Do Cigarette Taxes Make Smokers Happier?

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To measure how policy changes affect social welfare, economists typically look at how policies affect behavior, and use a formal model to infer welfare consequences from the behavioral responses. But when different models can map the same behavior to very different welfare impacts, it becomes hard to draw firm conclusions about many policies. An excellent example of this conundrum is the taxation of addictive substances such as cigarettes. Existing empirical evidence on smoking is equally consistent with two models that have radically different welfare implications. Under the rational addiction model, cigarette taxes make time consistent smokers worse off. But, under alternative time inconsistent models, smokers are made better off by taxes, as they provide a valuable self-control device.

We therefore propose an alternative approach to assessing the welfare implications of policy interventions: examining directly the impact on subjective well-being. We do so by matching information on cigarette excise taxation to separate surveys from the U.S. and Canada that contain data on self-reported happiness. And we model the differential impact of excise taxes on those predicted to be likely to be smokers, relative to others, in order to control for omitted correlations between happiness and excise taxation. We find consistent evidence in both countries that excise taxes make predicted smokers happier. This evidence suggests that the time inconsistent model of smoking is more appropriate, and that as a result welfare is improved by higher cigarette taxes.

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To measure how policy changes affect social welfare, economists typically look at how policies affect behavior. They then use a formal model to infer welfare consequences from the behavioral responses. The advantage of this approach is that many behaviors can be readily measured in easily available micro-data sets. The disadvantage is that the model used to make this inference is often empirically unverified. Since different models can map the same behavior to very different welfare impacts, it becomes hard to draw firm conclusions about many policies.

An excellent example of this conundrum is the taxation of addictive substances such as cigarettes. There is wide agreement that consumption of cigarette is fairly price sensitive (Chaloupka and Warner, 2001). But this fact is equally consistent with two very different models of why people smoke. Under the rational addiction model pioneered by Becker and Murphy (1988), agents decide to smoke by trading off the long-term costs of smoking against the immediate pleasures of doing so, all the while taking into account the addictive properties of nicotine. In such a model, taxes will reduce smoking but will also make smokers worse off: the price of a good that they enjoy is more expensive.

An alternative class of models suggests that smoking decisions are not made optimally. For example, in the model of Gruber and Koszegi (2001,2002), time inconsistent smokers have self-control problems: they would like to quit smoking but cannot. In this model, a rise in taxes also reduces smoking. But now the reduction in smoking makes smokers better off: the higher taxes provide a commitment device that helps them deal with their self-control problem.

These models have very different policy implications. Under the rational addiction model, the only reason to tax cigarettes is the presence of interpersonal externalities. Under the alternative time inconsistent model, optimal taxes can be quite high, even absent interpersonal externalities, due to the self-control benefits of taxation. Critically, since consumption can be

price sensitive under both models, existing evidence based solely on smoking behavior does not allow one to distinguish the correct model for welfare and policy analysis.[1]

In this paper, we go beyond the existing literature to propose a new approach. We do so by drawing on a source of data that is sometimes used in other disciplines but rarely by economists: data on self-reported happiness.[2] In principle, happiness is a direct welfare measure that can overcome the limitations of other approaches to welfare analysis of policies such as excise taxation. This measure has been repeatedly validated as a good correlate of well-being, using alternative psychological, physiological, and economic measures of well-being. Since the two models above make very different predictions of how taxes ought to affect happiness, this data allows us to distinguish between them in a way that traditional behavioral data cannot.

We use two independent data sets to examine the effect of cigarette taxes on happiness. These are the General Social Surveys (GSS) that are carried out both in the United States (since 1973) and in Canada (since 1985). Both surveys repeatedly ask a random sample of respondents to report on their well-being. In addition, the surveys also contain information on a host of other demographic variables and, in many years, on smoking behavior.

To assess the effect of taxes, we match to these surveys cigarette exercise tax data in each country. In both the US and Canada, states and provinces have independently changed their taxes over time, giving us significant variation to estimate the effect of cigarette tax changes on self-reported happiness. However, looking at how these tax changes affect happiness in the state

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1 Gruber and Koszegi (2001) lay out a possible test of time consistency using high frequency data on cigarette consumption, but this test is unlikely to be feasible given existing data.

[2]Easterlin (1974) provides an important early exception. Recent examples of work by economists using happiness data include Blanchflower and Oswald (1996), Clark and Oswald (1994), DiTella, MacCulloch and Oswald (2001) and Easterlin (1995).

or province as a whole would cause problems if other factors are changing along with these taxes. We therefore examine how tax changes differentially affect the happiness of those in a state who are predicted to be smokers. This strategy in essence uses those who are predicted to be non-smokers as a way of controlling for other shocks contemporaneous with cigarette tax changes.

Our results are striking: those who are predicted to be smokers are significantly happier when excise taxes rise. The fact that this conclusion emerges so clearly in two independent data sets, with different distributions of underlying happiness indicators, is quite striking. In both countries, the estimated effects appear surprisingly large. This evidence is very robust to a battery of specification checks across both countries. And our findings are inconsistent with two alternative explanations for our results, interpersonal externalities within the family, and long run impacts of taxes in a time consistent setting. Overall, our findings are consistent with time inconsistent models of smoking and provide some evidence that cigarette taxes may serve to actually increase the welfare of smokers themselves.

Our paper proceeds as follows. In Part I, we discuss the alternative predictions for the impact of cigarette taxes on happiness, the models that underlie those predictions, and the importance of assessing the impact of cigarette taxation on welfare, in terms of optimal government policy. In Part II, we discuss the use of subjective well being indicators as a measure of welfare. In Part III, we discuss our data source and our empirical strategy. Part IV presents basic results and our battery of specification checks. Part V then explores two alternative explanations for our findings: intra-family externalities and long run averaging. Part VI concludes.

Part I: Smoking Behavior and Policy

The key question that we propose to assess in this paper is whether cigarette taxation raises or lowers the happiness of potential smokers. In this section, we expand on why cigarette taxation might have either positive or negative effects on happiness. We then discuss the strong differences in government policy implied by these different models.

Cigarette taxes will decrease happiness among smokers under the rational addiction model of Becker and Murphy (1988). Becker and Murphy model the act of smoking as the building of an addiction stock. The more cigarettes smoked today, the greater the addiction capital tomorrow. High addiction capital lowers *average* utility but raises the *marginal* utility of smoking. In this way, smoking lowers future utility but also increases the craving for another cigarette. The key feature of any addiction model is on how people deal with this intertemporal problem. In the original Becker-Murphy formulation individuals discounted the future *exponentially*, meaning that they discount k-periods forward by δ^k, where δ is the per-period time discount factor. Since an exponential individual makes a time-consistent choice to smoke, a rise in taxes can only *lower* discounted utility today. If it were to raise it, then the rational addict could raise utility by simply reducing smoking by the amount that the tax does, i.e. by emulating the tax. So cigarette taxes should reduce the happiness of time consistent rational addicts.

Gruber and Koszegi (2001,2002) develop an alternative to the Becker and Murphy model where smokers can actually be made better off by cigarette taxation. Their alternative embeds within the Becker-Murphy stock addiction framework preferences that are *time inconsistent*, following Laibson (1997) and O'Donoghue and Rabin (1999). In this quasi-hyperbolic formulation, next period is discounted by $\beta\delta$, the following period by $\beta\delta^2$, and k periods in the

future by $\beta\delta^k$, where $\beta<1$ is an extra discount factor that changes the discounting of this period relative to the entire future. The key feature of such a hyperbolic model is that individuals will have self-control problems. Specifically, a sophisticated hyperbolic individual (one who knows that he discounts hyperbolically) would like to smoke less in the future than he actually can. The problem arises because he is patient about the future (the relative discount rate between future periods is δ), but impatient about the present (the relative discount rate between today and tomorrow is $\beta\delta<\delta$). This means that when the future arrives he will end up making more impatient choices (i.e. smoke more) than he would like to from today's vantage point.

