The choice of discount brand cigarettes: a comparative analysis of International Tobacco Control surveys in Canada and the USA (2002–2005)

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ABSTRACT

Background Increasing tobacco taxes to increase price is a proven tobacco control measure. This article investigates how smokers respond to tax and price increases in their choice of discount brand cigarettes versus premium brands.

Objective To estimate how increase in the tax rate can affect smokers' choice of discount brands versus premium brands.

Methods Using data from International Tobacco Control surveys in Canada and the USA, a logit model was constructed to estimate the probability of choosing discount brand cigarettes in response to its price changes relative to premium brands, controlling for individual-specific demographic and socioeconomic characteristics and regional effects. The self-reported price of an individual smoker is used in a random-effects regression model to impute price and to construct the price ratio for discount and premium brands for each smoker, which is used in the logit model.

Findings An increase in the ratio of price of discount brand cigarettes to the price of premium brands by 0.1 is associated with a decrease in the probability of choosing discount brands by 0.08 in Canada. No significant effect is observed in case of the USA.

Conclusions The results of the model explain two phenomena: (1) the widened price differential between premium and discount brand cigarettes contributed to the increased share of discount brand cigarettes in Canada in contrast to a relatively steady share in the USA during 2002–2005 and (2) increasing the price ratio of discount brands to premium brands—which occurs with an increase in specific excise tax—may lead to upward shifting from discount to premium brands rather than to downward shifting. These results underscore the significance of studying the effectiveness of tax increases in reducing overall tobacco consumption, particularly for specific excise taxes.

INTRODUCTION

There is widespread recognition of the importance of taxation as one of the most effective measures of tobacco control and its demonstrated value as a public health policy in preventing tobacco-related disease and death.[1 2] A tax increase is expected to raise the retail price of cigarettes and the increased price has proven to cause some smokers to quit, lower the likelihood that non-smokers will begin to smoke and lower the average consumption of those who continue to smoke.[3]

The taxation of tobacco products, however, may not be as effective in curbing tobacco consumption as it is intended to be, owing to compensatory behaviour among smokers to maintain the affordability of tobacco products in response to price increases. The study of compensatory behaviour of smokers has appeared in different forms of altered smoking behaviour in the literature, such as by smoking cigarettes that are longer and higher in tar and nicotine content,[4] substituting cheaper tobacco products,[5–13] purchasing from low-taxed and untaxed sources of cigarette[14] or switching to roll your own or discount brand cigarettes.[14–17] Such compensatory behaviour would diminish the expected reduction in cigarette consumption and would, in turn, dampen the impact of any tax-induced price increase on public health outcomes. As for example, a study on Chinese smokers confirmed that the intention to quit smoking is lower among smokers who use less expensive cigarettes, implying weaker price sensitivity of smokers.[18]

Using data from the first four waves of the International Tobacco Control (ITC) Policy Evaluation Survey in Canada and the USA during 2002–2005, the present article examines the brand choice behaviour of smokers in these two countries by the classification of cigarettes into discount and premium brands. The objective is to understand how changes in the relative price of these two types of brands can affect smokers' choice of the lower price option of discount brands. Typically, one would expect smokers to switch downwards to discount brand cigarettes in order to compensate for tax and price increases. However, this may not necessarily be the case if the relative price of premium brands falls as a result of tax and price increases, in which case smokers would be induced to switch upwards. This is expected under specific tax system which implies a constant price increase across brands when tax is increased and reduction in the relative price of higher-price brands. The idea of this article is to test the validity of this hypothesis using data from Canada and the USA.

METHODS

Description of data

The data used for the analysis come from ITC surveys conducted in Canada and the USA in four annual waves between 2002 and 2005. It is a longitudinal survey conducted by random-digit dialling telephone interviews of more than 2000 representative

adult smokers (18 years or older) from each country. The survey questionnaire is uniform across the two countries, permitting the use of comparable variables for cross-country analysis. Details of the methods used in ITC surveys are presented in Thompson *et al*.[19]

The data collected on individual smokers include average daily consumption of cigarettes, brand of cigarettes, source and volume of purchase, the prices they paid per unit of purchase (loose or in packs or cartons), use of discount coupons, household income, level of education, age, gender and region of residence (state, province, etc). The price per unit of purchase of packs or cartons is converted to price per stick of cigarette by dividing the unit price of purchase by the number of cigarettes contained in each unit. The prices reported in 2002, 2003 and 2004 are adjusted for inflation and converted to 2005 prices for each country using the Consumer Price Index from Organisation for Economic Co-operation and Development statistics.

The brand of cigarettes reported by the smokers of factory-made cigarettes is categorised as 'premium' and 'discount' for the two countries on the basis of manufacturer-specific classification of the cigarettes they market. Much of this information was collected through the documents and advertisements of tobacco companies published on their respective websites. A complete list of these brands is provided in table 1. The summary statistics of pooled data from four waves of all the variables used for analysis are presented in table 2.

Cigarette price and brand

The average prices per cigarette of premium and discount brands reported by smokers in the ITC Survey over the years under observation are presented in figures 1 and 2 for Canada and the USA, respectively. It appears from figure 1 that the price gap widened in Canada over time from 4 cents per stick in 2002 to 6 cents per stick in 2005, which resulted in lowering of the price ratio of discount to premium brand cigarettes. The Health Canada statistics of 2006 also show that discount brand cigarettes cost \$10–\$20 less per carton or \$1.25–\$2.50 per pack, that is, 5–10 cents per stick for 25 stick packs.[20] In contrast, as shown in figure 2, the prices of discount and premium brand cigarettes in the USA converged over this period.

The ITC Survey shows that in Canada, the percentage of discount brand cigarette consumption among factory-made cigarettes increased from 17.6% in 2002 to 42.2% in 2005. In contrast, the share of discount brand cigarette consumption in the USA fell from 30.7% in 2002 to 29.8% in 2005. The shares of premium and discount brand consumption by year of observation are presented in the secondary vertical axes in figures 1 and 2 for Canada and the USA. The upward trend in the market share of discount brand cigarettes in Canada and the downward trend in the USA continued until 2011, as shown in figures 3 and 4, respectively, based on Euromonitor International Ltd data.

Before 2003, the market for discount brand cigarettes in Canada was occupied by about two dozen small tobacco companies manufacturing at lower production costs and selling cigarettes at cheaper rates than the premium brands marketed by the leading producers. The total market share of discount factory-made cigarettes was 2% in 2001, which went up to 12% in 2002.[21] According to a different source, the share of discount brand cigarettes was somewhat smaller, around 8% by the end of 2002.[22] The growth of the smaller manufacturers of cigarettes was clearly visible in the number of cigarettes produced by the largest of the smaller manufacturers, Grand River Enterprises (GRE), over this period. The production of GRE was 4500 cases in January 2001, 10200 cases in January 2002 and 25 600 cases or 250 million cigarettes in January 2003.[21]

In response to the growing market share of the smaller cigarette companies, the major manufacturers in Canada began introducing discount brands. In February 2003, Rothmans, and Benson & Hedges reduced the price of their Number 7 brand cigarettes, which occupied 5.8% of the market share of manufactured cigarettes in that year, by about \$1.[23] Imperial and JTI-Macdonald soon developed their own discount brands within 18 months. In total, discount factory-made cigarettes dramatically increased their market share in Canada from 10% in 2003 to 40% in 2005.[24] According to Canadian Tobacco Use Monitoring Survey (2005), the percentage of current smokers who purchased discount brands within the 6 months prior to the survey was 36%.[25]

The US cigarette market experienced this type of dramatic change in the composition of factory-made cigarette market

Table 1 List of premium and discount brands of factory-made cigarettes in Canada and the USA

Country	Premium	Discount
Canada	Accord, American, Avanti, Belmont, Belvedere, Benson & Hedges, Black Cat, Camel, Cameo, Captain Black, Craven A, Craven M, Drum, Du Maurier, Dunhill, Export A, Gauloise, Golden Leaf, Kool, Macdonald, Marlboro, More, Peter Stuyvesant, Player's, Premium, Rothman's, Salem, Sportsman, Supreme, Sweet Caporal, Vantage, Viscount, Vogue, Winston	Advantage, Baileys, Bronco, Canadian Classics, Celesta, Colts, Daily Mail, Daker, DK's, Gipsy, John Players Special (JPS), Legend, Mark Ten, Matinee, Maximum, Medallion, Number 7, Peter Jackson, Podium, Putters, Rockport, Smoking, Smokin' Joes, Sobranie, Studio, Tabec, Trad A, Tremblay, Unify
The USA	Accord, American Spirit, Barclay, Belair, Benson & Hedges, Camel, Capri, Carlton, Century, Chesterfield, Commander, Djarum, Dunhill, Eve, Export A, Gitanes, Jade, Kamel, Kent, Kool, L & M, Lark, Lucky Strike, Marlboro, Max, Merit, More, Nat Sherman, Natural American Spirit, Newport, Now, Pall Mall, Parliament, Philip Morris, Players, Quest, Raleigh, Rothman, Salem, Sampoerna, Saratoga, Satin, State Express 555, Tareyton, Triumph, True, Vantage, Virginia Slims, Winston	1st class, Alpine, Austin, Bailey, Basic, Best Buy, Best Value, Black & White, Bonus Value, Braves, Bridgeport, Bridgeton, Bristol, Bronco, Bronson, Bucks, Buffalo, Calon, Cambridge, Carnival, Century, Chancellor, Champion, Checkers, Cherokee, Cheyenne, Cimarron, Covington and Jasmine, CT, Decade, Desert Sun, Doral, Double Diamonds, Eagle, Epic, Exact, Export, Forsyth, Generic, Gold Coast, GPC, Grand Prix, Gsmoke, GT One, Gunsmoke, Harper, Homer, Kentucky's Best, Kingsley, Kingsport, Kingston, Legend, Lewiston, Liggett, Mack, Magna, Main Street, Malibu, Marathon, Market, Maverick, Melbourne, Miss Diamond, Misty, Monarch, Mond International, Money, Montclair, Moves, Native, Natural, Natural Blend, New, Niagara's, Old, Old Gold, Opal, Pall Mall Generic, Parker, Poker, Prime, Primo, Private Stock, Pyramid, Rainbow, Raleigh Extra, Richland, Riviera, Rodeo, Roger, Ropers, Sabre, Seneca, Shield, Silver, Sincerely Yours, Sixty Ones, Skydancer, Smokin Joes, Sonoma, Special, Sport, Sterling, Storm, Summit, Sundance, Tacoma, The Brave, Tracker, Tucson, Unify, US-1, USA, USA Gold, Value Buy, Value Pride, Viceroy, Wave, Westport, Yours

Sources: Authors' compilation from web-based sources of tobacco manufacturers.

Table 2 Summary statistics of sample characteristics in Canada and the USA, 2002–2005

	Canada	USA
Number of cigarettes smoked per day	16.03	17.78
Percentage of smokers using discount brand	26.35	27.20
Reported price per cigarette stick of brand used (2005 dollars)	0.34	0.17
Ratio of discount brand price to premium brand price	0.87	0.75
Percentage of smokers who received tobacco industry promotions	21.17	71.34
Percentage of smokers by household income groups		
Below $10 000	5.70	10.05
$10 000–$29 999	23.04	27.67
$30 000–$44 999	20.66	21.01
$45 000–$59 999	18.23	17.00
$60 000–$74 999	11.88	9.24
$75 000–$99 999	11.37	8.35
$100 000–$149 999	6.59	4.49
$150 000 and over	2.52	2.20
Percentage by highest level of education		
Grade school, some high school	15.08	10.15
Completed high school	29.56	32.35
Technical, trade school, community college	32.01	32.65
Some university—no degree	8.74	10.03
Completed university degree	11.43	10.66
Postgraduate degree	3.18	4.16
Mean age of smokers (years)	42.71	44.21
Percentage of male smokers	44.87	42.19
Percentage of white smokers	92.00	83.36
Percentage of married/cohabitating smokers	54.41	48.23
Percentage of smokers by year of observation		
2002	31.84	32.41
2003	21.00	19.04
2004	25.28	26.18
2005	21.89	22.37
Percentage of smokers by province/region of residence		
Province	Canada	Region	USA
Newfoundland and Labrador	1.67	New York	6.55
Prince Edward Island	0.44	Pennsylvania	5.07
Nova Scotia	3.22	North-east	7.31
New Brunswick	1.88	Illinois	3.71
Quebec	21.05	Michigan	3.05
Ontario	40.95	Ohio	4.45
Manitoba	4.24	Mid-west	13.36
Saskatchewan	3.39	Florida	4.85
Alberta	10.08	Texas	5.66
British Columbia	13.08	South	23.57
		California	9.77
		West	12.66

Source: ITC Canada and USA surveys, 2002–2005.

much earlier, in the 1980 s and 1990 s, with the introduction and spread of discount and deep discount brand cigarettes and the increased use of price-related promotions.[15 26] The market share of discount cigarettes rose from almost none in the early 1980 s to about 40% in the early 1993, and then went down to 27% in 1997.[27] As the ITC data show, this share did not exceed 30% until 2005.

