SNUS, A HEALTHIER OPTION:
AN ANALYSIS USING THE RATIONAL ADDICTION AND HYPERBOLIC DISCOUNTING MODEL

By

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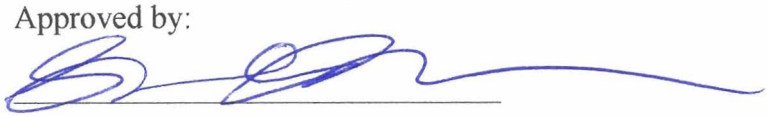

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Snus, a healthier substitute:
An analysis using the rational addiction and hyperbolic discounting model

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Abstract

The usage of snus has been proven to be a healthier alternative for smoking cigarettes. However, the question posed now is how to design public policy in regards to the taxation of snus; this will be analyzed using a rational addiction model and a hyperbolic discounting model. The rational addiction model is the hypothesis that addictions can be modeled in a future-oriented, rational, and optimal consumption plan. The hyperbolic discount model is a time-inconsistent model of discounting. With the rational addiction model, the user is trying to maximize utility by keeping the future in mind, whereas the user in a hyperbolic discounting model wants to maximize the utility of his or her present state by discounting his or her losses and gains in the future- a reward today is better than a reward tomorrow, but a reward tomorrow and the next day are valued similarly, which holds true for tomorrow as well. There are two views of interest in this paper: an economic approach and a public health approach. Each approach has different points of action; public health favors public policies which tax and ban tobacco products in general, whereas in an economic sense, public policies may not be necessary because an individual is maximizing his or her utility through the usage of these addictive goods. The latter holds true with the exception of negative externalities (i.e. healthcare costs, secondhand-smoke) or if people are irrational like in a hyperbolic discounting model.

Section 1- Introduction

A reduction in the number of smokers would increase the health of individuals and society as a whole. However, reducing the number of smokers is a challenging task since nicotine is a highly addictive substance and relapsing seems common among smokers trying to quit. Thus, an examination of an alternative to cigarettes may seem a more practical approach in improving individual and societal health. Also, in terms of economics, snus may also increase the utility of individuals, those already addicted to a source of nicotine, or those wanting to optimize their utility by using an external good.

Snus, Swedish moist snuff, is an important nicotine source in addition to cigarette smoking in Sweden. Since the way in which snus delivers nicotine to the body is closer to that of a cigarette, it is probably a better substitute than nicotine patches and other replacement therapy medications. Snus and cigarettes provide the user with a "rush" of nicotine. Moist snuff, not snus, has shown success in smoking cessation programs (Anderrson 2006).

All tobacco products have proven to be highly addictive; however, the negative health affects associated with the usage of snus are less than those from smoking cigarettes. Swedish snus, compared with snuff in the United States, is also less harmful since it has a lower concentration of nitrosamines. The way snus is manufactured and stored causes it to deliver lower concentrations of the harmful chemicals found in tobacco products. Snus, is still known to contain carcinogenic substances, but it has yet to be proven to produce cancer in humans. Other risks from using snus include all the effects of nicotine on the cardiovascular system: increase in heart rate, cardiac output, blood pressure and coronary blood flow. Increased risk of cardiac infarction has not been found. Those who are pregnant should stay away from snus, as it is likely

to be dangerous to the unborn fetus. Further explored in this document are health expenditures attributable to smoking, the rational addiction model, the hyperbolic model, and the discussion of what should be done in an economic sense and also in a public health perspective in terms of public policy.

Section 2- Health Expenditures Attributable to Smoking

Annually, 5.1 million years of potential life is lost in the U.S. as a result of cigarette smoking. Between 2000 and 2004, $193 billion in annual health-related economic losses were estimated through the usage of cigarette smoking: nearly $96 billion in direct medical costs and an additional $97 billion in lost productivity (CDC).

In 2004, $15,566 million (4.9% of total health expenditures) was spent on ambulatory care, $48,694 million (10.25%) in hospital care, $15,480 million (9.4%) in prescription drugs, and $8,492 million (7.8%) in the nursing home (CDC). Smoking contributes to a twenty-one percent increase in inpatient and outpatient spending, and a twenty-eight percent increase in medication (Sturm 2002). There is an increased average of $230 per year because of smoking. Though these numbers are attributable to smoking specifically, the assumption can be made that snus would have lower costs associated with it because it is a healthier alternative and not known to cause cancer.