As Gruber and Koszegi show, the discounted utility of a sophisticated hyperbolic consumer can rise if a tax is imposed. The reason is that the tax serves as a self-commitment device.[3] By forcing a reduction in the smoking in the future, the tax allows the sophisticated hyperbolic agent to do something they would not be otherwise be able to do.[4] This is the essence of the empirical test carried out below: a positive impact of cigarette taxation on the present discounted value of happiness is the direct implication of a sophisticated time inconsistent model.

Existing empirical evidence on smoking, reviewed in Chaloupka and Warner (2000) and Gruber (2001), does not distinguish between these models. There is a strong consensus that smoking is moderately price elastic, but agents are price elastic under either of these models. Gruber and Koszegi (2001) find that smokers respond not only to the current price, but also to next period's price in their smoking decisions. They show, however, that this tests only the non-

[3] As Gruber and Koszegi (2002) discuss, this government-provided commitment device is valued by consumers because the private sector cannot plausibly provide true commitment.

[4] Of course, a sophisticated time inconsistent consumer's first choice would be a tax that started next period, but

myopia condition that is present in both the rational addiction and their alternative model; this test has no implications for the time consistency aspect which strongly differentiates the models.

There is a large body of evidence to support the notion that agents are time inconsistent, in particular with regards to their smoking decisions. Laboratory experiments document overwhelmingly that consumers are time inconsistent (Ainslee, 1992). In experimental settings, consumers consistently reveal a lower discount rate when making decisions over time intervals further away than for ones closer to the present, raising the specter of inter-personal conflict over decisions that have implications for the future.

In the context of smoking, there is indirect evidence for time inconsistency that is reviewed in Gruber and Koszegi (2001,2002). A hallmark of sophisticated time inconsistency is the use of self-control devices. And there is substantial evidence that self-control devices are frequently employed to quit smoking; people regularly set up socially managed incentives to refrain from smoking by betting with others, telling others about the decision, and otherwise making it embarrassing to smoke (Prochaska et al., 1982). Various punishment and self-control strategies are recommended by both academic publications (Grabowski and Hall, 1985) and self-help books (CDC, various years). Such self-control devices are not needed by a time consistent agent; while such an agent would obviously like to make quitting as costless as possible, lowering the utility of an undesired alternative is irrelevant for decisionmaking.

An alternative formulation of time inconsistency is the *naive* case, where individuals do not recognize their own self-control problems (O'Donoghue and Rabin, 1999). One feature that distinguishes naive time-consistent agents from time-inconsistent agents is an inability to realize

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Gruber and Koszegi show that even a tax that starts this period would make time inconsistent smokers better off.

desired future levels of smoking. In fact, unrealized intentions to quit at some future date are a common feature of stated smoker preferences. Eight of ten smokers in America express a desire to quit their habit (Burns, 1992). Among high school seniors who smoke, 56 percent say that they won't be smoking five years later, but only 31 percent of them have in fact quit five years hence. Moreover, among those who smoke more than one pack/day, the smoking rate five years later among those who stated that they *would not* be smoking (74 percent) is actually higher than the smoking rate among those who stated that they *would* be smoking (72 percent) (U.S. Department of Health and Human Services, 1994).

This set of evidence paints a compelling case that many decisions, and in particular smoking, are not time consistent. This is particularly true when one acknowledges that there is absolutely no evidence, experimental or otherwise, for time consistent preferences as a better explanation for laboratory or real world phenomenon than are time inconsistent preferences. But none of this evidence meets the gold standard for economics testing, which is to test the hypothesis through revealed behavior in response to a real change in the underlying economic environment. Unfortunately, that may be a standard that is almost unreachable given the similarities between the models. Thus, whether higher cigarette taxes will make smokers better or worse off remains an open question.

Understanding the impacts of cigarette taxes on well-being is not simply a matter of intellectual curiosity; these different models also have radically different implications for government policy. Under the rational addiction model, there is no rationale for government regulation of addictive bads other than interpersonal externalities. Just as the government has no cause, absent market failures, for interfering with revealed preference in the realm of non-

addictive goods, there is no reason to take addictiveness per se as a call to government action, if individuals are pursuing these activities rationally. It is this framework that implicitly underlies the well-known efforts of Manning et al. (1989) and others to measure the external costs of cigarette and alcohol consumption. These estimates, which are frequently cited and influential in debates over excise taxation, suggest that the optimal tax rate for cigarettes in particular is fairly low, since the net external costs of smoking are small. In particular, most estimates of the externalities from smoking are well below the existing average level of excise taxation (Gruber and Koszegi, 2002).

Gruber and Koszegi (2002) explore in detail the implications for government policy of a introducing time inconsistent, quasi-hyperbolically discounted preferences into the Becker-Murphy framework. In the Gruber and Koszegi model, the optimal excise tax is greater than zero even absent externalities, due to the self-control benefits to time inconsistent agents. Calibrations show that this point is not a theoretical curiosity, since the "internalities" (damage to the smoker himself) of smoking are so large, at over $35 per pack when accounting for mortality effects alone (calculated using the impacts of smoking on length of life and standard estimates of the value of a life from Viscusi, 1992). They find that the optimal tax in their model, even with very modest time inconsistency, is well over $1 per pack, above and beyond externalities. [5]

It is important to note that not all alternatives to the rational addiction model deliver the prediction that smokers will be made better off by higher cigarette taxes. For example, in the

[5] Gruber and Koszegi (2001) also extend this analysis to show that a time inconsistent formulation has radical implications for the incidence of cigarette excise taxation. Since lower income groups, either on a current or permanent income basis, are more likely to smoke, traditional analyses have viewed cigarette taxes as regressive. But when such taxes play a corrective role, as in the time inconsistent formulation, the incidence is reversed for a wide class of parameter values. This is because both the higher smoking rates of lower income groups and their greater price elasticities imply a greater corrective benefit to them from higher taxation.

temptation models of Bernheim and Rangel (2001), agents do not behave in a rational time consistent fashion; they have different preferences over "tempted" and "untempted" states. But there is by definition no price elasticity in the "tempted" state, so that higher prices serve no self-control purpose; thus, higher prices only make them worse off. Similarly, in the model of Gul and Pessendorfer (2001), there is a direct disutility from being tempted; but, so long as the agent can afford the product which is tempting them, there is no reduction in this disutility from higher prices. But variations on these models which introduce price elasticities into the "tempted" state could deliver similar implications for well-being to the sophisticated hyperbolic model.

Interestingly, if agents are time inconsistent but completely naïve about their self-control problems, a cigarette tax will not have a positive, immediate effect on their happiness. This is because such smokers (wrongly) view themselves as time consistent; since they (wrongly) think they can quit any time they want to, they (wrongly) view the tax as a burden and not a commitment device. This is an extreme case, however. More realistically, agents may be partly sophisticated and partly naïve. Specifically, they may recognize that they have a self-control problem but under-estimate its magnitude. This could lead them to still be made somewhat better off in the short run from a tax increase. So finding an increase in happiness due to cigarette taxes is consistent with either full or partial sophistication.

Part II: What does Happiness Measure?