The period of observation in the present study from 2002 to 2005 coincided with the implementation of several statutes complementary to the provisions of the 1998 Master Settlement Agreement (MSA) in the USA in response to growth in the market share of manufacturers not participating in the MSA (NPM). Despite provisions in the MSA keeping NPMs from having a significant cost advantage, loopholes in the MSA and non-compliance by NPMs gave them a cost advantage over participating firms, keeping their prices well below those of participating manufacturers. The better enforcement of the MSA regulations using complementary legislations prevented the non-compliance of NPMs to a great extent, a trend that helped the price gap between premium and discount brand cigarettes stabilise in the early 2000 s.[27] However, the market share of cigarettes made a marked shift from discount to premium brands later in the decade, which is more likely an outcome of the largest federal cigarette tax increase that occurred in April 2009.

The rise in discount brand cigarette market share in Canada was accompanied by a large-scale migration of smokers from premium brand to discount brand use. This is evident in the joint distribution of smokers by brand of last purchase of cigarettes in two successive waves of the ITC Survey reported in table 3. Among smokers who reported to have purchased premium brand cigarettes in 2002, 5.3% switched to discount brands in 2003, 21.7% by 2004 and 28.2% by 2005. Similarly, among smokers who bought premium brand cigarettes in 2003, we found that 20% switched to discount brands in 2004 and 26.6% by 2005. Between 2004 and 2005, 10.9% smokers switched from premium to discount brands. These results suggest that the spike in the rise of discount brand cigarette use occurred during 2003–2005. In the USA, the percentage of smokers switching from premium to discount brands was steady at 3–5% and was no more prevalent than the percentage switching from discount to premium brands.

Model of choice of cigarette brand

After an individual decides to smoke, she/he decides on the brand of cigarettes to use. This choice depends on the relative price of brands as well as the demographic and socioeconomic characteristics of individual smokers that set individual preference for higher or lower price products and product quality. Individuals may also respond to sales promotions offered by tobacco manufacturers as incentive to purchase certain brands. Individual preference for a particular type of brand may shift over time for reasons such as fashion, the entry of a new brand in the market, increase in market concentration and the like. For a random draw of individual i observed in year t, we can write the following logit equation corresponding to the decision to choose cigarette brands:

$$\Pr[B_{it} = 1] = \frac{1}{1 + \exp[-(X'_{it}\beta + e_{it})]} \quad (1)$$

Here, B takes the value of 1 if a smoker smokes discount brand cigarette and 0 if she/he smokes premium brand, X is a vector of observable explanatory variables, β is the vector of parameters corresponding to the regressors X and e represents the random unobservable influences on the choice of brands. We can rewrite equation (1) in regression form of the log of the OR of choosing discount brands to choosing premium brands as follows:

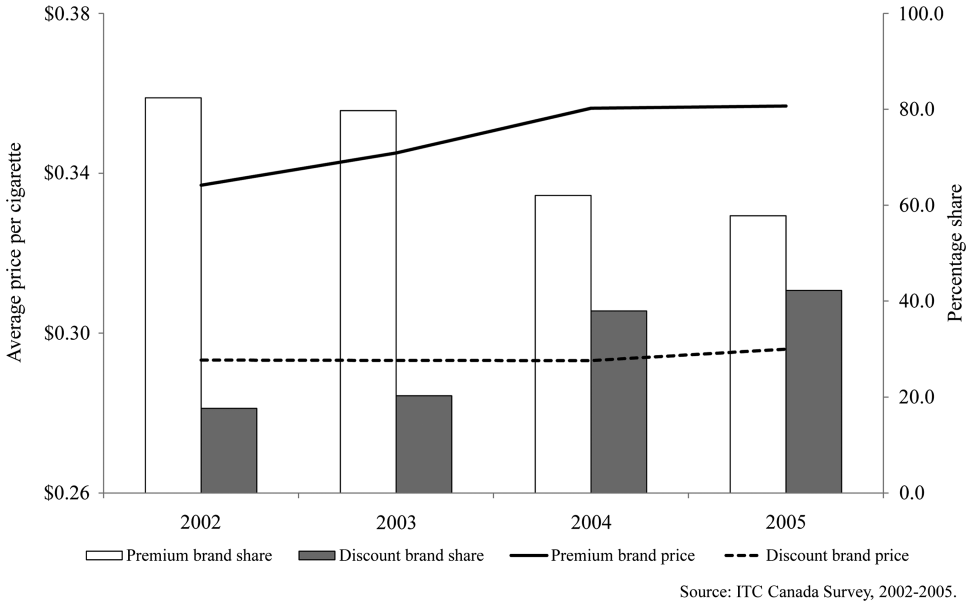

Figure 1 Average price per cigarette (2005 CAD) by brand of purchase and percentage share of premium and discount brand factory-made cigarette consumption in Canada, 2002-2005.

$$\begin{aligned} &\beta_1 \text{ Relative price of discount to premium brand} \\ &+ \sum_j \beta_{2j} \text{ Household income group } (j) \\ &+ \sum_l \beta_{3l} \text{ Highest level of education } (l) \\ &+ \beta_4 \text{ Age} + \beta_5 \text{ Male} + \beta_6 \text{ White} \\ &+ \beta_7 \text{ Married} \\ &+ \beta_8 \text{ Received tobacco industry promotion} \\ &+ \sum_k \beta_{9k} \text{ Year } (k) + e_i \end{aligned} \tag{2}$$

In the estimation of equation (2), we do not control for individual-specific fixed effects because the real price variable individuals face within a short period of time does not vary much for a specific person. This makes the fixed effect estimate of the effect of price on the choice of brand statistically insignificant. However, we adjust the SEs of estimates for individual-level correlation of error terms by using multiple observations on individuals as clusters.

In equation (2), we are particularly interested in the marginal effect of the change in the relative prices of discount and premium brands on the choice of brands. It is expected that if the relative price of discount brand gets higher, the probability of smoking discount brand cigarettes will be lowered. Conditional on smoking participation, it implies greater probability of smoking premium brand cigarettes, that is, upward trading to premium brands.

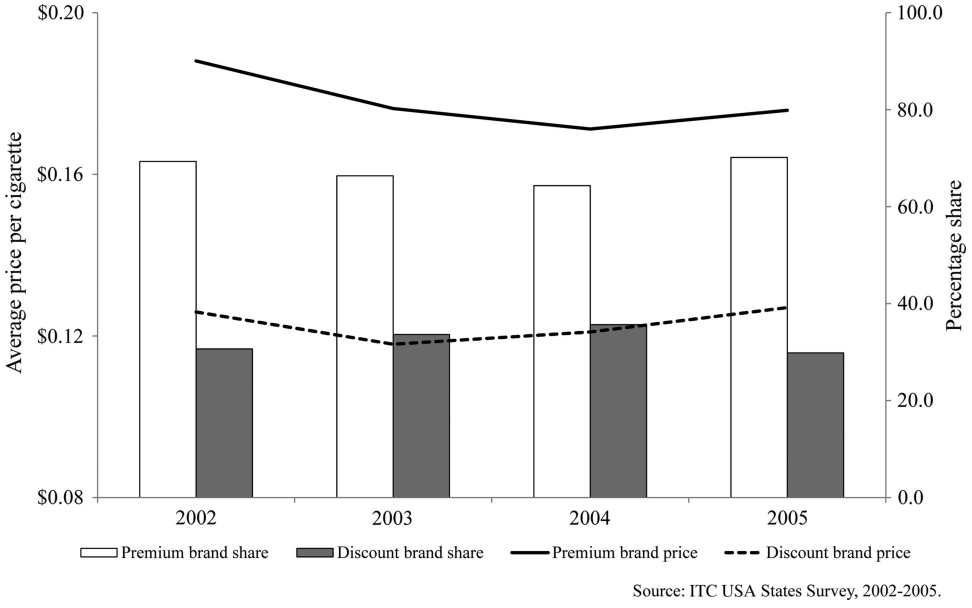

Figure 2 Average price per cigarette (2005 USD) by brand of purchase and percentage share of premium and discount brand factory-made cigarette consumption in the United States, 2002-2005.

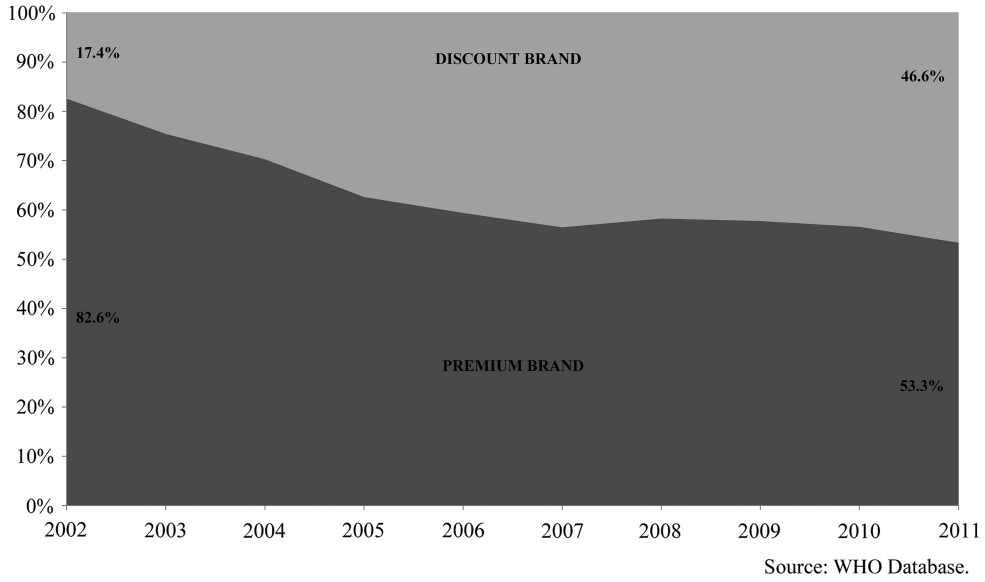

Figure 3 The market share of premium and discount brand cigarettes in Canada, 2002–2011.

In calculating the price ratio, the self-reported price of one's own brand and the imputed price of the alternative brand that one does not smoke can be used. For example, in case of a discount brand user, the price of premium brand is imputed using information of premium brand smokers; and for a premium brand smoker, the price of discount brand is imputed using information of discount brand smokers. The prices of discount and premium brands are imputed using the following linear regression separately for the discount and premium brand smokers:

$$P_{it} = X'_{it}\beta_0 + RES'_{it}\delta + a_i + u_{it} \quad (3)$$

where P is the self-reported price per pack of cigarette purchased, X is the same set of explanatory variables as in equations (1–2), *RES* represents the categorical variables indicating the region of residence of smokers, a represents the individual specific random error component in self-reported price that is uncorrelated with other observable characteristics of individuals and u stands for the random unobserved disturbances in the determination of price.