Since actual figures for snus expenditures in the U.S. were unable to be determined, a study in Sweden is used to illustrate the cost savings associated from snus in comparison to cigarette smoking. In 2001, tobacco-related diseases created costs of 995 million € ($1,305 M USD), 1100 € ($1,442 USD) per smoker in Sweden. According to calculations performed by Hortlund and Arnberg (2010), a snus user created costs of 76.1€ ($100 USD) per year (Appendix

A, “Tobacco- Related Costs: A Comparison Between Snus Users and Smokers”). Thus demonstrating that snus users contribute significantly less healthcare costs than cigarette smokers.

Model Section

Section 3a- The Theory of Rational Addiction

Becker and Murphy’s (1988) theory of rational addiction is formed on the basis that addictions can be useful in modeling rational consumption plans. Rationality, in an economic context, is defined as a consistent strategy to maximize utility over time. With the anticipation of future consequences of their choices, rational consumers try to maximize utility from stable preferences. On the other hand, addiction occurs when past consumption of a good is positively correlated with its future consumption.

The utility of an individual at any given moment in time depends on the consumption of two goods. Past consumption of a good can affect its current utility through “learning by doing”. A rational person will maximize utility subject to his or her expenditures. He or she will also be able to recognize that the consumption of a harmful good has negative effects on future utility, whereas a beneficial good has positive effects on future utility (Becker 1988).

Addiction occurs if and only a behavior displays adjacent complementarity (complementarity between past and current consumption), which implies that an individual is addicted to a good when past consumption of the good raises the marginal utility of present consumption. Even though this effect on utility is necessary, it is still not sufficient even for potential addiction since potential addiction depends on other variables as well (Becker 1988). A good may be addictive to some individuals and not to others, for example not everyone is

addicted to alcohol, gambling, jogging, etc. Individuals have different preferences, and thus a one-time exposure to an addictive good may not cause a person to be addicted.

Addictions include an interaction between individuals and goods. A person's outlook on time determines whether there is adjacent complementarity. If a person is present- oriented, then they have the potential to be more addicted to harmful goods in comparison to a future-oriented individual. This result comes from the idea that an increase in past consumption leads to a smaller rise in full price when the future is discounted more heavily. Dependent on the individual and the good is the rate of depreciation of past consumption, the complementarity between past and present consumption, and the effects of changes in the stock of consumption capital on earnings (Becker 1988).

The initial stock of consumption capital and location of a demand curve plays a significant role in a person's potential to become addicted. Consumption will grow over time if an individual's initial consumption exceeds the steady-state level and will cease if below that level. The steady state's instability is positively correlated with an increase in the level of potential addiction. Unstable steady states are necessary in explaining rational "pathological" addictions- a person's consumption of a good continually increases over time even though he or she expects the future and his or her rate of time preference is no smaller than the rate of interest (Becker 1998). Unstable steady states are also important in explaining "normal" addictions that involve a temporary rapid increase in consumption. Multiple steady states may occur. In the instance of two steady states, relatively few individuals will consistently consume small quantities of addictive goods. Goods that are highly addictive to most people are prone to having a bimodal distribution of consumption; one mode is near abstention for consumption deviates from an unstable state moves toward zero.

Rationality does not rule out strong discounts of the future. In fact, consumers become more myopic as his or her time preference for the present increases (Becker 1988). Rational behavior is different from myopic behavior in that present consumption is dependent of future consumption (Anderrson 2006).

Studies of harmful addictions often discuss reinforcement and tolerance. Reinforcement is defined as the greater current consumption of a good raises its future consumption and is also closely related to adjacent complementarity; past smoking increases cravings for smoking today. On the other hand, tolerance is built on the concept that the given levels of consumption are less satisfying when past consumption has been greater (Becker 1988). The rate of increase in utility decreases with the amount of cigarettes smoked (diminishing marginal utility) (Andersson 2006). Rational harmful addictions implies tolerance because the higher the past consumption of a harmful good, the lower its present utility at the same level of consumption. Time preference is not required for addiction (Becker 1988). Smoking one extra cigarette today increases instantaneous utility because the smoker is relaxed through the cigarette's nicotine content (Andersson 2006).

Each smoker has constraints to his or her budget: consumer's wealth and prices of cigarettes and nonaddictive goods. Factors that constraint a smoker's budget is the price of cigarettes today, consumer's wealth, future discount prices.

A permanent price change of an addictive good may have only a small short-run effect on demand. However the effect will grow over time until a new steady state is reached. The long-run effect on consumption in relation to permanent change in price tends to be larger for addictive goods.