Our methodology relies on using subjectively reported happiness measures in empirical work. But how much can such measures be trusted? Economists worry about the validity of such questions and to some extent the scientific evidence supports these worries (Bertrand and

Mullainathan 2001). A large array of evidence has shown that subjective survey questions are prone to significant reporting error. For example, studies have found that the placement of well-being questions affects how they are answered. If they are preceded by a question, for example, that asks about dating behavior, people are more likely to report unhappiness. Beyond order choice, instantaneous mood at the time of survey is also found to have a large effect on how people answer such questions. Schwarz and Strack (1999) provide a nice survey of these effects.

Yet such results only tell us that there is measurement error in these questions. There is also measurement error in the numerous other variables that economists study. What is more relevant for our purposes is that the evidence is clear that these questions also contain significant true signal about well-being. Evidence of this kind comes in several varieties but they all follow a similar methodology: find a more objective measure of well-being and see how well this measure correlates with the self-report. And strong positive correlations have been found for a large set of such variables. For example, outsider's assessments of a person's happiness or independent counts of smiles correlate positively with self-reported happiness. Moving to much more physiological measures, everything from heart rate, blood pressure, skin resistance measures of responses to stress, to even level of activity in the left versus right prefrontal lobe all are found to correlate with subjective reports of well being (Kahneman 1999; Gardner and Oswald, 2001). These studies all suggest that despite the measurement error inherent in this attitudinal question, it nevertheless correlates effectively with well being.

A more subtle concern raised in Bertrand and Mullainathan (2001) is that the measurement error may be correlated with other variables. This makes it hard to assess whether something is affecting happiness or simply the measurement error in happiness. But in our

framework, for this to drive our results, the measurement error in happiness would have to change in specific states coincident with cigarette taxes and in such a way that it only affects those with high predicted smoking. It is hard to see how his could be driven by the considerations cited in Bertrand and Mullainathan (2001) as generating correlated measurement error, considerations such as cognitive dissonance and social reference effects.

Moreover, the small happiness literature in economics also has uncovered interesting patterns further bolstering the idea that these variables in fact measure well-being. In cross-sections, happiness generally rises with factors that economists would associate with improved well being, such as higher incomes. The income effect appears to be causal, as it is present for lottery winners and those receiving inheritances (Gardner and Oswald, 2001). Self-reported well-being is also lower for the unemployed, and for those who are divorced (Blanchflower and Oswald, 2000); interestingly, however, the reduction in happiness due to unemployment is mitigated when there is a larger "reference group" of unemployed (Clark, forthcoming). Despite the increased use of this measure, there has been no attempt to date of which we are aware that uses these subjective well-being measures to attempt to either distinguish models of behavior, or to draw welfare conclusions about particular tax or spending interventions. As a whole, therefore, the available evidence suggests that while subjective well-being measures do contain noise, they also contain significant signal and are a fruitful area for empirical exploration.[6]

6 It is also important to note that subjective questions may be eliciting two different notions of "well being". In economic terms, they might be eliciting the Present Discounted Value of all future utility or simply the flow utility of today. For our purposes, it is not important which is being elicited. The sign of the effect is informative for us in either case. The distinction could be important, however, in studies that are much more reliant on specific magnitudes rather than signs.

Part III: Data and Empirical Strategy

Data

We use two data sets to measure happiness, the General Social Surveys (GSS) from the U.S. and from Canada. The U.S. GSS is a nationally representative survey in the United States that has been administered to 1500 to 2500 households in most years since 1972; we use data from 1973 (the first year where state identifiers are available) through 1998. The Canadian GSS is a nationally representative survey of Canadians that has been administered sporadically since 1985; we use all available surveys that include a happiness question (1985, 1986, 1989, 1990, 1991, 1996, and 1998).[7] Both surveys ask a variety of standard economics questions, but their use has mostly been in other disciplines, since the survey's main focus is on questions not traditionally used by economists: attitudes towards current events or political parties; religious devotion; and psychological measures such as happiness. It is the last measure that forms our key dependent variable.

In particular, in each year the U.S. GSS asks respondents "Taken all together, how would you say things are these days -- would you say that you are very happy, pretty happy, or not too happy"? The Canadian GSS question asks "Would you describe yourself as very happy, somewhat happy, somewhat unhappy, or very unhappy", and there is also an option for "no opinion". Since only a very small share of the sample responds that they are very unhappy or no opinion, we combine those responses with somewhat unhappy to form our unhappiness

7 The U.S. GSS survey is a random sample and requires no weighting, but the Canadian GSS is not nationally representative unless weighted, so that all of our regression estimates use survey weights.

category.[8]

Another advantage of both surveys for our purposes is that both surveys have been carried out for many years. Over the time periods covered there have been enormous changes in the real excise tax rates charged by the states and the Canadian provinces, absolutely and relative to each other. It is these changes that provide the identifying variation for our model. Data on state cigarette excise taxes come from the publication *The Tax Burden on Tobacco*. We use state excise tax values as of February of each year, as the GSS data were collected over the February-April period. Data on Canadian tobacco taxes were collected by Gruber, Sen and Stabile (2002), and incorporate both federal and provincial excise and sales taxes on cigarettes. We use the tax rate as of the month of the survey, since the Canadian GSS was collected in various months of the year over time.

Table 1 shows the means and standard deviations of the variables in both data sets. The first three columns show the GSS data from the US, and the second three columns show the data for Canada; in each set of columns, we first show the means for all respondents, and then separately by smokers and nonsmokers. We use three dummy variables as our dependent variables for measuring happiness, corresponding to the three possible answers to the happiness question above. Over our entire sample, in the United States 32% of respondents report themselves to be very happy, 55% are pretty happy, and 12% are not very happy. In Canada, however, we see a different distribution: only 5% of the people report being unhappy, 34% report

8 The wording of the Canadian question changes somewhat over time. In 1986, the question adds "Presently, would you describe yourself as…", and the 1991 and 1996 surveys add "usually, would you describe yourself as…". These wording changes appear to affect the distribution of responses across the very and somewhat happy categories, but do not impact the share of the sample saying that they are unhappy, which is the category upon which we focus. Any overall impacts from wording changes will be captured in the year dummies included in the regression.

being "somewhat happy" and 59% report being "very happy" (with 2% missing). These differences are consistent with the literature reviewed earlier, which discusses the sensitivity of the happiness responses across countries or types of wording. But the consistent impacts of cigarette taxation we will see in both countries below confirm that these differences do not interfere with our tests.

Both data sets collected data directly on smoking behavior, but only periodically. In the U.S. GSS, these smoking data were collected from 1977 to 1993; in the Canadian GSS, they were collected in 1986, 1991, and 1996. In those years, 35% of the U.S. sample reports themselves as smokers, which is consistent with prevalence rates over this time period; in the Canadian data 28% report smoking. Table 1 also summarizes the data sets based on whether the person reports being a smoker, a non-smoker and whether the data is missing. Smokers are somewhat less happy than average in both data sets. While this consistent with the notion that they would like to quit but cannot, it is equally consistent with heterogeneity in smoking behavior by underlying happiness.

The average real (in 1999 dollars) excise tax rate on cigarettes in the US is 31.6 cents, with a standard deviation of 15.8 cents, while in Canada it is 1.17 Canadian dollars, with a standard deviation of 39 cents. There is wide variation in excise taxes across states, over time, and within states over time; 25% of the variation in excise taxes in the United States, and 32% in Canada, is within states/provinces over time. This allows us to control for fixed state/province differences in cigarette taxes and happiness in our analysis below, as well as time trends in both.