In equation (3), the random effect a controls for the reporting error that may arise from various sources (eg, from recall bias). It is assumed that the reporting bias remains constant over time, that is, individuals who understate (overstate) the price they paid systematically understate (overstate) price in repeated observations over time. In order to eliminate the reporting bias, the price ratio is constructed by using prices of used brand and alternative brand predicted from equation (3). Thus, we estimate two versions of the choice of brand equation (2)—one with the

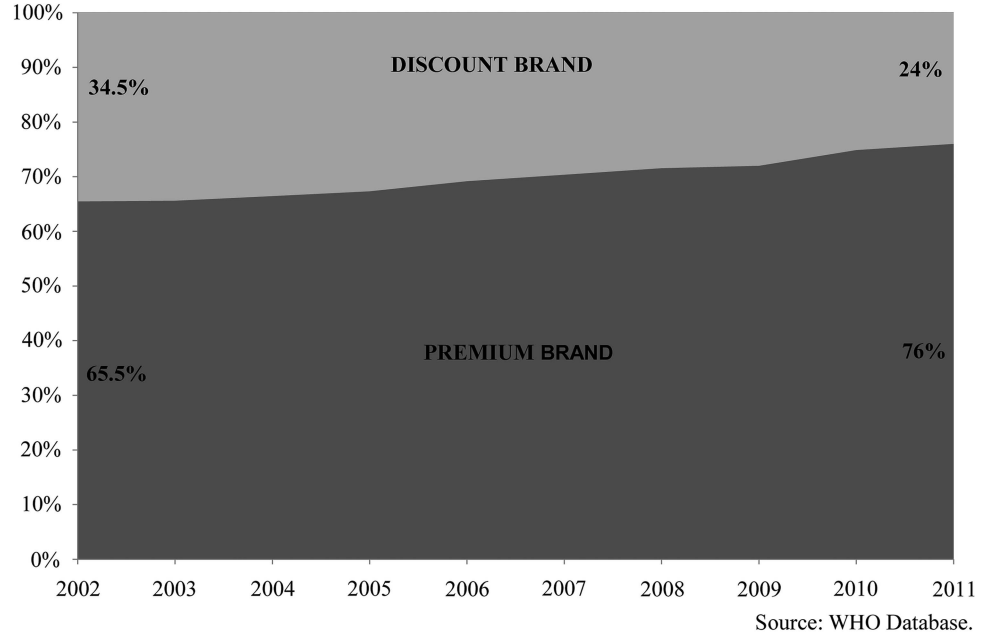

Figure 4 The market share of premium and discount brand cigarettes in the United States, 2002–2011.

Table 3 Percentage of smokers by brands of cigarettes purchased in two consecutive waves in Canada and the USA, 2002–2005

	Canada			The USA		
	2003			2003		
Brands of cigarette purchased in 2002	Premium	Discount	Total	Premium	Discount	Total
Premium	75.8	5.3	81.1	62.2	4.3	66.5
Discount	3.1	15.8	18.9	3.8	29.7	33.5
Total	78.9	21.1	100.0	66.0	34.0	100.0
2002	2004			2004		
	Premium	Discount	Total	Premium	Discount	Total
Premium	56.9	21.7	78.6	59.4	5.2	64.6
Discount	2.5	18.9	21.4	4.7	30.6	35.3
Total	59.5	40.5	100.0	64.1	35.9	100.0
2002	2005			2005		
	Premium	Discount	Total	Premium	Discount	Total
Premium	52.9	28.2	81.1	62.0	5.1	67.1
Discount	2.1	16.8	18.9	5.4	27.6	32.9
Total	55.0	45.0	100.0	67.4	32.6	100.0
2003	2004			2004		
	Premium	Discount	Total	Premium	Discount	Total
Premium	59.0	20.0	79.0	60.8	3.3	64.1
Discount	2.3	18.7	21.0	2.9	33.0	35.9
Total	61.3	38.7	100.0	63.7	36.3	100.0
2003	2005			2005		
	Premium	Discount	Total	Premium	Discount	Total
Premium	54.2	26.6	80.8	63.2	4.4	67.6
Discount	2.8	16.4	19.2	3.2	29.2	32.4
Total	57.0	43.0	100.0	66.4	33.6	100.0
2004	2005			2005		
	Premium	Discount	Total	Premium	Discount	Total
Premium	52.4	10.9	63.3	62.2	3.3	65.5
Discount	5.5	31.2	36.7	4.8	29.7	34.5
Total	57.9	42.1	100.0	67.0	33.0	100.0

The percentages are weighted by the average daily cigarette consumption of individuals in the two waves under consideration and are adjusted for cluster survey design by province (Canada) or state (the USA).
Source: ITC Canada and USA surveys, 2002–2005.

price ratio constructed from self-reported price of used brand and the predicted price of the alternative brand, and the other with the price ratio constructed from the predicted prices of both used and alternative brands. More formally, the first measure of price ratio is given by the following:

$$\text{Price ratio (discount brand user)} = \text{Self} - \text{reported price of discount brand} / \text{Imputed price of premium brand};$$

$$\text{Price ratio (premium brand user)} = \text{Imputed price of discount brand} / \text{Self} - \text{reported price of premium brand}$$

The second measure of price ratio is given by the following:

$$\text{Price ratio (discount brand user)} = \text{Imputed price of discount brand} / \text{Imputed price of premium brand};$$

$$\text{Price ratio (premium brand user)} = \text{Imputed price of discount brand} / \text{Imputed price of premium brand}$$

It should be pointed out here that both the choice of brand and the self-reported price may be driven by a third variable, which is the quality of cigarettes. Failing to control for this unobservable factor may introduce endogeneity in the relative price variable and bias the estimated coefficient. The second measure of the price ratio based on the predicted prices of both used and alternative brands addresses this possible endogeneity bias.

RESULTS

Cigarette prices

The price equation (2) is estimated for premium and discount brand cigarettes using the random-effects method. The results for Canada and the USA are compared in table 4. The price ratio estimated by dividing the price of discount brands by the price of premium brands, both predicted from the estimated price equations presented in table 4, ranges from 0.73 to 1.06 with a mean of 0.88 for Canada. For the USA, this ratio varies from 0.45 to 1.03 with a mean of 0.74.

Choice of cigarette brands

The probability of a smoker choosing a discount or a premium brand cigarette is significantly influenced by the price of discount brand cigarettes relative to premium brands as shown in Model 1 in table 5 for Canada and the USA. When the self-reported price of used brand is replaced with the predicted price in constructing the price ratio (Model 2), the estimate shows negative effect of the ratio of discount to premium brand prices on the probability of choosing discount brands with a larger magnitude in Canada. The larger size of the estimate obtained from Model 2 compared with Model 1 is likely driven

Table 4 Random-effects estimation of price equation for premium and discount brand cigarettes in Canada and the USA, 2002–2005

	Canada		The USA	
	Premium	**Discount**	**Premium**	**Discount**
Household income				
▶ $10 000–$29 999	0.00264	0.0105	−0.00385	0.00378
	(0.70)	(1.51)	(−1.23)	(1.22)
▶ $30 000–$44 999	0.00351	0.0131	−0.00257	0.00706*
	(0.91)	(1.85)	(−0.79)	(1.98)
▶ $45 000–$59 999	0.00410	0.00662	0.000209	0.00471
	(1.02)	(0.80)	(0.06)	(1.19)
▶ $60 000–$74 999	0.00552	0.0124	0.00325	0.0109*
	(1.32)	(1.61)	(0.88)	(2.08)
▶ $75 000–$99 999	0.00712	0.00639	−0.00147	0.0108*
	(1.76)	(0.77)	(−0.39)	(2.02)
▶ $100 000–$149 999	0.00407	0.0172*	−0.000613	0.0128
	(0.89)	(2.01)	(−0.14)	(1.55)
▶ $150 000 and over	0.00291	0.0370**	0.00601	−0.0210
	(0.41)	(2.60)	(0.97)	(−1.33)
Highest level of education				
▶ Completed high school	0.000208	0.00811	0.00487	−0.00337
	(0.08)	(1.73)	(1.81)	(−0.80)
▶ Technical, trade school, community college	0.000273	0.00798	0.00544*	−0.00273
	(0.11)	(1.63)	(1.96)	(−0.66)
▶ Some university–no degree	0.00555	0.0128	0.00379	−0.000587
	(1.74)	(1.80)	(1.15)	(−0.11)
▶ Completed university degree	0.00551	0.0152**	0.00576	−0.00568
	(1.62)	(2.69)	(1.70)	(−0.93)
▶ Postgraduate degree	0.0109**	0.0179	0.0166***	0.000354
	(2.64)	(1.46)	(3.58)	(0.04)
Age	−0.000562***	−0.000347**	−0.000464***	−0.000360***
	(−9.38)	(−3.00)	(−8.27)	(−4.15)
Male	0.00279	−0.000860	0.000724	−0.00130
	(1.68)	(−0.28)	(0.46)	(−0.54)
White, English only	0.00808*	0.00898	−0.0185***	−0.0160***
	(2.30)	(0.98)	(−8.92)	(−4.17)
Married, cohabitating	−0.00408*	−0.00212	−0.00631***	−0.00119
	(−2.36)	(−0.65)	(−3.93)	(−0.48)
	Canada		The USA	
	Premium	Discount	Premium	Discount
Received tobacco industry promotions	−0.00469**	−0.00425	−0.00668***	0.000586
	(−2.64)	(−1.89)	(−4.54)	(0.34)
Year 2003	0.00776***	−0.0000475	−0.0116***	−0.00705***
	(6.02)	(−0.02)	(−8.22)	(−4.60)
Year 2004	0.0222***	−0.0109***	−0.0142***	−0.00630**
	(13.14)	(−3.57)	(−8.99)	(−3.20)
Year 2005	0.0221***	−0.0142***	−0.00937***	0.000726
	(11.10)	(-4.27)	(−5.10)	(0.34)
Fixed effects for province (Canada)/region (USA) of residence				
Prince Edward Island/Pennsylvania	−0.00745	0.00794	−0.0380***	0.00554
	(−0.79)	(0.63)	(−6.40)	(0.47)
Nova Scotia/North-east	−0.0275***	−0.0243**	−0.00195	0.0236
	(−4.07)	(−2.63)	(−0.31)	(1.83)
New Brunswick/Illinois	−0.0532***	−0.0466***	−0.0349***	−0.00497
	(−6.35)	(−4.80)	(−5.17)	(−0.37)
Quebec/Michigan	−0.0937***	−0.110***	−0.0182**	0.0398**
	(−17.32)	(−13.79)	(−2.73)	(3.01)
Ontario/Ohio	−0.0876***	−0.0936***	−0.0580***	−0.0220*
	(−16.54)	(−11.70)	(−9.72)	(−1.97)
Manitoba/Mid-west	0.00381	0.0188	−0.0650***	−0.0243*
	(0.59)	(1.76)	(−11.80)	(−2.30)
Saskatchewan/Florida	0.00780	−0.00578	−0.0726***	−0.0418***

Continued

Table 4 Continued

	Canada		The USA	
	Premium	Discount	Premium	Discount
	(0.97)	(−0.51)	(−12.53)	(−3.84)
Alberta/Texas	−0.00950	−0.0247**	−0.0698***	−0.0366***
	(−1.66)	(−2.79)	(−11.73)	(−3.41)
British Columbia/South	−0.0143*	−0.00880	−0.0805***	−0.0405***
	(−2.49)	(−1.04)	(−14.80)	(−3.89)
/California			−0.0345***	−0.00171
			(−6.07)	(−0.16)
/West			−0.0451***	−0.00425
			(−7.65)	(−0.39)
Observations	4387	1575	4575	1730

The omitted categories include single non-white, non-English female smokers with highest level of education below high school, household income under $10 000, who did not receive any tobacco industry promotion in the year 2002, who resided in Newfoundland and Labrador in case of Canada and in New York region in case of the USA.
The estimated coefficients represent marginal effects for small change in continuous variables and for discrete change in categorical variables from 0 to 1 with reference to the omitted categories.
t statistics are reported in parentheses below the coefficient estimates.
*p<0.05, **p<0.01, ***p<0.001.

by the correction of the endogeneity bias from using self-reported variable of used brand as in Model 1. This coefficient, however, is not statistically significant in case of the USA.