Past and future price affect current consumption.) Changes in past price affect current consumption by changing the current stock of consumption capital, whereas future prices affect current consumption by changing current full prices through effects on future consumption and future stock. The relationship between complementarity and addiction suggests that an anticipated rise in future prices of addictive goods will lower current consumption. The longer the future price changes are implemented, the greater the reduction in the past consumption of he good. Therefore, the stock of capital would be smaller when carried into the present. The effects of recent past prices are larger than more distant past prices when steady states are stable. On the other hand, changes in consumption at one point in time in an unstable steady state lead to larger changes in future consumption since the consumption capital continually grows. Life changes seem to also play a role in the model of rational addiction. Stressful changes in the life cycle may have the same effect on consumption as the change in price. For example, an increase in stress may raise the current consumption of the addicted food just like a reduction in price may raise present consumption. With this being said, individuals with the same utility function, same wealth, and same price exposure, may have a different degree of addiction because they have different experiences.

A temporary event has the capability to "hook" a rational person permanently to an addictive good. This model acknowledges that individuals often become addicted because of their unhappiness. The rational addiction model assumes that addicts are rational and maximize utility; however if their addiction results from an anxiety-raising event, they would not be happy because it lowers their utility. If prevented from using these addictive goods, these individuals would be even unhappier.

Different personalities and preferences struggle to control behavior. The nonaddictive personality, when in control, will take an approach to reduce the power of the addictive personality when it is in control.

The theory of rational addiction explains why many severe addictions are stopped only with an abrupt cessation of consumption. A rational individual will end his addiction if his or her demand for the good is lowered sufficiently or his stock of capital is lowered sufficiently. Consumption declines more rapidly when changes in current consumption have a large effect on future consumption. Rational individuals end stronger addictions more quickly than weaker ones. The loss in utility from the cessation of consumption gets bidder as an addiction gets stronger in the short run. The behavior of an abrupt cessation in consumption is rational because a large short-term loss in utility is exchanged for a larger long-term gain.

A rational addict may postpone the cessation of his or her action in attempts to reduce the short-run loss in utility from the sudden stop in usage. Failures and uncertainty is common and is different for every individual (Becker 1988).

Section 3b- Results

Policy implication when observing the rational addiction model for one good suggests that intervention is not needed unless there are externalities. A user of cigarettes maximizes his or her utility when he or she smokes. Therefore, the implementation of a tax or ban on cigarette consumption will decrease the individual's utility. The rational addiction model assumes that the user is maximizing his or her well-being keeping future consequences in mind. If the rational user feels that smoking is maximizing his or her utility, then government intervention should not be implemented. The rational individual is capable of making decisions on his or her own.

There are negative externalities associated with using cigarettes. One would be that an individual's healthcare cost would be increased. With the rational addiction model, the user will keep these future costs in mind while maximizing his or her well-being. This does not suggest that the user will stop or decrease his or her consumption, but the user may or may not modify his or her behavior in order to lessen the impact of these externalities. Healthcare costs not only affect the individual smoker, but the greater population as well. Unpaid healthcare costs are paid by the local, state, and federal government through taxation and premiums. Essentially, these costs are incurred by us, the general public. Another externality to keep in mind is second-hand smoke. Again, there are healthcare costs associated with it as well as health risks are being imposed on innocent bystanders- those who do not smoke.

Some may argue that there is a positive externality when it comes to smoking. Social Security and Medicare make up a huge portion of overall healthcare costs. The CDC estimates that an average smoker loses 10 years of his or her life; these premature deaths could result in savings to Medicare, Social Security, private pensions and other programs. Viscusi (2011) found that for every pack of cigarettes smoked, the country reaps a net cost savings of 32 cents. According to NPR, however, smokers do pay a fair amount in cigarette taxes that should offset the amount of savings made from premature deaths (Adamson 2012).

Section 4a- Rational Addiction with Two Addictive Goods

When adapting the rational addiction model to fit two addictive goods, snus and cigarettes are substitutes for one another because both goods provide the user with nicotine. There are two separate habit stocks for this case since each nicotine source has its own social and

psychological factors connected with it; each source may not be switched without certain adjustment costs. A habit stock measures the degree of addiction (Bask 2003).

As marginal utility will decrease over time with cigarettes, the same concept applies to snus, and both goods used simultaneously. Tolerance causes habit stocks to affect utility in a negative manner and at an increasing rate. The assumption can be made that there is a direct negative health effect from the habit stocks (Bask 2003).

Each consumer has his or her own budget constraint. The consumer is then faced with the task of choosing the amount of goods that will maximize utility subject to his or her own personal budget constraint. In the model with two addictive goods, important factors include: the price of cigarettes, the price of snus, constant interest rate, and the present value of wealth.