Table 1 also shows the means for the key control variables used in our analysis. Some interesting features are worth noting. Smokers are less educated. For example in the United

States, they have a high school dropout rate of 33% compared to 25% for non-smokers. They are also more likely to be unemployed and less likely to be out of the labor force, although this likely largely reflects the fact that the smoking rate is much higher among males. We have endeavored to use as much as possible a common set of control variables in the two data sets, but the available variables are not identical (e.g. there are no consistent labor supply measures in the Canadian GSS).

Finally, income is available only categorically in the U.S. GSS, in fine gradations until the top of the income distribution, then in larger intervals and finally a top code. In order to create a smooth income measure, we have used data from each year's Current Population Survey to impute values to each of these larger ranges and the top-coded range. Income is measured continuously in some years of the Canadian GSS, and in categories in other years; in the latter set of years, we use the midpoint of the income ranges (or 1.25 times the top value for the upper range). In the regressions in each country we control for quartiles of the real income distribution. In Canada, but not in the U.S., data are available on both personal and household income, so we include measures for both types of income.

Empirical Strategy

Let H_{ijt} be the happiness of individual i who lives in state j at time t, and T_{jt} be the real level of cigarette taxes in state j at time t. A simple regression that relates happiness to cigarette taxes in the state would be:

(1) $H_{ijt} = \alpha + \beta_j + \eta_t + \delta T_{jt}$

where β_j are state fixed effects and η_t are year fixed effects, respectively. These fixed effects

completely control for any fixed differences between states and between years, which means that only within-state variation in cigarette taxes is used in the estimation. Though it deals with many of the obvious endogeneity problems inherent in using state policy, this approach may still have problems. For example, if states are changing cigarette taxes at different points in their state business cycle, the estimated "effect" may instead reflect the effect of these economic conditions. Another potential omitted factor from this model is the state spending (or reduced other taxes) that is financed by cigarette taxation. If we find that higher cigarette taxes lead to a general rise in happiness that could simply reflect the fact that these revenues are used in a welfare-enhancing way. Finally, we have the fact that only about a third of our sample smokes on average, so an impact for smokers could be masked in the full sample.

To address this problem, we exploit the fact that cigarette taxes should only affect the happiness of those who are smokers (and former smokers). We can therefore compare the effect of taxes on this group to taxes on those who do not smoke. We cannot do so by using direct data on smoking behavior, for three reasons. First, the happiness effect in our model should operate through both current and former smokers. Second, smoking decisions are themselves a function of the tax rate, leading to a potential sample selection bias: if those who stop smoking when tax rates go up are happier on average than those who continue smoking, this would bias us towards finding a reduction in happiness among (remaining) smokers from higher taxes. Finally, smoking data are only available for a subset of years in both surveys. We therefore compare the impact of excise taxation on <u>predicted</u> smokers.

Specifically, we first estimate a regression that relates smoking behavior to the observable predictors of smoking we see in the GSS data. Most of the variables are available in both

countries, but some are available only in one or the other; we used the broadest set of covariates possible to generate the best possible prediction of smoking behavior. Our predictors are: age category and gender interactions; household income quartile dummies; personal income quartile dummies (Canada only); education categories (high school dropout, high school graduate, some college, and college graduate); education of the respondents mother and father (by the same categories; U.S. only); race (white, black, and other; U.S. only); marital status (married, divorced/separated, widowed, never married); dummies for number of children (U.S.) or household size (Canada); dummies for full time work, part time work, unemployed, out of labor force, and whether ever worked (U.S. only); religious attendance (8 categorical values in U.S. that rise monotonically with attendance; three dummies for weekly, monthly, or annual attendance in Canada); born in Canada; live in house or apartment (Canada only); own your house (Canada only); language spoken at home (Canada only); and the state/year or province/year unemployment rate. We estimate such an equation for each year that has smoking information, and use that to form a predicted probability of smoking ($PREDSMOK_{ijt}$).[9]

We then estimate equations of the form:

$$(2) \qquad H_{ijt} = \alpha + \beta_j + \eta_t + \delta T_{jt} + \theta PREDSMOK_{ijt} + \gamma T_{jt} * PREDSMOK_{ijt} + \zeta X_{ijt}$$

where the coefficient of interest is now γ. So we are now asking whether deviations in cigarette taxes from their state-specific mean cause a relative change in the happiness of predicted smokers relative to those unlikely to smoke. We also include the set of covariates, X, that were used to predict smoking, and which may have independent effects on happiness, as well as a full

9 In years before the first smoking information is available (1973-76 in U.S.; 1985 in Canada), we use the first available year of information to form the prediction. In years after the last smoking information is available (1994-98 in U.S.; 1998 in Canada), we use the last available year. In years between, we interpolate from years that have the

set of state and year dummies (and, for Canada, month dummies, since some of the Canadian GSS surveys are carried out throughout the year and we want to capture any seasonality in survey responses). Note that when these X variables are included, the coefficient θ is still identified by the fact that the prediction equations are estimated year-by-year, while we don't allow for year-specific coefficients on the Xs. But this is a very tenuous source of identification, and as a result we don't focus our analysis on the direct effect of PREDSMOK. Rather, the key coefficient is γ on the interaction between PREDSMOK and T. This is well identified by the interaction between changing taxes within states over time and the predicted odds of smoking.[10]

We create dummy variables for the various happiness responses described above, and use those as our dependent variables. We estimate linear probability models for ease of interpretation; probit estimates are similar. In estimating all our equations, we adjust the standard error to allow for both auto-correlation and the grouped data, as suggested by Bertrand, Duflo and Mullainathan (2001). We do this by performing a White correction that allows for an arbitrary variance-covariance matrix within states.

Part IV: Results

Basic Results

Table 2 shows our basic findings. The first three columns focus on American Data, while

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smoking information.

10 We show below that allowing a distinct time trend for our predicted smoker group also does not change our basic findings.

the second three focus on Canadian data. Each regression is an OLS estimate of (2), including covariates, where the dependent variable is a dummy indicating which level of happiness people chose. Where the covariates used are the same in both countries, we use one row for both regressions; where they differ, we use separate rows for the U.S. and Canadian cases.

In the U.S. data, cigarette taxes have a positive but insignificant effects on the probability of predicted smokers answering "very happy" or "pretty happy". It has a negative and very significant effect on the probability of answering "Not happy". Specifically, the interaction term between the predicted smoking variable and the tax rate in column (3) is significantly negative. This suggests that cigarette taxes especially reduce unhappiness amongst those predicted to be smokers. Our estimated effect here is that each penny of excise taxation reduces unhappiness by 0.156 percentage points among predicted smokers. Given that the effect is focused on reduction in unhappiness, we focus on this variable for the remainder of our U.S. analysis.

In the next three columns, we examine the effect of Canadian tax changes on happiness in the Canadian data. Strikingly, we once again find that higher cigarette taxes make predicted smokers happier. Taxes raise the probability of predicted smokers answering "very happy", while reducing the probability of them answering "somewhat happy" or "unhappy". Once again, the statistically most significant effects are found here for unhappiness, where we find that each cent of excise taxation lowers the odds of being unhappy by 0.048 percentage points. To parallel the U.S. analysis, we focus on this unhappiness measure for the rest of the paper.

There are two ways to gauge these magnitudes. The first is to contrast the impact of excise taxation to other predictors of happiness. For example, we find that, conditional on all other Xs, being in the top income quartile reduces unhappiness by about 7.5 percentage points

(relative to the bottom income quartile) in the U.S., and by about 6 percentage points in Canada (incorporating the impact of being in the top quartile of both family and personal income). So a 50-cent (in the U.S.) or $1.33 (in Canada) excise tax would have the same effect. In other words, such an excise tax level would be equivalent to moving a predicted smoker from the bottom to the top income quartile.