To understand what the magnitude of the estimated coefficient of the price ratio indicates, suppose the initial price per pack of premium brand cigarette is $7 and the initial price per pack of discount brand is $6, so that the ratio of the discount brand price to premium brand price is 0.857 (=6/7). If the specific tax per pack increases by $1 and the tax is fully shifted to consumer so that the new prices are $8 per pack for premium brands and $7 per pack for discount brands, the price ratio increases to 0.875 (=7/8). Given the coefficient of the price ratio for Canada at −0.782, the effect of the increase in the price ratio from 0.857 to 0.875 would be $-0.782\times(0.875-0.857)=-0.014$. It means that a $1 increase in specific excise can reduce the probability of using discount brand cigarettes by 1.4%, as discount brand smokers switch to premium brands.

The negative sign of the effect of changes in the price ratio of discount to premium brand cigarettes on the probability of choosing discount brand cigarettes implies that as excise tax increases uniformly across all brands, the percentage gap between premium and discount brand prices narrows. As a result, the relative gain from buying discount brand cigarettes shrinks creating incentive to choose premium brands over discount brands. This finding conforms to the evidence from a recent report published by United Bank of Switzerland (UBS) Investment Research that increasing state excise tax rates in the USA resulted in shift in the market share towards premium brands due to narrowing of the price gaps.[28] According to this report, the average cigarette price gap between premium and discount brands is highest and the market share of premium brand cigarettes is lowest in the states with the lowest excise tax per pack. The average price gap is 52% for tax rates below $0.50, 46% for $0.51–$1.00, 37% for $1.01–$1.50 and 27% for above $1.50, while the corresponding market shares of premium brands are 80%, 85%, 85% and 94%.

DISCUSSION

Using data from the first four waves of the ITC Survey in Canada and the USA between 2002 and 2005, this article examines the role of the price of discount brand cigarettes relative to the price of premium brand cigarettes in the choice of discount brand cigarettes by smokers. We find that a lower ratio of discount brand price to premium brand price tends to increase the likelihood of smoking discount brand cigarettes. This result confirms that the widened price differential between premium and discount brand cigarettes was a major cause of an increased share of discount brand cigarette consumption in Canada in contrast to a relatively steady share in the USA during the period under observation (2002–2005). As smokers who switch to discount brands are less likely to quit,[15] one can expect that a change in the relative price of cigarette brands in favour of the use of discount brand cigarettes would lead to lower quit rates and greater smoking prevalence. Supporting policy measures are needed to curb the expansion of the discount brand market by controlling the underlying price-cutting strategy of cigarette manufacturers as has happened in Canada accompanying the tax and price increases in the 2000 s.

This result also implies that increasing the price of discount brands relative to the price of premium brands induces smokers to trade up to premium brands, as standard economic theory would suggest that choices are made based on relative prices. This finding stands in contrast with the conventional wisdom about the compensatory behaviour of smokers that higher tax and price would induce smokers to switch to discount brands as a price-minimising strategy.[2–10] In countries, such as the USA and Canada, where taxes are specific and the same per unit tax applies to all brands, a given increase in the tax and a full pass-through of the tax increase to price would raise the price of discount brands relative to premium brands. The estimated model of choice of brand predicts that this would reduce the smoking of discount brand cigarettes and create an incentive to switch from discount to premium brands. Indeed, this has been the case in the USA where specific tax increases reduced the market share of generic (lower-priced) brands significantly in the 1980s and 1990 s.[29] Upward switching has not previously been seen as a possible response to higher prices, but the present model shows that upward switching naturally follows from the consideration of the change in the price ratio rather than change in average price, and that this phenomenon would be expected to occur under specific tax regimes rather than under ad valorem tax regimes, where an increase in base price does not change the price ratio.

One data limitation of the analysis undertaken in this article is that the smokers of premium brands do not report the market price they face for discount brands and vice versa. This has led

Table 5 Marginal effects from the logit model of probability of using discount brand cigarettes in Canada and the USA, 2002–2005

Dependent variable: uses discount brand cigarettes=1 premium brand cigarettes=0	Canada		The USA	
	Model 1	Model 2	Model 1	Model 2
Ratio of discount brand to premium brand price (self-reported price of used brand)	-0.180***		−0.202***	
	(−3.42)		(−5.48)	
Ratio of discount brand to premium brand price (imputed price of used brand)		−0.782**		−0.308
		(−3.08)		(−1.83)
Household income				
$10 000–$29 999	0.0105	0.00802	−0.0625*	−0.0673**
	(0.27)	(0.21)	(−2.51)	(−2.66)
$30 000–$44 999	−0.0482	−0.0518	−0.0831**	−0.0887***
	(−1.37)	(−1.45)	(−3.24)	(−3.38)
$45 000–$59 999	−0.0573	−0.0751*	−0.140***	−0.140***
	(−1.62)	(−2.19)	(−6.54)	(−6.43)
$60 000–$74 999	−0.0490	−0.0521	−0.134***	−0.139***
	(−1.28)	(−1.35)	(−6.33)	(−6.40)
$75 000–$99 999	−0.101**	−0.113***	−0.186***	−0.190***
	(−3.14)	(−3.58)	(−11.24)	(−11.24)
$100 000–$149 999	−0.103**	−0.0999**	−0.185***	−0.193***
	(−2.84)	(−2.64)	(−11.02)	(−11.40)
$150 000 and over	−0.0906	−0.0785	−0.192***	−0.199***
	(−1.94)	(−1.47)	(−11.36)	(−11.41)
Highest level of education				
Completed high school	0.0149	0.0327	−0.00197	−0.0157
	(0.57)	(1.20)	(−0.07)	(−0.57)
Technical, trade school, community college	−0.0173	0.0000735	0.0320	0.0163
	(−0.72)	(0.00)	(1.14)	(0.57)
Some university–no degree	−0.0711*	−0.0530	0.0204	0.0161
	(−2.47)	(−1.68)	(0.56)	(0.46)
Dependent variable: uses discount brand cigarettes=1 premium brand cigarettes=0	Canada		The USA	
	Model 1	Model 2	Model 1	Model 2
Completed university	−0.0410	−0.0252	−0.0728**	−0.0888***
Degree	(−1.43)	(−0.81)	(−2.66)	(−3.32)
Postgraduate degree	−0.0991**	−0.0702	−0.0816*	−0.0857*
	(−2.84)	(−1.75)	(−2.39)	(−2.45)
Age	0.00277***	0.00296***	0.00608***	0.00627***
	(4.72)	(5.08)	(11.19)	(11.83)
Male	−0.0749***	−0.0818***	−0.0423*	−0.0457**
	(−4.43)	(−4.91)	(−2.52)	(−2.79)
White, English only	0.114***	0.108***	0.108***	0.107***
	(5.02)	(4.83)	(5.57)	(5.63)
Married, cohabitating	0.0361*	0.0496**	0.0574***	0.0599***
	(2.06)	(2.86)	(3.33)	(3.39)
Received tobacco industry promotions	0.164***	0.163***	−0.0200	−0.0250
	(8.58)	(8.82)	(−1.30)	(−1.58)
Year 2003	0.0166	0.00589	0.0183	0.0191
	(1.13)	(0.40)	(1.58)	(1.69)
Year 2004	0.185***	0.121***	0.0331*	0.0333*
	(9.99)	(3.94)	(2.17)	(2.18)
Year 2005	0.232***	0.164***	−0.0263	−0.0225
	(10.13)	(4.65)	(−1.47)	(−1.26)
Observations	5962	6497	6307	6898

The omitted categories include single, non-white, non-English female smokers with highest level of education below high school, household income under $10 000, those who did not receive tobacco industry promotions and observations in the year 2002.
The estimated coefficients represent marginal effects for small change in continuous variables and for discrete change in categorical variables from 0 to 1 with reference to the omitted categories.
t statistics are reported in parentheses below the coefficient estimates.
* p<0.05, ** p<0.01, *** p<0.001.

us to estimate a price equation to impute the unobservable price and then use it for the estimation of the relative price of discount to premium brand cigarettes. The ability to control for the price of discount brands for premium brand smokers and the price of premium brands for discount brand smokers depends critically on a well-specified equation imputing price. Besides, the estimated coefficient of the relative price variable differs remarkably between the two approaches we take for

estimating the price ratio. For Canada, the estimate is −0.18 when we use self-reported price of used brand in contrast to −0.782 when we use imputed price of used brand along with imputed price of the alternative brand. In case of the USA, the estimate is −0.202 when we use self-reported price of used brand, while it becomes −0.308 and statistically insignificant when imputed price of the used brand is used. Thus, the results appear to be sensitive to the use of self-reported or imputed price of the used brand in the construction of the relative price.

The second limitation is that the data available for the brand used by a smoker refer to the one they smoke more than any other. The identification of a single brand used by a smoker may not reflect the true preference pattern of a smoker if the smoker frequently switches between premium and discount brands.

Finally, the choice of the period from 2002 to 2005 is critical for the finding of the study because this is the period when Canada experienced a remarkable shift in the discount brand market share, while the US market stabilised following better enforcement of the MSA. After 2005, the shifts are not going to be as dramatic. This created a perfect experimental situation for us to test our hypothesis.

CONCLUSION

The present article underlines the significance of studying the effectiveness of tax increases in reducing overall tobacco consumption, keeping in view the effect of tax and price increases on the brand choice behaviour of smokers. Under a tax system comprised entirely of uniform specific tax, a tax increase can result in upward switching from low-priced to higher-priced brands due to a rise in the relative price of lower-priced brands. If a system comprised entirely of ad valorem tax, then an increase in the tax rate would maintain the same relative prices and would have no impact on brand choice, all else remaining the same. If the tax system is a mix of ad valorem and specific taxes, the price gap is larger in countries that rely more heavily on ad valorem tax.[30] Under this system, the price gap still narrows a bit as the tax goes up, due to the specific component, and creates incentive to switch upwards. Evidence from European Union countries suggests that under a more complicated tiered system, there is a potential for the price gap to increase as taxes increase, for example, when the rates at the top end rise by relatively more than on the bottom end. While focusing on the implications for the specific tax regime in force in the two countries included in the present study, this article points to the need for similar research in countries with ad valorem, mixed or more complicated tax structures.

What this article adds

- This article investigates the choice by smokers of premium and discount brand cigarettes in response to tax and price increases based on a model that focuses on the behavioural impact of the price ratio of discount to premium brands. We estimate the model using longitudinal data from representative samples of smokers in Canada and the USA. This model explains why an increase in the tax rate and price that raises the relative price of discount brands may result in upward switching from discount to premium brands as happened in the USA during the 1990 s, or conversely, why the share of discount brand cigarettes increased in Canada in response to declining relative price of discount brands during 2002–2005. Upward switching has not previously been seen as a possible response to higher prices, but the present model shows that upward switching naturally follows from the consideration of the change in the price ratio rather than change in average price, and that this phenomenon would be expected to occur under specific tax regimes rather than under ad valorem tax regimes, where an increase in base price does not change the price ratio.