Long-run demand elasticities should be kept in mind since these give a measure of the response between steady states to a permanent change in price. Since the model is applied to two goods, cross-price elasticities can be derived and estimated.

Section 4b- Results

Using snus to quit smoking may be advisable in an economic sense, but less advocated for public health. Public health strives to reduce health risks in every way possible. The usage of snus, though less risky than cigarettes, still has some negative effects on the body.

Since snus delivers nicotine in the same way as a cigarette does, the user is still gaining utility from the addictive goods. A rational individual will make his or her own decision whether to continue using both goods. If he or she feels that using both goods is maximizing his or her well-being, forcing him or her to quit may not make the individual better off.

There are still three options the government can take: taxation on only cigarettes, taxation on only snus, and taxation on both these goods. Of these three options, taxation on cigarettes leads to more positive results. Increasing the total cigarette price does indeed lead to a lower consumption of the good, and leads to more consumption of snuff and other smokeless tobacco products. According to Bask (2003), an increase on cigarettes would lead to higher consumption of snus because the two goods are substitutes for one another. Thus, a decrease in cigarettes and an increase in snus would, in theory, lead to less healthcare costs and exposure to negative externalities such as second-hand smoke.

Section 5a- Hyperbolic Discounting Model

In contrast with the rational addiction model, is the hyperbolic discount model, where individuals are time inconsistent. When an individual is under a realistic environment, his or her awareness of self-control problems alleviates the over-consumption of an addictive good. The rational addiction model assumes that there is not any hyperbolic discounting.

Hyperbolic discounting is not consistent with the theory of rational addiction because the theory of rational addiction is future-oriented, whereas hyperbolic discounting views are time inconsistent. A reward today is valued relatively more than a reward tomorrow; however a reward tomorrow and a reward the next day are valued similarly. This holds true when tomorrow arrives as well. Hyperbolic discounting show that substance abusers discount delayed consequences to a greater extent than non-drug users; users devalue the benefits of drug abstinence to such a degree that delayed reinforcements cannot compete with the immediate reinforcing consequences of drug use. Individuals discount delayed costs to a lesser degree than delayed benefits (the sign effect). This suggests that delayed costs of smoking may control more

behavior than delayed benefits of abstinence (Odum 2002). Declining rates of time discount suggest time inconsistency and self control problems when choices are uncommitted.

$$V = A/1+kD$$

V represents the present discounted value of a delayed reward; this is also the indifference point. A is the amount of the delayed reward, k represents the derived constant proportionate the degree of delay discounting, and D is the delay itself. Reward types also matter.

The discount rate between the current and next period is higher than that of two consecutive periods in the future. This holds true when the next period arrives as well. Thus, the self-control problem arises because the shift in the discount rate between two consecutive periods leads to an optimal choice in the current period to be different from that chosen in the previous period (Kan 2007).

Short-run behavior tends to conflict with preferences in the long-run. If future plans for the long run are established, individuals are more probable to meet the deadlines either given to them or self-assigned (delayed gratification). Likewise, in the short-run, individuals are more probable to give into achieving instant gratification. This combination of time preferences is called hyperbolic discounting. There are gaps between a person's long-run goals and short-run behavior. Since the individual's short-run preferences for instant gratification will undermine his or her effort to implement long-run goals, his or her desired level of target savings is not achieved (Angeletos 2001). Robert Strotz (1956) first claimed that people are more impatient when making short-run tradeoffs in comparison to long-run tradeoffs (Angeletos 2001).

Consumers face uncertainty with future labor income, which also limits their ability to borrow against this future labor income (Angeletos 2001).

A discount function is created and measures the value of utility at each time period. For a zero delay function, delaying a reward reduces its value. There is experimental evidence that makes the implication that the discount rate declines at a higher rate in the short-run rather than the long run; the delay in a short-run reward by a few days reduces the reward more than delaying a long-run reward by a few days. The consumer may then have to struggle with intrapersonal strategic conflict because of this dynamic inconsistency between short-run and long-run preferences. “Early selves” want to implement preferences on “later selves”, while “later selves” think about maximizing their own interests (Angeletos 2001).

Section 5b- Results

This model can be easily analyzed when looking at smoking. Those who want to quit smoking have a demand for control devices. For example, cigarette excise taxes serves as a self-control function for a low- income smoker (Kan 2007).