This exercise implies very large impacts of excise taxes on happiness. But one difficulty with this type of comparison is that the effect of the X variables themselves on happiness may not be well identified. While the impact of cigarette taxes on the happiness of predicted smokers is, we argue, a well identified relationship, the same cannot necessarily be said of the impact of factors such as income on happiness; those who are richer may be fundamentally less happy for other reasons, for example, understating the impact of income on happiness.

A better comparison may be to consider what these results imply for the effects on happiness of reducing smoking. Estimates of the impact of excise taxes on tobacco expenditures are generally in the range of -0.5, although Gruber and Koszegi (2002) obtain a higher elasticity of roughly -0.6 using more recent data. Gruber, Sen and Stabile (2002) estimate an elasticity for Canada of –0.45.

These estimates suggest that each 10 cent increase in price leads to a 6% decline in smoking in the U.S. (given the base average real price of 97 cents over our sample period) and a 3% decline in smoking in Canada (given the base average real price of $1.67). Our happiness regressions suggest that this tax rise is also associated with an decrease in 1.5 percentage points of happiness amongst all those who are predicted smokers in the U.S., or roughly 10% of baseline unhappiness among smokers, and 0.46 percentage points among those who are predicted

smokers in Canada, or roughly 7.6% of baseline unhappiness among smokers. Extrapolating, then, these findings suggest that reducing smoking by 60% would fully remove unhappiness among smokers in the U.S., and that reducing smoking by 40% would fully remove unhappiness among smokers in Canada.

These implied effects are once again quite large. At the same time, the data reviewed earlier suggests that smoking is a very negative influence in the lives of many smokers so it is plausible that there could be large effects on happiness from smoking reduction. Nevertheless, given these large magnitudes, we turn next to specification checks to demonstrate that the estimates are robust.

Comparing the results across the countries suggests that a similar level change in taxes has a much smaller effect in Canada than in the US. One possible interpretation of this could come from the higher level of base prices in Canada, relative to the U.S. Given these high taxes already in place in Canada, the remaining pool of smokers may be those with the largest self-control problems. These smokers may need much larger tax changes to dissuade them from smoking. This contention is consistent with the fact that the elasticities of smoking with respect to price are similar across the two countries, despite the fact that base prices are much higher in Canada.

Specification Checks

In Table 3, we further explore the sensitivity of our findings to concerns about omitted state variables that might be correlated with cigarette excise tax policy, focusing on the

"unhappy" variables in both countries. In the first column, we show our basic results from Table 2 for comparison. In the second column, we interact the state/year unemployment rate with PREDSMOK, to capture any differential impacts of the cycle on the happiness of predicted smokers and nonsmokers; this has no impact on our estimates. In the third column, we include state-specific linear time trends to capture any slow-moving trends in tax policy and happiness that might confound our results; including these trends raises the estimates in both samples. In the fourth column, we interact a time trend with the predicted smoking measure, to allow for separate trends in well-being for predicted smokers and nonsmokers; once again, there is little impact. In the fifth column, we interact each state dummy with PREDSMOK to allow for the effect of predicted smoking to vary by state; this reduces the estimate somewhat in the U.S., but raises it in Canada. Overall, our findings are reasonably robust to these controls for slow-moving trends in the data or heterogeneity in populations across states.

In Table 4, we address a different worry: that our happiness result arises through the spending financed by cigarette excise tax increases. Suppose, for example, that government spending is more redistributive than excise taxation, or at least valued more by the types of individuals who are predicted to smoke. Then our finding could reflect the happiness effects of spending, not excise taxation.

To address this point, we have gathered data on three other state or province taxes: the excise taxes on gas and alcohol, and the state or province sales tax rate.[11] We have also gathered data on state or province real revenues per capita. If this is a spending effect, so long as cigarette

11 The sales tax rate in both countries is an ad valorem rate; the gasoline tax is cents per gallon in the U.S. and cents per litre in Canada; the alcohol tax is dollars per case of beer in the U.S. and ad valorem rate in Canada. All dollar tax rates are expressed in real terms.

excise revenues are spent in a similar fashion to other tax revenues, then we should see a similar happiness effect from these other taxes. We therefore add to our regression specification these tax variables, as well as their own interactions with predicted smoking.

In column (1), we see the effect of the beer tax, in column (2), the effect of the gas tax, in column (3) the effect of the sales tax and in column (4), the effect of total state revenues. In all four cases and in both countries, we see that the inclusion of these variables does not much affect the initial estimate of the cigarette tax*predicted smoker interaction. Moreover, the new interaction terms with other taxes themselves are never negative and significant, although, for the U.S., there is a marginally significant negative effect of revenues per capita. For Canada, the interactions with gas and sales taxes are actually positive and significant, suggesting that higher tax rates on those items raise unhappiness among predicted smokers. This may reflect the fact that these regressive taxes are targeted to those low income persons most likely to smoke. But, if anything, they suggest a bias against our finding for cigarette taxation. Thus there is little evidence that it is *spending* of tax money (rather than the tax itself) that is affecting smoker happiness.

Yet another possibility is that cigarette taxes are somehow spent differently than other kinds of taxes, so that there remains a happiness effect through the revenue side. We have investigated this possibility by gathering data on the composition of public spending in the U.S. over the 1977-1999 period, decomposing total spending into spending on: educational services, social services, transportation, public safety, environment and housing, government administration, utility expenditures and other spending. We then regressed each of these spending categories on the different taxes to determine whether the marginal effect of cigarette

taxes was different than the other taxes we have studied. No significant pattern was found. This suggests that differential spending of cigarette tax revenues does not drive our results.

Part V: Alternative Interpretations

These results so far are consistent with a time inconsistent model. But could they also be consistent with the time-consistent model? On the surface they are not, but with some reinterpretations they can be. One possibility is to argue that it is not smokers who are made happier but instead the spouses and relatives of smokers. Since our identification strategy compares predicted smokers to predicted non-smokers, our estimates would also include this externality effect if spouses and relatives have similar background characteristics. They would then also appear to be predicted smokers.

Of course, if higher taxes made family members better off, then this would indicate another potential failure of the standard model: imperfect family utility maximization. That is, by the same logic that shows that time consistent smokers cannot be made better off by a higher tax, families of smokers cannot be made better off by a higher tax if the smoker was maximizing family utility. If family utility was being maximized, and family members were better off with less smoking, then smoking would have already fallen. But the failure to maximize family utility is a very different type of failure than that discussed earlier, so it is important to distinguish whether this is driving our results.

We investigate this possibility in two ways in Table 5. First in columns (1) through (6), we separately examine the effect by marital status and gender. If our effects are due to individual internalities, there is no *a priori* reason to believe the self-control problem ought to be greater for

any particular group (holding constant the predicted level of smoking). If, on the other hand, our effects were due to intra-family externalities, one would expect differences. Specifically, one would expect married people to show bigger effects since they are more likely to experience the externalities of smoking. Moreover, since men smoke more, wives should experience a bigger externality than husbands.

In Table 5, we therefore separately estimate our baseline model for married versus single people and then for four different groups: married men, married women, single men and single women. In the US data, there is some evidence that married people show a bigger effect, and that the effect is indeed largest for married women. In the Canadian data, however, the largest effect is for single men and the effects for singles are much larger than the effects for marrieds. Thus, the variation across groups seems essentially random and unrelated to the externalities story.

