, the 2001 Federal Tobacco Control Strategy caused a series of tax increases. Since 2002, there has been a steady small increase in taxes across all provinces.

Literature agrees that cigarette taxes are generally effective, with some exceptions. However, there are contrasting findings on the socio-demographic characteristics of these exceptions.



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A conventional belief among academics has been that young smokers are more responsive to cigarette prices than older smokers (Lewit and Coate, 1982). However, recent literature finds that the relation between age and cigarette price responsiveness cannot be determined *a priori*, due to the number of influences that affect smoking responses (DeCicca et al., 2002). Several prior studies have also discovered that low income/educated smokers are more responsive to taxes than high income/educated smokers (Gruber and Koszegi, 2004; Townsend et al., 1994). Lastly, some studies found men are more tax-sensitive than women, while others found the reverse (Lewit and Coate, 1982; Farrelly et al., 2001). Most of these studies have been US focused; we examine the impact of recent tax increases on smoking participation of different groups in Canada.

Data

Data come from the Statistics Canada National Population Health Survey (NPHS) household component, a nationally representative sample of the Canadian population which collects information on health-related behavior, as well as corresponding economic and social-demographic variables. Data are from 1998-2008, when there was a large percentage cigarette tax increase across all Canadian provinces. We use longitudinal data to study the long-term impact of taxes on smoking behaviour. Since the NPHS does not provide tax data, we obtain it from respective provincial tax offices. In using recent tax data, we provide an update on the effectiveness of cigarette taxes in altering smoking behavior. (See full report for analysis strategy.)

Results

Smoking Prevalence and Cigarette Taxes

Data show that the average smoking prevalence rate in Canada has been declining for more than two decades. Percentage of smokers is lower for those who are female, married, older, more educated, and with high income. The declined proportion of Canadian smokers was larger between the years 2000-2002 for most groups. During this period, average cigarette tax increased substantially in all Canadian provinces.

Heterogeneous Responses to Cigarette Taxes

By estimating a regression model, we found that for the whole population, a 10% increase in cigarette taxes caused smoking participation to fall by about 2.3%. However, our model also focuses on tax responses of various socio-demographic groups. The following tables present tax elasticity by gender, household income, self-rated health status, education, and age. Our interpretation of responsiveness mainly focuses on estimates of tax elasticity.

Box 1: Elasticity

Tax elasticity measures the percentage change in participation caused by a percent change in tax. For example, our tax elasticity estimate for the whole population is 0.227, which implies that a 10% increase in cigarette taxes will cause smoking participation to fall by about 2.3%. The higher a group's elasticity, the more responsive it is to taxes. For simplicity, all elasticity coefficients in this brief are presented as absolute values.



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Here, tax elasticity is larger for males than females. A 10% increase in cigarette taxes would cause men's smoking participation to fall by 3.2%, as opposed to a

| | Gender | | Income Level | | Health Status | |
|-----------------------|--------|--------|--------------|-------|---------------|-------|
| | Male | Female | Low | High | Low | High |
| Tax Elasticity | 0.322 | 0.12 | 0.183 | 0.202 | 0.191 | 0.317 |

1.2% participation decrease for women. Although tax elasticity of the high income group is larger than the low income group, this is not statistically significant. Other results in our model show that the low income group is more responsive to taxes than the high income group (see full report for details).

Lastly, the high tax elasticity of the high health group (those who report excellent or very good health) shows it is more tax-sensitive than the low health group (those who report good, fair, or poor health).

We group formal education into two groups: low educated represents those with secondary education or less, high educated represents those with any schooling above secondary.

| | Two groups | | Four groups | | | |
|-----------------------|--------------|---------------|----------------|-----------|---------------------|----------------|
| | Low educated | High educated | Less secondary | Secondary | Some post secondary | Post secondary |
| Tax elasticity | 0.414 | 0.033 | 0.555 | 0.218 | 0.018 | 0.042 |

With a tax elasticity estimate of 0.41, the low educated group is much more tax-sensitive. We further divided these groups into four different categories: less than secondary, some secondary, some post secondary, and post secondary. We find that respective tax elasticity estimates generally agree with the two-group results.

Our tax elasticity estimate for age 45-65 is twice as large as those for ages 12-24 and 25-44. These findings contest the conventional belief that young adults are more sensitive to cigarette prices.

| | Three groups | | | Two groups | |
|-----------------------|--------------|-------|-------|------------|-------|
| | 12-24 | 25-44 | 45-65 | 18-40 | 41-65 |
| Tax elasticity | 0.122 | 0.114 | 0.24 | 0.015 | 0.084 |

In re-estimating our model using only two age categories, we again show that the older age group is more tax responsive than age group 18-40. These results also suggest that the age group 25-40 is the least responsive group.

We further re-estimated our model using data from 1998-2002, because the largest tax change occurred in most Canadian provinces from 2000-2002.

We hypothesized that the tax impact was higher during this period for all age categories. Remarkably, tax elasticity increased for all age groups except 25-44, which remained largely unresponsive. Table 4 shows this result.

| | Age | | |
|-----------------------|-------|-------|-------|
| | 12-24 | 25-44 | 45-65 |
| Tax elasticity | 0.658 | 0.035 | 0.403 |



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Conclusion

This study ultimately agrees that cigarette taxes are generally effective in Canada, with some exceptions. Our tax elasticity estimates show that if taxes increase by 10%, smoking participation will fall by about 2.3%. However, this study also shows that higher cigarette taxes have a different impact on smoking participation across different groups of smokers.

We find that males are much more tax-sensitive than females, in accordance with some prior studies. Another result coinciding with prior literature is that the low income group and low education group are more responsive to taxes than the high income and high education group. This differential response of low income/education smokers versus high income/education smokers raises the debate about the distributional impact of cigarette taxes. We also find that the age group 45-65 is more tax-sensitive than other age groups, while the age category 25-44--the largest fraction of smokers in our sample--is remarkably unresponsive to taxes.

Cigarette taxes remain popular with policy makers to combat smoking. Identifying the socio-demographic characteristics of smokers who respond to tax increases will help in designing appropriate supplementary measures to reduce smoking, as there is no "one-size fits all" effective policy.

References

- Chaloupka, F.; Pacula, R.L. Sex and Race Differences in Young People's Responsiveness to Price and Tobacco Control Policies. *Tob. Control* 1999, 8, 373-378.
- DeCicca, P.; Kenkel, D.; Mathios, A. Putting Out the Fires: Will Higher Taxes Reduce the Onset of Youth Smoking? *J. Polit. Econ.* 2002, 110, 144-169.
- Farrelly M.C.; Bray, J.W.; Pechacek, T.; Woollery, T. Responses by Adults to Increases in Cigarette Prices by Socio-demographic Characteristics. *Southern Econ. J.* 2001, 68, 156-165.
- Gruber, J.; Koszegi, B. Tax Incidence when Individuals are Time-inconsistent: The Case of Cigarette Taxes. *J. Public Econ.* 2004, 88, 1959-1988.
- Lewit, E.; Coate, D. The Potential for Using Excise Taxes to Reduce Smoking. *J. Health Econ.* 1982, 1, 121-145.
- Townsend, J.; Roderick, P.; Cooper, J. Cigarette Smoking by Socioeconomic Group, Sex, and Age: Effects of Price, Income, and Health Publicity. *Br. Med. J.* 1994, 309, 923-927.

About this Policy Brief

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