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低价品牌卷烟的选择：国际烟草控制政策评估项目加拿大和美国调查（2002-2005）的比较分析

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摘要

背景 增加烟草税以提高卷烟价格已被证明是烟草控制的一个有效策略。本文研究了为了应对税收和价格上涨，吸烟者如何选择低价与高端品牌卷烟。

目的 评估增税如何影响吸烟者对低价品牌与高端品牌的选择。

方法 采用国际烟草控制政策评估项目（ITC）加拿大和美国的调查数据，控制个体的人口学和社会经济学方面的特征以及区域效应，我们构建了一个logit模型，以评估吸烟者在低价品牌与高端品牌的相对价格发生变化时，选择低价品牌卷烟的可能性。在随机效应回归模型中，我们采用吸烟者个人的自报价格作为价格变量，并在logit模型中为每个吸烟者构建低价品牌与高端品牌的价格比率。

结果 低价品牌卷烟价格与高端品牌价格的比率每上涨0.1，选择低价品牌的可能性在加拿大下降0.08，但在美国并未观察到显著效应。

结论 该模型的结果解释了两种现象：（1）2002-2005年间，高端品牌卷烟与低价品牌卷烟的价差增大，加拿大低价品牌卷烟市场份额增大，而同期美国则变化不大；（2）低价品牌相对于高端品牌价格比率增加——该现象发生在从量消费税提高时——可能导致吸烟者由吸低价品牌转而吸高端品牌卷烟，而不是反之。这些结果强调，研究提高税率，特别是从量消费税率，对能否有效降低烟草总消费量十分重要。

前言

税收作为烟草控制最有效策略之一的重要性及其作为一项公共卫生政策在预防烟草相关疾病和死亡方面所彰显的价值已被人们普遍认同[1,2]。提高税收可提高卷烟的零售价格，而价格上涨已被证明会促使一些吸烟者戒烟，降低不吸烟者开始吸烟的可能性以及减少继续吸烟者的平均烟草消费量[3]。

然而，吸烟者在面对价格上涨时会采取补偿行为以维持对烟草产品的购买力，所以对烟草产品征税可能不会像所预期的那样有效抑制烟草消费。在文献中，对吸烟者补偿行为的研究已经涉及到各种不同改变吸烟方式的行为，例如通过吸食焦油和尼古丁含量更高、更耐用的卷烟[4]，用廉价烟草产品替代[5-13]，购买税率低或免税来源的卷烟[14]，或者转为吸自卷香烟或低价品牌卷烟等[14-17]。上述补偿行为会降低我们所预期的烟草消费减少量，相应地，会抑制税收所致的价格上涨对加强公众健康的影响。例如，一项关于中国吸烟者的研究证实，选用较便宜卷烟的吸烟者其戒烟意愿较低，也就意味着吸烟者对价格的敏感性较低[18]。

采用2002-2005年国际烟草控制政策评估项目（ITC）加拿大和美国最初4轮调查的数据，本文将卷烟分为低价品牌和高端品牌两类，进而考察这两个国家的吸烟者对上述两类品牌的选择行为。本文研究目的是了解这两类品牌相对价格的变化如何影响吸烟者选择价格较低的低价品牌。通常认为，为补偿税收和价格上涨，吸烟者会转向选择低价品牌卷烟。然而，事实并非如此。如果税收和价格上涨导致高端品牌的相对价格下降，吸烟者将会转向选择高端品牌。上述现象发生在从量税收制度下，表现为税收增加时各品牌价格上涨同样的价格，从而导致高端品牌的相对价格降低。本文旨在通过加拿大和美国的数据，验证该假设的有效性。

方法

数据描述

分析数据来源于2002-2005年间在加拿大和美国实施的四轮ITC项目调查。这是一项纵向调查，在每个国家选择超过2000名有代表性的成年吸烟者（18周岁及以上），按照随机方法进行电话调查。两个国家使用相同的调查问卷，使得两国间可以进行变量比较分析。ITC项目调查中使用的分析方法详见Thompson等[19]人的研究。

收集到的吸烟者个体数据包括卷烟日均消费量、卷烟品牌、购买来源与规格、购买单位（散装、包或条）的价格、折扣券的使用、家庭收入、教育水平、年龄、性别以及居住地（州、省等）。购买每包或每条卷烟的价格除以每单位的卷烟数量，换算成每支卷烟的价格。通过使用经济合作与发展组织的统计数据得出的消费者价格指数（CPI），我们将2002年、2003年和2004年报告的价格根据通货膨胀进行调整，换算成每个国家2005年的价格。

根据市场上所售卷烟的厂商分类，将两国吸机制卷烟者报告的卷烟品牌划分为“高端品牌”和“低价品牌”两类。大多数信息通过烟草公司在各自网站上发布的文件和广告获得。这些品牌全部列在表1中。4次调查的混合数据中所有分析用到的变量的描述性统计结果见表2。

卷烟价格与品牌

图1和图2分别展示加拿大和美国两国参与ITC项目调查的吸烟者，其报告的每支高端品牌卷烟与低价品牌卷烟的平均价格随时间的变化趋势。由图1可知，加拿大的价差随时间扩大，从2002年的每支4美分增加到2005年的每支6美分，进而导致低价品牌卷烟较高端品牌卷烟的价格比率下降。2006年，加拿大卫生部的统计数据显示，低价品牌卷烟的价格不足10-20美元/条或1.25-2.50美元/包，也就是说，规格25支/包的卷烟，其每支价格为5-10美分。与此相反，美国低价品牌卷烟与高端品牌卷烟的价格在此期间内呈收敛趋势，如图2所示。

ITC项目调查结果显示，加拿大低价品牌卷烟消费量占机制卷烟的比例自2002年的17.6%上升到了2005年的42.2%。相比之下，美国低价品牌卷烟的消费量份额自2002年的30.7%下降到了2005年的29.8%。调查期间，加拿大和美国每年高端品牌与低价品牌的消费量份额分别见图1和图2的第二纵坐标。基于Euromonitor International Ltd的数据分析，加拿大低价品牌卷烟市场份额的上升趋势以及美国的下降趋势一直持续到2011年，分别见图3、图4所示。

在2003年以前，加拿大低价品牌卷烟的市场被24个小烟草公司占据，这些小公司生产成本低，其卷烟零售价格低于主导厂商所经销的高端品牌。2001年，低价机制卷烟的总市场份额仅为2%，到2002年时已上升到12%[21]。另有消息称，低价品牌卷烟的市场份额要略低，2002年底约为8%[22]。在此期间，小制造商生产的卷烟不断增加。这可以从最大的小制造商，Grand River Enterprises (GRE)，所生产的卷烟数量中明显观察到。GRE在2001年1月份的产量为4500箱，2002年1月份为10200箱，2003年为25600箱即2.5亿支卷烟[21]。

为了应对小卷烟公司市场份额的增加，加拿大的大生厂商们开始生产低价品牌。在2003年2月份，Rothmans和Benson & Hedges公司将他们名为 Number 7的卷烟品牌的价格降到了1美元，同年，该卷烟品牌的市场份额占到机制卷烟的5.8%[23]。Imperial和JTI-Macdonald在18个月内迅速研发出了自身的低价品牌。总体而言，加拿大低价卷烟的市场份额自2003年的10%大幅上升到2005年的40%[24]。根据“加拿大烟草使用监测调查（2005）”结果，调查前6个月内购买低价品牌的吸烟者比例为36%[25]。

早在20世纪八、九十年代，随着低价及廉价品牌卷烟的出现和流行以及价格促销活动的增多，美国卷烟市场在机制卷烟市场构成方面经历了巨大变化[15,26]。在20世纪八十年代早期，低价卷烟的市场份额几乎为零，到1993年初增加到40%左右，之后1997年下降到27%[27]。ITC项目数据显示，这一份额直到2005年才超过30%。

表1 加拿大和美国机制卷烟的高端品牌与低价品牌分类清单

国家	高端品牌	低价品牌
加拿大	Accord, American, Avanti, Belmont, Belvedere, Benson & Hedges, Black Cat, Camel, Cameo, Captain Black, Craven A, Craven M, Drum, Du Maurier, Dunhill, Export A, Gauloise, Golden Leaf, Kool, Macdonald, Marlboro, More, PeterStuyvesant, Player’s, Premium, Rothman’s, Salem, Sportsman, Supreme, Sweet Caporal, Vantage, Viscount, Vogue, Winston	Advantage, Baileys, Bronco, Canadian Classics, Celesta, Colts, Daily Mail, Daker, DK’s, Gipsy, John Players Special (JPS), Legend, Mark Ten, Matinee, Maximum, Medallion, Number 7, Peter Jackson, Podium, Putters, Rockport, Smoking, Smokin’ Joes, Sobranie, Studio, Tabec, Trad A, Tremblay, Unify
美国	Accord, American Spirit, Barclay, Belair, Benson & Hedges, Camel, Capri, Carlton, Century, Chesterfield, Commander, Djarum, Dunhill, Eve, Export A, Gitanes, Jade, Kamel, Kent, Kool, L & M, Lark, Lucky Strike, Marlboro, Max, Merit, More, Nat Sherman, Natural American Spirit, Newport, Now, Pall Mall, Parliament, Philip Morris, Players, Quest, Raleigh, Rothman, Salem, Sampoerna, Saratoga, Satin, State Express 555, Tareyton, Triumph, True, Vantage, Virginia Slims, Winston	1st class, Alpine, Austin, Bailey, Basic, Best Buy, Best Value, Black & White, Bonus Value, Braves, Bridgeport, Bridgeton, Bristol, Bronco, Bronson, Bucks, Buffalo, Calon, Cambridge, Carnival, Century, Chancellor, Champion, Checkers, Cherokee, Cheyenne, Cimarron, Covington and Jasmine, CT, Decade, Desert Sun, Doral, Double Diamonds, Eagle, Epic, Exact, Export, Forsyth, Generic, Gold Coast, GPC, Grand Prix, Gsmoke, GT One, Gunsmoke, Harper, Homer, Kentucky’s Best, Kingsley, Kingsport, Kingston, Legend, Lewiston, Liggett, Mack, Magna, Main Street, Malibu, Marathon, Market, Maverick, Melbourne, Miss Diamond, Misty, Monarch, Mond International, Money, Montclair, Moves, Native, Natural, Natural Blend, New, Niagara’s, Old, Old Gold , Opal, Pall Mall Generic, Parker, Poker, Prime, Primo, Private Stock, Pyramid, Rainbow, Raleigh Extra, Richland, Riviera, Rodeo, Roger, Ropers, Sabre, Seneca, Shield, Silver, Sincerely Yours, Sixty Ones, Skydancer, Smokin Joes, Sonoma, Special, Sport, Sterling, Storm, Summit, Sundance, Tacoma, The Brave, Tracker, Tucson, Unify, US-1, USA, USA Gold, Value Buy, Value Pride, Viceroy, Wave, Westport, Yours

信息来源：作者根据烟草制造商的网站资料编辑

表2 2002–2005年加拿大与美国样本特征统计量概况

	加拿大	美国
每日吸烟数量	16.03	17.78
吸低价品牌的吸烟者比例	26.35	27.20
每支卷烟的报告价格(2005美元)	0.34	0.17
低价品牌/高端品牌	0.87	0.75
接受过烟草公司促销活动的吸烟者比例	21.17	71.34
不同家庭收入群体中的吸烟者比例		
低于10,000美元	5.70	10.05
10,000-29,999美元	23.04	27.67
30,000-44,999美元	20.66	21.01
45,000-59,999美元	18.23	17.00
60,000-74,999美元	11.88	9.24
75,000-99,999美元	11.37	8.35
100,000-149,999美元	6.59	4.49
150,000美元及以上	2.52	2.20
吸烟者的最高受教育程度比例		
小学、中学	15.08	10.15
高中毕业	29.56	32.35
技校、中专、社区大学	32.01	32.65
大学未毕业	8.74	10.03
大学毕业	11.43	10.66
研究生学位	3.18	4.16
吸烟者的平均年龄（年）	42.71	44.21
男性吸烟者比例	44.87	42.19
白人吸烟者比例	92.00	83.36
已婚或同居吸烟者的比例	54.41	48.23
观察期间每年的吸烟者比例		
2002年	31.84	32.41
2003年	21.00	19.04
2004年	25.28	26.18
2005年	21.89	22.37
不同居住地（省/地区）的吸烟者比例		
省 加拿大	地区	美国
Newfoundland and Labrador 1.67	New York	6.55
Prince Edward Island 0.44	Pennsylvania	5.07
Nova Scotia 3.22	North-east	7.31
New Brunswick 1.88	Illinois	3.71
Quebec 21.05	Michigan	3.05
Ontario 40.95	Ohio	4.45
Manitoba 4.24	Mid-west	13.36
Saskatchewan 3.39	Florida	4.85
Alberta 10.08	Texas	5.66
British Columbia 13.08	South	23.57
	California	9.77
	West	12.66

信息来源： ITC项目加拿大与美国调查（2002-2005）

在本研究观察期（2002-2005年）内，美国对《Master Settlement Agreement （MSA）（1998）》的部分条款进行了一系列补充，以应对未签署MSA生产商(NPM)市场份额的增加。尽管MSA条款使NPMs的成本优势不那么显著，但MSA的漏洞及NPMs不遵守协议内容，仍使NPMs相对签署协议的公司有较大的成本优势，这使得前者的价格明显低于后者。通过补充立法加强MSA规章的实施，在一定程度上约束了NPMs的违规行为，促使20世纪初高端品牌与低价品牌卷烟间的价差趋向稳定[27]。然而，在随后二十年间，卷烟的市场份额发生了逆转，低价品牌减少而高端品牌增多，这很大可能是2009年4月联邦卷烟税大幅增加的结果。