In columns (7) through (8), we examine this possibility in a different way. In the U.S. data, which has information on spousal education and labor supply, we estimate spousal predicted smoking as a function of the same set of covariates as above, but using the spouse's education and labor supply in place of the respondent. This allows us to augment our regression model by also including the predicted smoking of the spouse and it's interaction with the tax. Unfortunately, this exercise cannot be carried out in Canada due to the paucity of information on spousal characteristics. If our results are driven by within-family externalities, then we would see effects through spousal smoking, and reduced or zero effects through own smoking.

In fact, we do find some weak evidence for a role for spousal smoking in determining own happiness. The interaction of spousal predicted smoking and the tax is negative and

marginally significant for all married persons; that is, married couples where the spouse is more likely to smoke are also made marginally better off by the tax. But the inclusion of this term has no effect on our key estimated interaction of respondent predicted smoking with the tax. Thus, within-family externalities may be present, but they appear unable to explain our results.

There is a further complication with interpreting these results as evidence for a time inconsistent model, however, which is much more fundamental. The key differential prediction between the time consistent and inconsistent models is over the immediate impact of taxation on the present discounted value sum of utility. But, in fact, we do not measure the present discounted value of utility, only happiness at a point in time. This makes interpretation of the results somewhat more complicated. For a time consistent consumer, the effect of taxes on today's utility is clearly negative, but the effect on future happiness can be positive. This is because reducing smoking today can raise future utility. Put another way, the tax inducing him to reduce smoking is analogous to an investment in which he bears a cost today (immediate pain of withdrawal) and reaps a benefit in the future (higher utility tomorrow). Even though the net effect of this investment on utility is negative, when appropriately discounted, the long-run effect will be positive. On the other hand, the sophisticated hyperbolic consumer is made *immediately* better off by a tax, since they are pleased to have this commitment device made available.

The problem is that our existing test does not measure the immediate impacts of the tax, but rather the average impacts over time. Since we are regressing current happiness on current taxes, our estimated coefficients include the immediate effect of taxes on happiness. But if taxes are correlated over time, they will also include the lagged effect. Specifically, the more auto-correlated are cigarette taxes, the more the estimated effect in equation (2) includes the

effect of lagged taxes. Thus, our test cannot rule out that time consistent smokers are being made better off in the long run, which through serially correlated tobacco taxes appears as an effect of the current tax on happiness.

This discussion suggests a stricter test to distinguish these models: examine the immediate, rather than long run, impact of taxes on happiness. But doing so increases our data requirements dramatically. To measure the average effect over time, all we require is that, summed over all periods before and after a tax changes in a state, we have sufficient observations to identify an impact of a tax change. But, to examine an immediate impact requires having data in one period on enough observations to distinguish the impact of taxation. This is impossible in the U.S. GSS. That data has the advantage of many years of data, but the typical sample size in any year is fewer than 2000 observations, which is then divided over 50 states. When years are pooled, our state specific sample sizes are sufficient to identify average tax effects. But identifying short run effects is impossible.

The Canadian GSS, however, does permit a short run comparison. Our Canadian GSS data have between 9300 and 27,600 observations per year. Moreover, these are divided over only 10 provinces, so that the average province/year cell size is over 2000 observations. Thus, we can aggregate these data to the province/year level and estimate changes regressions that allow us to examine short run impacts of tax changes.

To do so, we divide our Canadian GSS sample into those likely and unlikely to smoke; the former group is composed of those above the 75^{th} percentile of the predicted smoker distribution (a 41% chance of smoking or greater), while the latter is composed of those below the 25^{th} percentile (a 19% chance of smoking or smaller). We then create a data set where each

observation measures the mean level of unhappiness and excise taxes for each predicted smoker group in each province in each survey year. Using these data, we regress the *change* in mean happiness on the *change* in mean excise taxes separately for each group, including a full set of year dummies to capture time trends in happiness changes. By using changes, rather than fixed effects, we measure the short run, rather than the average longer run, effects of tax changes on well-being.

Estimating this changes model for predicted smokers, we obtain a coefficient of –0.044 (0.016). This result confirms that, for predicted smokers, there is a short-run negative effect of higher taxes on unhappiness; when taxes rise, happiness falls. For predicted non-smokers, on the other hand, this changes model yields an estimate of –0.009 (0.008), which is both statistically insignificant, and statistically significantly lower than the estimate for predicted smokers, confirming the causal interpretation of our finding for predicted smokers.

Thus, it appears that the impact of taxes on unhappiness does occur in the short run, which is consistently only with the sophisticated (or partly sophisticated) time inconsistent model. Of course, even this evidence is not dispositive, as our differences are taken over one or more years. If the costs of quitting are high enough and/or discount rates are high enough, even within one year a time consistent smoker could be made better off from reducing smoking. But the overall pattern of findings remains much more consistent with the time consistent alternative than with the rational addiction model.

Part VI: Conclusions

The results in this paper have potentially important implications for how policy makers

should view smoking in general and cigarette taxes in particular. In particular, they suggest that smokers themselves may be made better off by cigarette taxes. This result is inconsistent with several rational views of smoking that would view such a tax as a pure hindrance on smokers, and more consistent with behavioral time-inconsistent models in which these taxes may serve as self-control devices.

The methodology used in this paper should also have broader interest. Economists are often concerned with welfare, with how policies affect the happiness of people. Yet there are few tools for empirically assessing welfare. In the case of smoking, as with many other behaviors, behavioral reactions to changes in the environment can only provide limited insight into the welfare implications of policy interventions. Theories that have very different policy implications can accommodate a variety of behaviors and, as a consequence, empirical work on behavioral responses can leave us in the dark about welfare.

Subjective well-being measures provide a possible way to directly address welfare questions. As our analysis shows, this direct approach is empirically feasible. Happiness measures may be noisy, but in our case at least, they contain sufficient signal to discern effects of moderate size policies. This is heartening because happiness data is abundant. In the US, the GSS is available in moderately large samples for many years. Looking beyond the US, the Canada data we use is not the exception but rather the rule: many countries, notably in Europe, collect cross-sections and panel data on happiness. In short, the results in this paper suggest that by using happiness data, economists may be able to directly assess the impacts of public policy on well-being.

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Table 1: Summary Statistics

	US Data			Canadian Data		
	All	Smoker?		All	Smoker?	
		No	Yes		No	Yes
Report "Very Happy"	0.320	0.355	0.277	0.588	0.720	0.646
	(.466)	(.479)	(.448)	(.492)	(.449)	(.478)
Report "Pretty Happy" (US) or "Somewhat Happy" (Canada)	0.554	0.543	0.559	0.338	0.226	0.281
	(.497)	(.498)	(.497)	(.473)	(.418)	(.450)
Report "Not Too Happy" (US) or "Unhappy" (Canada)	0.119	0.091	0.152	0.050	0.044	0.064
	(.323)	(.288)	(.359)	(.217)	(.205)	(.245)
Real Tax Rate	0.316	0.280	0.278	1.170	1.227	1.211
	(.158)	(.115)	(.117)	(.394)	(.494)	(.490)
Predicted Smoker	0.352	0.298	0.456	0.300	0.247	0.365
	(.190)	(.171)	(.174)	(.154)	(.147)	(.148)
Smoke?	0.352	0.000	1.000	0.276	0.000	1.000
	(.478)			(.447)		
White	0.835	0.844	0.832			
	(.371)	(.363)	(.374)			
Black	0.135	0.128	0.144			
	(.342)	(.334)	(.351)			
Married	0.565	0.583	0.548	0.552	0.543	0.515
	(.496)	(.493)	(.498)	(.497)	(.498)	(.500)
Separated or Divorced	0.145	0.113	0.191	0.084	0.066	0.126
	(.353)	(.317)	(.393)	(.278)	(.249)	(.331)
Widowed	0.185	0.179	0.183	0.138	0.204	0.117
	(.388)	(.384)	(.387)	(.345)	(.403)	(.321)
High School Dropout	0.265	0.247	0.332	0.370	0.389	0.403
	(.441)	(.431)	(.471)	(.483)	(.488)	(.491)
High School Graduate	0.321	0.317	0.348	0.150	0.136	0.171
	(.467)	(.465)	(.476)	(.357)	(.343)	(.376)
Some College	0.217	0.213	0.199	0.147	0.134	0.152
	(.412)	(.410)	(.399)	(.354)	(.340)	(.359)
College Graduate	0.194	0.220	0.118	0.301	0.327	0.265
	(.396)	(.414)	(.323)	(.459)	(.469)	(.441)
Full Time Worker	0.490	0.464	0.536			
	(.500)	(.499)	(.499)			
Part Time Worker	0.101	0.106	0.089			
	(.301)	(.307)	(.284)			
Unemployed	0.029	0.019	0.044			
	(.169)	(.138)	(.206)			

Not in Labor Force	0.344	0.379	0.287			
	(.475)	(.485)	(.452)			
Church Attendance Index	3.884	4.457	3.076			
	(2.694)	(2.676)	(2.445)			
Church Attendance 1				0.238	0.281	0.130
				(.426)	(.450)	(.336)
Church Attendance 2				0.121	0.122	0.098
				(.326)	(.328)	(.298)
Church Attendance 3				0.267	0.248	0.290
				(.443)	(.432)	(.454)
Unemployment Rate	9.556	10.396	10.569	6.595	6.833	6.947
	(2.772)	(2.626)	(2.698)	(2.113)	(1.952)	(1.994)
	36421	10279	5583	100663	35990	13742

Notes: Standard errors in parenthesis. Columns 1-3 are for the US data and column 4-6 are for Canadian data. Columns 1 and 4 are full sample means. Columns 2 and 3, and columns 5 and 6, restrict to sample of non-smokers and smokers respectively. Smoker data is only available for a subset of the full sample in both data sets.

Table 2: Relation Between Cigarette Taxes and Unhappiness

	Very Happy	Pretty Happy	Not Happy	Very Happy	Somewhat Happy	Unhappy
		US Data			Canadian Data	
Tax	-0.027	-0.005	0.032	0.000	0.013	0.000
	(.033)	(.034)	(.020)	(.029)	(.023)	(.011)
Predicted Smoking	-0.069	-0.014	0.075	0.198	0.194	0.096
	(.038)	(.040)	(.026)	(.051)	(.055)	(.040)
Predicted Smoking*Tax	**0.047**	**0.109**	**-0.156**	**0.072**	**-0.058**	**-0.048**
	(.078)	**(.070)**	**(.045)**	**(.062)**	**(.052)**	**(.020)**
Married	0.176	-0.079	-0.095	0.118	-0.098	-0.020
	(.009)	(.011)	(.008)	(.005)	(.004)	(.004)
Separated/Divorced	0.022	-0.020	-0.005	-0.029	-0.025	0.023
	(.009)	(.012)	(.009)	(.008)	(.009)	(.004)
Widowed	0.036	0.005	-0.041	-0.010	-0.034	0.023
	(.012)	(.015)	(.010)	(.009)	(.009)	(.004)
High School Dropout	0.053	0.011	0.029	0.135	0.144	0.022
	(.049)	(.042)	(.028)	(.013)	(.018)	(.005)
High School Graduate	0.052	0.032	0.007	0.191	0.123	0.012
	(.047)	(.043)	(.028)	(.014)	(.019)	(.004)
Some College	0.055	0.037	0.000	0.210	0.124	0.015
	(.049)	(.047)	(.029)	(.021)	(.014)	(.005)
College Graduate	0.064	0.023	0.003	0.220	0.135	0.017
	(.046)	(.046)	(.030)	(.027)	(.017)	(.003)
Father High School Dropout	0.002	0.007	-0.008			
	(.004)	(.005)	(.004)			
Mother High School Dropout	-0.007	0.007	0.001			
	(.007)	(.007)	(.005)			
Father High School Graduate	0.006	0.016	-0.020			
	(.007)	(.008)	(.005)			
Mother High School Graduate	0.004	0.007	-0.009			
	(.008)	(.010)	(.006)			
Father Some College	0.009	0.000	-0.009			
	(.012)	(.011)	(.007)			
Mother Some College	0.005	0.012	-0.014			
	(.013)	(.014)	(.007)			
Father College Graduate	0.024	-0.001	-0.020			
	(.010)	(.010)	(.007)			
Mother College Graduate	0.029	-0.009	-0.017			
	(.014)	(.013)	(.009)			

Lowest Household Income Quartile	-0.044 (.011)	0.025 (.012)	0.027 (.010)	-0.049 (.023)	0.036 (.015)	0.021 (.009)
2nd Household Income Quartile	-0.023 (.010)	0.045 (.011)	-0.014 (.010)	-0.026 (.011)	0.039 (.008)	0.001 (.004)
3rd Household Income Quartile	0.009 (.012)	0.033 (.011)	-0.033 (.009)	-0.010 (.004)	0.020 (.005)	0.006 (.003)
Top Household Income Quartile	0.054 (.011)	-0.001 (.010)	-0.047 (.009)	0.048 (.007)	-0.009 (.003)	-0.008 (.003)
Lowest Personal Income Quartile				-0.016 (.009)	0.029 (.007)	0.023 (.006)
2nd Personal Income Quartile				-0.018 (.007)	0.018 (.005)	0.015 (.003)
3rd Personal Income Quartile				0.007 (.006)	0.013 (.007)	-0.002 (.005)
Top Personal Income Quartile				0.030 (.012)	0.008 (.006)	-0.006 (.002)
White	-0.004 (.016)	0.031 (.013)	-0.020 (.009)			
Black	-0.084 (.016)	0.041 (.014)	0.043 (.014)			
One Child	-0.029 (.008)	0.016 (.009)	0.018 (.005)			
Two Children	-0.017 (.007)	0.002 (.009)	0.020 (.005)			
Three Children	-0.033 (.008)	0.012 (.010)	0.027 (.006)			
Four Children	-0.018 (.011)	0.004 (.012)	0.020 (.009)			
Five or More Children	-0.021 (.011)	0.005 (.010)	0.020 (.008)			
Household Size 2				0.014 (.013)	-0.011 (.013)	-0.010 (.006)
Household Size 3				-0.005 (.008)	0.001 (.006)	-0.013 (.003)
Household Size 4+				0.003 (.011)	0.004 (.012)	-0.013 (.005)
Full Time Worker	0.029 (.012)	0.043 (.014)	-0.068 (.011)			
Part Time Worker	0.021 (.012)	0.039 (.014)	-0.056 (.010)			