随着加拿大低价品牌卷烟市场份额的增加，大批使用高端品牌卷烟的吸烟者转而购买低价品牌。这种现象在表3报告的连续两轮ITC项目调查中吸烟者最近一次购买卷烟品牌的联合分布中清晰可见。2002年那些声称购买过高端品牌卷烟的吸烟者中，有5.3%在2003年转而购买低价品牌，这一比例在2004年为21.7%，2005年为28.2%。类似地，我们发现，在2003年购买过高端品牌卷烟的吸烟者中，有20%的人在2004年转而购买低价品牌，到2005年该比例为26.6%。在2004-2005年，10.9%的吸烟者由购买高端品牌转为低价品牌。这些研究结果说明，低价品牌卷烟在2003-2005年间处于上升高峰期。在美国，由高端品牌转为低价品牌的吸烟者比例稳定在3-5%，但这一现象并不比由低价品牌转为高端品牌的现象更普遍。

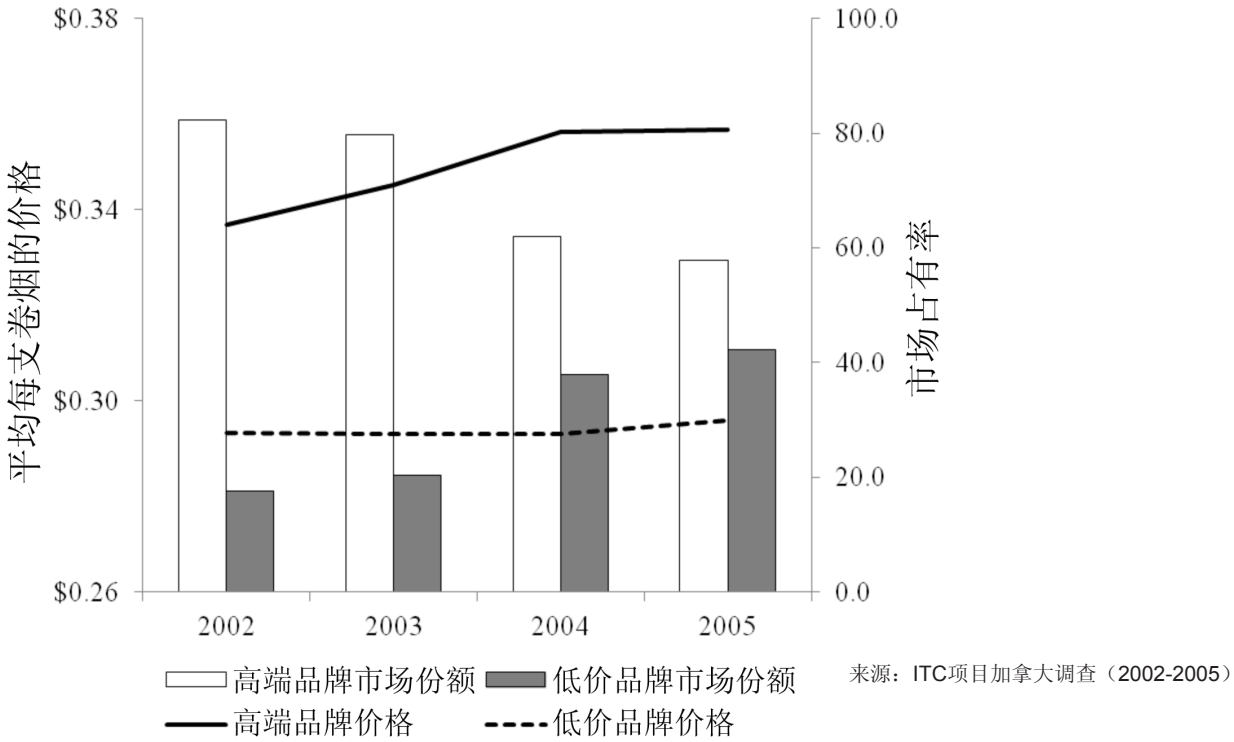
卷烟品牌选择模型

一个人决定开始吸烟后，她或他就要决定选择何种品牌的卷烟。选择的依据在于品牌的相对价格以及自身的人口学和社会经济学特征，因为正是这些依据决定了个人对产品价格（高或低）和产品质量的偏好。个体也可能对烟草公司某种品牌的促销活动作出反应。此外，受时尚、新品牌进入市场、市场集中度增加等影响，个体对特定品牌的偏好可能随时间变化。对于在第t年调查的一个随机个体i，我们可以用下列logit方程来表示其卷烟品牌的决定：

$$\Pr[B_{it}=1]=\frac{1}{1+\exp[-(X'_{it}\beta+e_{it})]} \qquad (1)$$

注意：如果吸烟者购买低价品牌卷烟，则B=1；反之，购买高端品牌，则B=0。X为可观测的解释变量（即自变量）向量，β为X的回归系数的向量，e代表影响品牌选择中不可观测的随机变量。方程（1）也可以写做选择低价品牌和选择高端品牌的几率比的log回归形式，如下：

$$\begin{aligned}&\beta_1 \text{ 低价品牌对高端品牌的相对价格}\\&+\sum_j \beta_{2j} \text{ 家庭收入群体 } (j)\\&+\sum_l \beta_{3l} \text{ 最高受教育程度 } (l)\\&+\beta_4 \text{ 年龄} + \beta_5 \text{ 男性} + \beta_6 \text{ 白人}\\&+\beta_7 \text{ 已婚}\\&+\beta_8 \text{ 接受过烟草公司促销活动}\\&+\sum_k \beta_{9k} \text{ 年份 } (k) + e_i\end{aligned} \qquad (2)$$

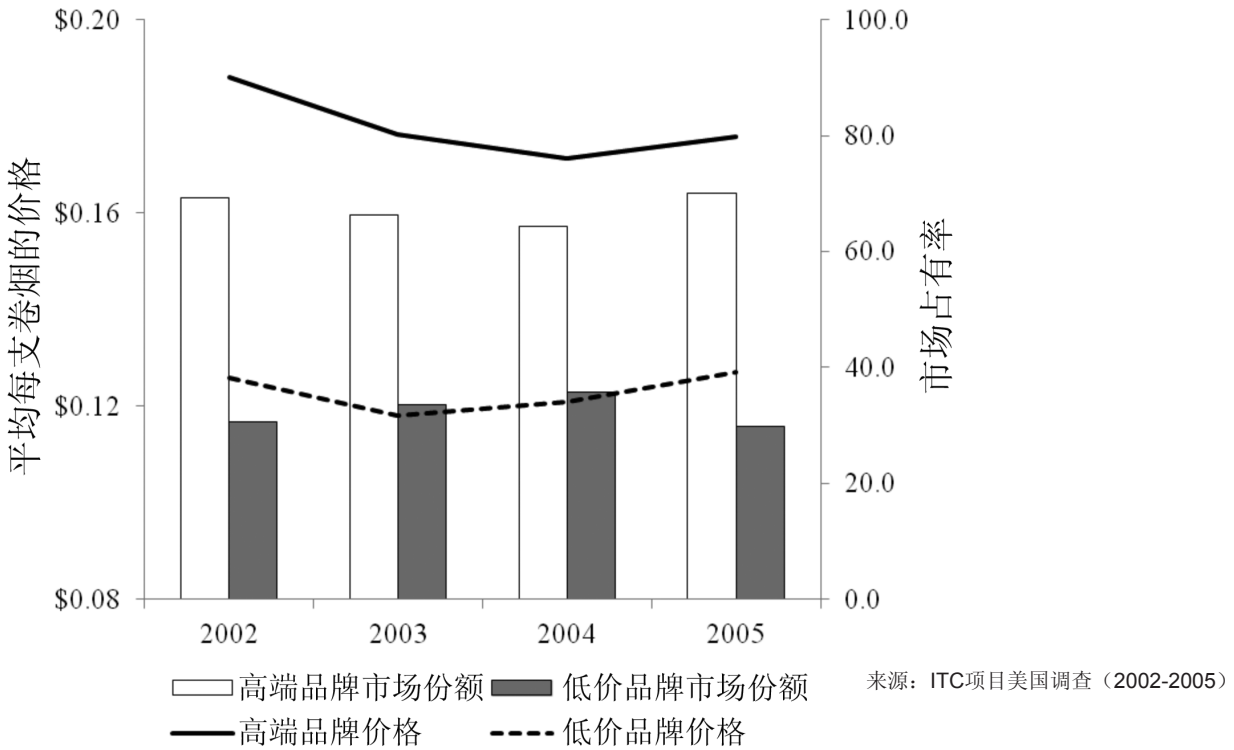


来源：ITC项目加拿大调查（2002-2005）

图1 加拿大高端品牌卷烟与低价品牌卷烟消费量的市场份额和购买单支卷烟的平均价格（2005年，CAD）（2002-2005）

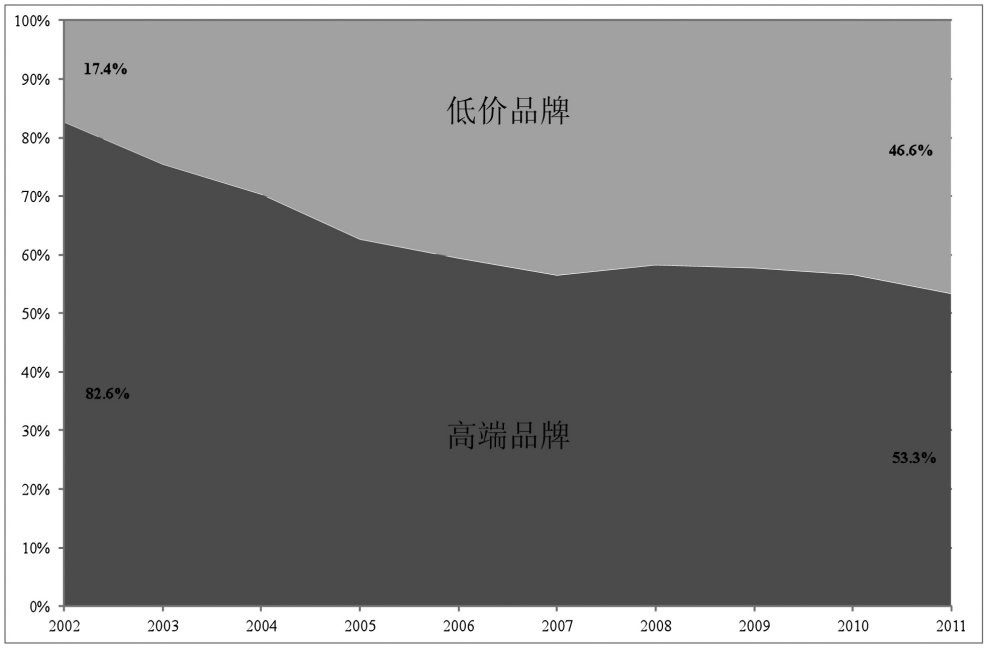
估算方程（2）时，我们没有对个体的固定效应加以控制，因为短期内特定个体面对的实际价格变量不会变化太大。这使得价格对品牌选择固定效应的估计在统计上不显著。然而，我们把个体多个观察值作为集群，来调整估计值的标准误差，使其适应个体水平误差项的相关性。

在方程2中，我们对低价品牌和高端品牌卷烟的相对价格变化对品牌选择的边际影响尤其感兴趣。我们预期如果低价品牌的相对价格上升，那么选择低价品牌的概率就会下降。假定吸烟率不变，那么选择高端品牌的概率会增加，也就是说，更多的吸烟者会选择更高一档次的高端品牌卷烟。