Unemployed	-0.026	-0.044	0.079			
	(.015)	(.018)	(.017)			
Not In Labor Force	0.032	0.021	-0.050			
	(.011)	(.012)	(.011)			
Ever Worked	0.012	-0.012	0.001			
	(.010)	(.011)	(.007)			
Unemployment Rate	-0.005	0.004	0.001	-0.004	0.005	0.000
	(.003)	(.002)	(.002)	(.005)	(.003)	(.002)
Church Attendance Index	0.016	-0.008	-0.007			
	(.001)	(.001)	(.001)			
Attend Church Weekly				0.147	-0.034	-0.012
				(.011)	(.007)	(.007)
Attend Church Monthly				0.086	-0.011	-0.010
				(.007)	(.009)	(.006)
Attend Church Annually				0.039	0.004	-0.009
Or Less				(.013)	(.010)	(.002)
Born in Canada				0.031	-0.016	-0.012
				(.010)	(.004)	(.005)
Live in House				0.036	0.006	0.013
				(.011)	(.009)	(.005)
Live in Apartment				0.038	0.023	0.017
				(.009)	(.007)	(.001)
Own Dwelling?				0.065	0.018	-0.011
				(.012)	(.002)	(.002)
Speak English at Home				-0.015	0.008	-0.001
				(.019)	(.018)	(.003)
Age*Sex Dummies	Yes	Yes	Yes	Yes	Yes	Yes
State Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	36421	36421	36421	100663	100663	100663

Notes: Dependent variable is a dummy variable indicating which answer people chose to a happiness question. The dependent variable in columns (1) and (4) is the dummy for people reporting "very happy"; in columns (2) and (5) it is the dummy for people reporting being "pretty happy" (2) or "somewhat happy" (5); and in columns (3) and (6) it is the dummy for people reporting being "not happy" (3) or "unhappy" (6). Standard errors, which are corrected to allow for grouped error terms at the state-level, are in parentheses. The variable "Predicted Smoking" is a continuous variable denoting the predicted smoking level. The first three columns use US data while the second three use Canadian data.

Table 3: Robustness Checks					
Panel A: US Data					
Tax	0.032	0.033	0.036	0.070	0.015
	(.020)	(.020)	(.022)	(.021)	(.022)
Predicted Smoking	0.075	-0.006	0.011	0.073	-0.190
	(.026)	(.036)	(.059)	(.025)	(.025)
Predicted Smoking*Tax	**-0.156**	**-0.152**	**-0.167**	**-0.152**	**-0.104**
	(.045)	**(.049)**	**(.046)**	**(.042)**	**(.077)**
Panel B: Canadian Data					
Tax	0.000	0.000	0.010	0.018	0.003
	(.011)	(.011)	(.009)	(.016)	(.015)
Predicted Smoking	0.096	0.072	0.180	0.097	0.096
	(.040)	(.061)	(.061)	(.040)	(.051)
Predicted Smoking*Tax	**-0.048**	**-0.048**	**-0.082**	**-0.048**	**-.057**
	(.020)	**(.021)**	**(.026)**	**(.020)**	**(.031)**
Demographic Controls	Yes	Yes	Yes	Yes	Yes
State Dummies	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes
Predicted Smoking*Unemployment Rate	No	Yes	No	No	No
State Dummies*Trend	No	No	Yes	No	No
Predicted Smoking*Trend	No	No	No	Yes	No
State Dummies*Pred Smoking	No	No	No	No	Yes

Notes: Standard errors are in parenthesis and are corrected to allow for correlation within states. The dependent variable in each column is a dummy for unhappiness. "Predicted Smoking*Unemployment Rate" means that the effect of predicted smoking was allowed to depend on the unemployment rate in the state. "State Dummies*Trend" means each state was allowed to have its own linear time trend. "Predicted Smoking*Trend" means that the regression includes an interaction of predicted smoking with a linear time trend. "State Dummies*PredSmoking" means that predicted smoking was allowed to have a different effect in each state. Regressions include all of the control variables shown in Table 2.

Table 4: "Effect" of Other Taxes

Panel A: US Data

	Beer Tax	Gas Tax	Sales Tax	Total Revenues
Cigarette Tax	0.038	0.035	0.033	0.029
	(.024)	(.020)	(.020)	(.019)
Other Tax	-0.017	-0.001	0.003	-0.004
	(.008)	(.001)	(.004)	(.023)
Predicted Smoking	0.055	0.060	0.060	0.125
	(.031)	(.048)	(.033)	(.038)
Predicted Smoking*Cigarette Tax	**-0.181**	**-0.162**	**-0.159**	**-0.144**
	(.055)	**(.043)**	**(.045)**	**(.043)**
Predicted Smoking*OtherTax	**0.034**	**0.001**	**0.003**	**-0.037**
	(.014)	**(.003)**	**(.006)**	**(.021)**

Panel B: Canadian Data

	Beer Tax	Gas Tax	Sales Tax	Total Revenues
Cigarette Tax	0.003	0.008	0.004	0.002
	(.008)	(.006)	(.010)	(.009)
Other Tax	-0.006	-0.002	-0.004	-0.006
	(.002)	(.001)	(.001)	(.004)
Predicted Smoking	0.082	0.072	0.067	0.059
	(.048)	(.044)	(.041)	(.034)
Predicted Smoking*Cigarette Tax	**-0.045**	**-0.047**	**-0.048**	**-0.049**
	(.020)	**(.021)**	**(.019)**	**(.020)**
Predicted Smoking*OtherTax	**0.001**	**0.002**	**0.004**	**0.009**
	(.002)	**(.001)**	**(.001)**	**(.007)**
Demographic Controls	Yes	Yes	Yes	Yes
State Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes

Notes: Standard errors are in parenthesis and are corrected to allow for correlation within states. The dependent variable in each column is a dummy for unhappiness. "Other Tax" refers to a different tax in each column. It refers to a beer or alcohol tax in column (1), gas tax in column (2), sales tax in column (3) and Total state/province revenues in column (4). Regressions include all of the control variables shown in Table 2.

Table 5: Effect by Demographic Group

Panel A: US Data

	Single	Married	Single Males	Single Females	Married Males	Married Females	Married	Married Males	Married Females
Tax	-0.016	0.075	0.006	-0.043	0.047	0.109	0.104	0.054	0.132
	(.038)	(.021)	(.095)	(.054)	(.039)	(.026)	(.027)	(.041)	(.037)
Predicted Smoking	0.076	0.071	0.024	0.076	0.092	0.076	0.061	0.075	0.075
	(.044)	(.038)	(.098)	(.057)	(.053)	(.041)	(.043)	(.058)	(.051)
Predicted Smoking*Tax	**-0.102**	**-0.219**	**-0.006**	**-0.141**	**-0.224**	**-0.258**	**-0.194**	**-0.201**	**-0.226**
	(.076)	**(.065)**	**(.203)**	**(.100)**	**(.093)**	**(.079)**	**(.044)**	**(.064)**	**(.052)**
Spouse's Predicted Smoking							0.046	0.066	0.002
							(.082)	(.132)	(.139)
Sp.Predicted Smoking*Tax							**-0.126**	**-0.066**	**-0.095**
							(.072)	**(.105)**	**(.116)**

Panel B: Canadian Data

	Single	Married	Single Males	Single Females	Married Males	Married Females
Tax	-0.001	-0.004	-0.005	0.001	-0.019	0.007
	(.015)	(.014)	(.018)	(.019)	(.019)	(.014)
Predicted Smoking	0.171	0.050	0.180	0.203	-0.038	0.131
	(.042)	(.051)	(.042)	(.048)	(.058)	(.068)
Predicted Smoking*Tax	**-0.072**	**-0.012**	**-0.095**	**-0.059**	**0.017**	**-0.034**
	(.017)	**(.030)**	**(.028)**	**(.032)**	**(.038)**	**(.028)**
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
State Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors are in parenthesis and are corrected to allow for correlation within states. The dependent variable in each column is a dummy for unhappiness. The first column includes only single people, the second and seventh column includes only married people, the third includes only single males, the fourth column includes only single females, the fifth and eighth only married males and the sixth and ninth only married females. Columns 7-9 include the spouse's predicted smoking, both direct and interacted with the cigarette tax as controls. Regressions include all of the control variables shown in Table 2.