来源：ITC项目美国调查（2002-2005）

图2 美国高端品牌卷烟与低价品牌卷烟消费量的市场份额和购买单支卷烟的平均价格（2005年，USD）（2002-2005）



来源：WHO数据库

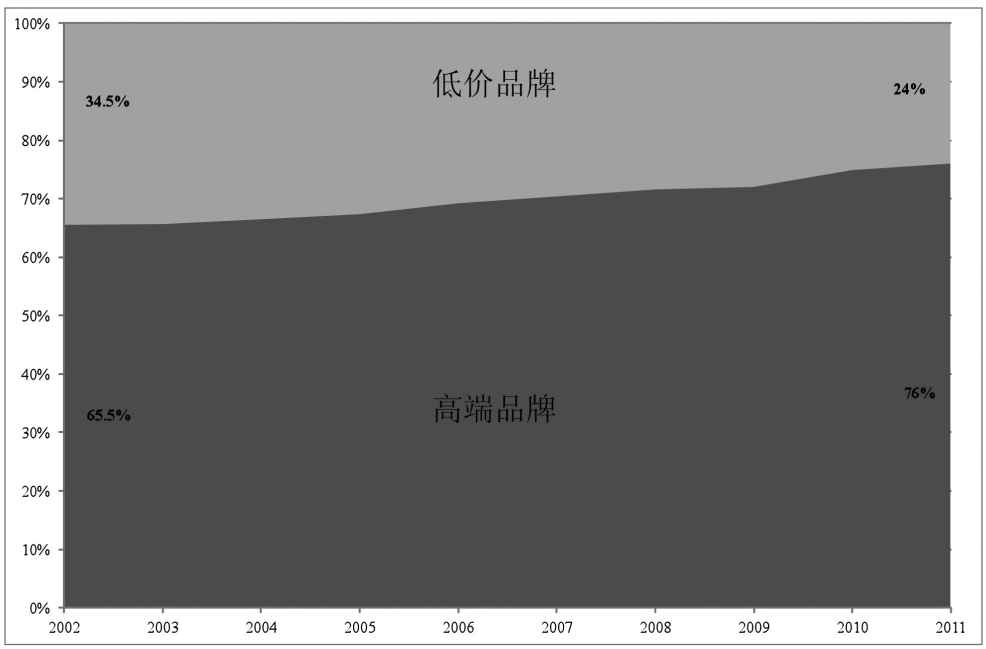
图3 加拿大高端品牌卷烟与低价品牌卷烟的市场份额（2002-2011）

在计算价格比率时，采用某种品牌的自报价格及其替代品牌的输入价格。比如，对于低价品牌吸烟者，高端品牌的价格采用高端品牌吸烟者提供的信息加以估算；对高端品牌吸烟者，低价品牌的价格采用低价品牌吸烟者提供的信息来估算。低价品牌与高端品牌的价格基于低价品牌与高端品牌吸烟者的相关信息，我们根据下列线性回归方程来分别估算低价品牌和高端品牌的价格：

$$P_{it} = X'_{it}\beta_0 + RES'_{it}\delta + a_i + u_{it} \qquad (3)$$

其中，P指购买每包卷烟的自报价格；X与方程（1-2）中的解释变量相同；RES代表吸烟者居住地的分类变量；a代表自报价格中与个体其他特征不相关的特定随机误差部分；u代表决定价格的随机且不可观测的干扰项。

在方程（3）中，随机效应a控制着各种来源的报告偏差（如回忆偏差）。假定报告偏差随时间变化而保持不变，即低估（高估）支付价格的个体在不同时间的重复观察中系统地低估（高估）了价格。为了消除报告偏差，我们使用方



来源：WHO数据库

图4 美国高端品牌卷烟与低价品牌卷烟的市场份额（2002-2011）

表3 加拿大与美国连续2轮调查中购买不同卷烟品牌的吸烟者比例（2002-2005）

	加拿大			美国		
	2003 年			2003 年		
2002年购买过的卷烟品牌	高端品牌	低价品牌	合计	高端品牌	低价品牌	合计
高端品牌	75.8	5.3	81.1	62.2	4.3	66.5
低价品牌	3.1	15.8	18.9	3.8	29.7	33.5
合计	78.9	21.1	100.0	66.0	34.0	100.0
2002	2004			2004		
	高端品牌	低价品牌	合计	高端品牌	低价品牌	合计
高端品牌	56.9	21.7	78.6	59.4	5.2	64.6
低价品牌	2.5	18.9	21.4	4.7	30.6	35.3
合计	59.5	40.5	100.0	64.1	35.9	100.0
2002	2005			2005		
	高端品牌	低价品牌	合计	高端品牌	低价品牌	合计
高端品牌	52.9	28.2	81.1	62.0	5.1	67.1
低价品牌	2.1	16.8	18.9	5.4	27.6	32.9
合计	55.0	45.0	100.0	67.4	32.6	100.0
2003	2004			2004		
	高端品牌	低价品牌	合计	高端品牌	低价品牌	合计
高端品牌	59.0	20.0	79.0	60.8	3.3	64.1
低价品牌	2.3	18.7	21.0	2.9	33.0	35.9
合计	61.3	38.7	100.0	63.7	36.3	100.0
2003	2005			2005		
	高端品牌	低价品牌	合计	高端品牌	低价品牌	合计
高端品牌	54.2	26.6	80.8	63.2	4.4	67.6
低价品牌	2.8	16.4	19.2	3.2	29.2	32.4
合计	57.0	43.0	100.0	66.4	33.6	100.0
2004	2005			2005		
	高端品牌	低价品牌	合计	高端品牌	低价品牌	合计
高端品牌	52.4	10.9	63.3	62.2	3.3	65.5
低价品牌	5.5	31.2	36.7	4.8	29.7	34.5
合计	57.9	42.1	100.0	67.0	33.0	100.0

上述比例考虑了两轮调查中每人每日烟草消费量的加权平均值，并依据省（加拿大）或州（美国）等整群调查设计做了相应调整。

数据来源：ITC项目加拿大与美国调查（2002-2005）

程（3）中已用品牌和替代品牌的估算价格构建价格比率。因此，我们使用方程（2）对品牌选择用两种方法进行估计：一种是用已用品牌的自报价格和替代品牌的估算价格构建价格比率，另一种是用已用品牌和替代品牌的估算价格构建价格比率。正式说来，第一种价格比率的衡量方法如下：

价格比率（低价品牌使用者）=
　　低价品牌自报价格/高端品牌估算价格
价格比率（高端品牌使用者）=
　　低价品牌估算价格/高端品牌自报价格

第二个价格比率的计算方法如下：

价格比率（低价品牌使用者）=
　　低价品牌估算价格/高端品牌估算价格
价格比率（高端品牌使用者）=
　　低价品牌估算价格/高端品牌估算价格

需要指出的是，品牌选择和自报价格均可能受第三种变量，即卷烟质量的影响。如果不能控制这种不可观测的因素，可能会引入相对价格的内生性，使估计系数产生偏差。第二种价格比率的衡量方法是基于已用品牌和替代品牌的估算价格，这可以解决这种可能的内生性偏差。

研究结果

卷烟价格

价格方程（2）采用随机效应方法，对高端品牌卷烟和低价品牌卷烟进行了估计。加拿大和美国的比较结果见表4价格比率=低价品牌价格/高端品牌价格（其中两种价格均为表4中的价格估计方程的预测结果），其均数和变化范围在加拿大和美国分别为0.88/（0.73，1.06）和0.74/（0.45，1.03）。

卷烟品牌的选择性

吸烟者选择低价品牌还是高端品牌卷烟，其概率很大程度上受低价品牌卷烟较高端品牌的相对价格影响，见表5中加拿大和美国的模型1。在采用已用品牌的预测价格取代自报价格构建价格比率（模型2）时，估计结果显示，在加拿大，低价品牌较高端品牌的价格比率对选择低价品牌概率的负效应绝对值较大。与模型1相比，模型2中的估计值较大，很可能源于对模型1中已用品牌的自报价格变量进行内生性偏差的校正。然而，两模型中的估计系数在美国没有统计显著性。

表4　加拿大与美国高端品牌与低价品牌卷烟价格方程的随机效应估计（2002-2005）

	加拿大		美国	
	高端品牌	低价品牌	高端品牌	低价品牌
家庭经济收入				
▶ 10,000-29,999美元	0.00264	0.0105	-0.00385	0.00378
	(0.70)	(1.51)	(-1.23)	(1.22)
▶ 30,000-44,999美元	0.00351	0.0131	-0.00257	0.00706*
	(0.91)	(1.85)	(-0.79)	(1.98)
▶ 45,000-59,999美元	0.00410	0.00662	0.000209	0.00471
	(1.02)	(0.80)	(0.06)	(1.19)
▶ 60,000-74,999美元	0.00552	0.0124	0.00325	0.0109*
	(1.32)	(1.61)	(0.88)	(2.08)
▶ 75,000-99,999美元	0.00712	0.00639	-0.00147	0.0108*
	(1.76)	(0.77)	(-0.39)	(2.02)
▶ 100,000-149,999美元	0.00407	0.0172*	-0.000613	0.0128
	(0.89)	(2.01)	(-0.14)	(1.55)
▶ 150,000 美元及以上	0.00291	0.0370**	0.00601	-0.0210
	(0.41)	(2.60)	(0.97)	(-1.33)
最高学历				
▶ 高中毕业	0.000208	0.00811	0.00487	-0.00337
	(0.08)	(1.73)	(1.81)	(-0.80)
▶ 技校、贸易学院、社区大学	0.000273	0.00798	0.00544*	-0.00273
	(0.11)	(1.63)	(1.96)	(-0.66)
▶ 大学未毕业	0.00555	0.0128	0.00379	-0.000587
	(1.74)	(1.80)	(1.15)	(-0.11)
▶ 大学毕业	0.00551	0.0152**	0.00576	-0.00568
	(1.62)	(2.69)	(1.70)	(-0.93)
▶ 研究生	0.0109**	0.0179	0.0166***	0.000354
	(2.64)	(1.46)	(3.58)	(0.04)
年龄	-0.000562***	-0.000347**	-0.000464***	-0.000360***
	(-9.38)	(-3.00)	(-8.27)	(-4.15)
男性	0.00279	-0.000860	0.000724	-0.00130
	(1.68)	(-0.28)	(0.46)	(-0.54)
白人，语言仅限英语	0.00808*	0.00898	-0.0185***	-0.0160***
	(2.30)	(0.98)	(-8.92)	(-4.17)
已婚或同居	-0.00408*	-0.00212	-0.00631***	-0.00119
	(-2.36)	(-0.65)	(-3.93)	(-0.48)
	加拿大		美国	
	高端品牌	低价品牌	高端品牌	低价品牌
接受过烟草公司的促销活动	-0.00469**	-0.00425	-0.00668***	0.000586
	(-2.64)	(-1.89)	(-4.54)	(0.34)
2003年	0.00776***	-0.0000475	-0.0116***	-0.00705***
	(6.02)	(-0.02)	(-8.22)	(-4.60)
2004年	0.0222***	-0.0109***	-0.0142***	-0.00630**
	(13.14)	(-3.57)	(-8.99)	(-3.20)
2005年	0.0221***	-0.0142***	-0.00937***	0.000726
	(11.10)	(-4.27)	(-5.10)	(0.34)

(表4 接上页)

	加拿大		美国	
	高端品牌	低价品牌	高端品牌	低价品牌
居住地省（加拿大）/州（美国）的固定效应				
Prince Edward Island/Pennsylvania	-0.00745	0.00794	-0.0380***	0.00554
	(-0.79)	(0.63)	(-6.40)	(0.47)
Nova Scotia/North-East	-0.0275***	-0.0243**	-0.00195	0.0236
	(-4.07)	(-2.63)	(-0.31)	(1.83)
New Brunswick/Illinois	-0.0532***	-0.0466***	-0.0349***	-0.00497
	(-6.35)	(-4.80)	(-5.17)	(-0.37)
Quebec/Michigan	-0.0937***	-0.110***	-0.0182**	0.0398**
	(-17.32)	(-13.79)	(-2.73)	(3.01)
Ontario/Ohio	-0.0876***	-0.0936***	-0.0580***	-0.0220*
	(-16.54)	(-11.70)	(-9.72)	(-1.97)
Manitoba/Mid-west	0.00381	0.0188	-0.0650***	-0.0243*
	(0.59)	(1.76)	(-11.80)	(-2.30)
Saskatchewan/Florida	0.00780	-0.00578	-0.0726***	-0.0418***
	(0.97)	(-0.51)	(-12.53)	(-3.84)
Alberta/Texas	-0.00950	-0.0247**	-0.0698***	-0.0366***
	(-1.66)	(-2.79)	(-11.73)	(-3.41)
British Columbia/South	-0.0143*	-0.00880	-0.0805***	-0.0405***
	(-2.49)	(-1.04)	(-14.80)	(-3.89)
/California			-0.0345***	-0.00171
			(-6.07)	(-0.16)
/West			-0.0451***	-0.00425
			(-7.65)	(-0.39)
观察时间	4387	1575	4575	1730

已省略的类别包括单身非白人、非英语女性吸烟者、最高学历高中以下、家庭收入低于10000美元、在2002年未接受过任何烟草公司促销活动者、居住在加拿大Newfoundland和Labrador省和美国纽约地区者。
估计系数代表连续变量细微变化的边际效应，分类变量从0到1的离散变化的边际效应，以省略的变量为参照基准。
t统计量在系数估计下的括号里报告。
*p<0.05, **p<0.01, ***p<0.001。

为了理解价格比率的估计系数的意义，假定每包高端品牌卷烟的最初成本为7美元，低价品牌为6美元，那么低价品牌较高端品牌的价格比率为0.857（=6/7）。如果每包的从量税增加1美元，税收完全转嫁给消费者，那么每包高端品牌卷烟的新价格变为8美元，低价品牌为7美元，此时价格比率增加为0.875（=7/8）。考虑到加拿大价格比率的系数为-0.782，价格比率由0.857上涨到0.875的效应为−0.782×(0.875–0.857)=−0.014。这意味着从量消费税每增加1美元，选择低价品牌卷烟的概率将下降1.4%，即低价品牌吸烟者转而选择高端品牌。

低价品牌卷烟较高端品牌卷烟价格比率的变化对选择低价品牌卷烟的概率有负效应，这意味着由于消费税在所有品牌中统一增加，高端品牌价格与低价品牌价格之间的价差比率缩小。因此，购买低价品牌卷烟的相对获利变少，促使吸烟者选择高端品牌的几率高于低价品牌。这一发现符合瑞士联合银行（UBS）投资研究部近期的报告结果，即由于价差比率缩小，美国州消费税率的增加导致高端品牌的市场份额增加[28]。根据这一报告，在每包卷烟消费税最低的地区，其高端品牌和低价品牌间的平均卷烟价差最高，而高端品牌卷烟的市场份额最低。税率低于0.50美元时，平均价差为52%；税率在0.51-1.00美元时，平均价差为46%；税率在1.01-1.50美元时，平均价差为37%；税率高于1.50美元时，平均价差为27%。相应地，高端品牌的市场份额依次是80%、85%、85%和94%。

讨论

采用ITC项目在2002-2005年间对加拿大和美国进行的4轮调查数据，本文验证了低价品牌卷烟与高端品牌卷烟的相对价格在影响吸烟者选择低价品牌卷烟的作用。我们发现，低价品牌价格较高端品牌价格的比率下降，往往会增加吸烟者选择低价品牌卷烟的可能性。这一结果进一步验证了，相较于美国低价品牌卷烟市场份额维持稳定，高端品牌卷烟与低价品牌卷烟间的价差增加，是造成2002-2005年间加拿大低价品牌卷烟消费量增加的主要原因。由于选择低价品牌的吸烟者戒烟的可能性更小[15]，可以预想到卷烟品牌相对价格的变化会促使吸烟者选择低价品牌，这将导致戒烟率降低和吸烟流行率增加。因此，在21世纪早期，应像加拿大那样，支持能抑制低价品牌市场扩张的政策措施，包括抑制卷烟制造商采用相关减价策略，以及提高税收和价格。

表5 加拿大和美国选择低价品牌卷烟概率的logit模型的边际效应（2002-2005）

因变量：选择低价品牌卷烟=1，高端品牌卷烟=0	加拿大		美国	
	模型1	模型2	模型1	模型2
低价品牌/高端品牌（已用品牌自报价格）	-0.180***		-0.202***	
	(-3.42)		(-5.48)	
低价品牌/高端品牌（已用品牌预测价格）		-0.782**		-0.308
		(-3.08)		(-1.83)
家庭收入				
10,000-29,999美元	0.0105	0.00802	-0.0625*	-0.0673**
	(0.27)	(0.21)	(-2.51)	(-2.66)
30,000-44,999美元	-0.0482	-0.0518	-0.0831**	-0.0887***
	(-1.37)	(-1.45)	(-3.24)	(-3.38)
45,000-59,999美元	-0.0573	-0.0751*	-0.140***	-0.140***
	(-1.62)	(-2.19)	(-6.54)	(-6.43)
60,000-74,999美元	-0.0490	-0.0521	-0.134***	-0.139***
	(-1.28)	(-1.35)	(-6.33)	(-6.40)
75,000-99,999美元	-0.101**	-0.113***	-0.186***	-0.190***
	(-3.14)	(-3.58)	(-11.24)	(-11.24)
100,000-149,999美元	-0.103**	-0.0999**	-0.185***	-0.193***
	(-2.84)	(-2.64)	(-11.02)	(-11.40)
≥150,000美元	-0.0906	-0.0785	-0.192***	-0.199***
	(-1.94)	(-1.47)	(-11.36)	(-11.41)
最高学历				
高中毕业	0.0149	0.0327	-0.00197	-0.0157
	(0.57)	(1.20)	(-0.07)	(-0.57)
技校，职业学院，社区大学	-0.0173	0.0000735	0.0320	0.0163
	(-0.72)	(0.00)	(1.14)	(0.57)
大学未毕业	-0.0711*	-0.0530	0.0204	0.0161
	(-2.47)	(-1.68)	(0.56)	(0.46)
因变量：选择低价品牌卷烟=1，高端品牌卷烟=0	加拿大		美国	
	模型1	模型2	模型1	模型2
大学毕业	-0.0410	-0.0252	-0.0728**	-0.0888***
	(-1.43)	(-0.81)	(-2.66)	(-3.32)
研究生	-0.0991**	-0.0702	-0.0816*	-0.0857*
	(-2.84)	(-1.75)	(-2.39)	(-2.45)
年龄	0.00277***	0.00296***	0.00608***	0.00627***
	(4.72)	(5.08)	(11.19)	(11.83)
男性	-0.0749***	-0.0818***	-0.0423*	-0.0457**
	(-4.43)	(-4.91)	(-2.52)	(-2.79)
白人，英语	0.114***	0.108***	0.108***	0.107***
	(5.02)	(4.83)	(5.57)	(5.63)
已婚或同居	0.0361*	0.0496**	0.0574***	0.0599***
	(2.06)	(2.86)	(3.33)	(3.39)
接受过烟草公司促销活动	0.164***	0.163***	-0.0200	-0.0250
	(8.58)	(8.82)	(-1.30)	(-1.58)
2003年	0.0166	0.00589	0.0183	0.0191
	(1.13)	(0.40)	(1.58)	(1.69)
2004年	0.185***	0.121***	0.0331*	0.0333*
	(9.99)	(3.94)	(2.17)	(2.18)
2005年	0.232***	0.164***	-0.0263	-0.0225
	(10.13)	(4.65)	(-1.47)	(-1.26)
观察值	5962	6497	6307	6898

已省略的类别包括单身非白人、非英语女性吸烟者、最高学历高中以下、家庭收入低于10000美元、在2002年未接受过任何烟草公司促销活动者、居住在加拿大 Newfoundland和Labrador省和美国纽约地区者。
估计系数代表连续变量细微变化的边际效应，分类变量从0到1的离散变化的边际效应，以省略的变量为参照基准。
t统计量在系数估计下的括号里报告。
*p<0.05, **p<0.01, ***p<0.001。

这一结果也暗示，提高低价品牌较高端品牌的相对价格，将诱使吸烟者购买高端品牌，正如标准经济学理论所述，“选择基于相对价格”。这一发现与传统的吸烟者补偿行为的观念形成鲜明对比，后者指的是税收和价格增加将造成吸烟者转而选择低价品牌，这是一种价格最小化策略[2-10]。在像美国和加拿大这样的国家——税收是从量形式，每一品牌征收相同的单位税——税收的特定增加和税收–价格的全部转移，将增加低价品牌较高端品牌的相对价格。品牌选择的估计模型预示着上述方式将会降低低价品牌卷烟的吸烟率，促使低价品牌向高端品牌转变。实际上，这就是美国的一个案例：在20世纪八、九十年代，从量税增加使通用类（低价）品牌的市场份额显著减少[29]。低价品牌向高端品牌的转变在应对价格上涨时并非显而易见，但现有模型说明，低价品牌向高端品牌的转变遵循着价格比率的变化而非平均价格的变化，这种现象在从量税制而非从价税制下才会发生，因为从价税制下基础价格的增加不会改变价格比率。

本文研究分析的一个不足之处在于，高端品牌吸烟者没有报告低价品牌的市场价格，或者相反，低价品牌吸烟者未报告高端品牌的市场价格。因此，我们需要用估计价格方程来预测不可观测的价格，并用它来估算低价品牌卷烟较高端品牌卷烟的相对价格。对高端品牌吸烟者来说的低价品牌价格以及对低价品牌吸烟者来说的高端品牌价格的控制能力，严重依赖于特定方程的预测价格。

此外，相对价格变量的估计系数在估计价格比率的两种方法间差异较大。比如加拿大，当我们采用已用品牌的自报价格时，该估计系数为-0.18；而采用已用品牌和替代品牌的预测价格时，该系数为-0.782。在美国，当采用已用品牌的自报价格时，该系数为-0.202，而采用已用品牌的预测价格时变为-0.308且统计不显著。因此，方程结果对采用自报价格还是预测价格来构建相对价格较敏感。

第二个不足之处是，吸烟者已用品牌的可用数据指的是吸烟者经常吸的那种品牌。如果吸烟者经常在高端品牌和低价品牌间转换，那么用单一品牌便不能反映吸烟者真实的选择模式。

最后，选择2002-2005年这段时间对研究结果至关重要，因为在这期间加拿大低价品牌市场份额发生了显著转变，而美国市场由于MSA的实施加强，低价品牌的市场份额保持稳定。2005年之后，这种转变不再那么显著。这为我们验证自己的假设创造了完美的实验情形。

结论

本文强调了研究税收增加对降低烟草总消费量的有效性是十分重要的，研究考虑了税收和价格上涨对吸烟者品牌选择行为的影响。在完全由单一从量税构成的税制中，由于低价品牌相对价格上涨，提高税收会导致吸烟者由低价品牌向高端品牌转变。如果一个税收制度完全由从价税组成，那么税收增加，相对价格将保持不变，品牌选择不受影响，其他方面也维持原状。如果税收制度由从价税和从量税两者混合构成，从价税份额大的国家其价差将增大[30]。在这种税制下，随税收增加，受从量税影响，价差仍会缩窄，刺激吸烟者由低价品牌向高端品牌转变。来自欧盟国家的证据表明，在复杂的分层税制下，随着税收增加，价差有可能会扩大，比如当高价卷烟的税率比低价卷烟的税率提高更多时。本文关注的是现有研究中两国实施从量税制的影响。对实施从价税制、混合税制及更复杂税制的国家，有待相似研究来验证。

本文贡献

▶ 本文基于低价品牌较高端品牌价格比率的行为效应模型，探讨了吸烟者应对税收和价格上涨时，对高端和低价品牌卷烟的选择，并运用加拿大和美国吸烟者代表性样本的纵向数据进行了模型估计。该模型解释了为何20世纪90年代税率上涨和低价品牌相对价格的升高，可能导致美国吸烟者由低价品牌向高端品牌转变；或者，相反的，为何2002-2005年间加拿大低价品牌卷烟的市场份额会随着低价品牌相对价格的降低而增加。以往并不认为这种低价品牌向高端品牌的转变是价格上涨的结果，但现有模型说明低价品牌向高端品牌的自然转变遵循着价格比率的变化而非平均价格的变化，这种现象在从量税制而非从价税制下发生；在从价税制下，基础价格的增加不会改变价格比率。

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出处和同行审查 未开展；外部同行已评审。

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