A smoker faces two choices: to continue or to quit. Each choice yields different paths of lifetime utilities. The assumption that the utility in the period in which the smoker quits is less than if the individual smokes in that period. Abstinence has a higher utility than smoking in the current period because smoking is harmful. The smoker will quit in the current period if the cost of quitting is smaller than the lifetime gain from not smoking. Instead of quitting in the current period, the smoker may consider quitting in the next. (Kan 2007)

An individual may also be classified as a perpetual procrastinator. This means that the smoker will not quit in the current period, but will plan in the next; however, when that next

period arrives, the same cycle repeats. The smoker will postpone forever and will never quit (Kan 2007).

A proposition of time inconsistent preferences is that an individual that realizes his or her self-control problems has a demand for commitment devices. If a smoker makes the decision to quit in the next period, he or she will impose a cost on him- or herself, which is to be paid if the individual smokes in the next period. To have an effect, the cost must be large enough that when the next period comes the lifetime utility associated with quitting is greater than the costs (Kan 2007).

According to Kan (2007), individuals who discount more are considered most impulsive. Through the usage of an empirical approach, smokers discounted significantly more than the non-smokers in terms of delay. Two groups of people were observed: smokers, and non-smokers. These individuals were all presented with hypothetical situations in which they decided whether they would rather have a "reward" now or later with varying consequences of their actions. Those who smoked were more inclined to choose receiving the reward sooner than later regardless of the consequences compared to non-smokers. Results were similar when "rewards" were set out with "losses".

The costs of smoking will increase with the implementation of public policies. A time consistent, rational smoker (an individual without self-control problems), will not support any public policies regardless of whether or not he or she wants to quit smoking. This is because a time consistent smoker is able to quit without any difficulty once it is determined that abstinence from smoking brings greater lifetime utility (Kan 2007).

Non-smokers are more supportive for an increase in cigarette excise taxes will increase the monetary cost of smoking, a ban on cigarette smoking in all public areas, and a ban on smoking in the workplace. Smokers who intend to quit have a demand for self-control devices; however those who intend to quit are less supportive than non-smokers. Both non-smokers and smokers least supported for a cigarette excise tax increase. Those who intended to quit smoking had a higher likelihood being strongly supportive or somewhat supportive for an anti-smoking public policy (Kan 2007). Based on cross-sectional data collected from Canada and the United States, Gruber and Mullainathan (2005) found that smokers, after an increase in cigarette taxes, are happier.

The age, health status, and whether or not there was a presence of other smokers at home or at work are important determinants of one's support for an increase in cigarette excise taxes. An older or a healthier smoker has more support for a tax hike. The presence of other smokers at home are work, are more likely to support for a tax hike (Kan 2007).

Education, health status, engagement in a weight-loss program, and awareness of the harms of smoking help to explain an individual's intention to quit smoking. Furthermore, having this intention to stop increases a smoker's probability of strongly supporting for a public area and workplace smoking ban. Age and presence of other smokers have a negative affect for the workplace smoking ban. Smokers that have the intention to quit in the future are more likely to support anti-smoking public policies. This suggests that smokers have a time inconsistent preferences and to discount the future hyperbolically. With these inconsistent preferences, the smoker is more likely to postpone quitting, so quitting may never be executed (Kan 2007).

Delayed cigarettes lost subjective value more rapidly than delayed money for the current smoker. Hyperbolic discounting refers to the devaluation of delayed rewards proportional to their delay. For each unit of time that causes an individual to have a delay in the delivery of a good, the reward's present utility decreases by an increasingly smaller proportion (Bickel 1999). Ex-smokers discounted monetary outcomes to a similar extent to never-smokers, and much less than current smokers, which suggests that the increase degree if discounting in current smokers could be a reversible effect of nicotine dependence.

Undergraduate students valued rewards in the near past more than rewards further back in the past, small rewards were discounted more than large rewards, and rewards were discounted more than losses. Future and past outcomes were generally symmetrical; cigarette smokers discounted both future and past hypothetical gains more than the non-smokers. One issue with this is that discounting refers to inability to inhibit responding or delayed gratification. Nothing can inhibit the past. Addicts do not seem to learn from prior experience or anticipate the future (Bickel 1999).

Delayed health gains lost value more quickly for smokers than for ex-smokers and never-smokers. In terms of health losses, again, delayed health loses lost value more quickly for smokers. Current smokers discounted health outcomes more than never-smokers. Discounting by ex-smokers was between that of smokers ad never smokers, Current and ex-smokers discounted health losses more than health gains. Smokers and ex-smokers discounted health losses more than health gains, whereas never-smokers discounted gains and losses similarly.

One issue with this model is that the similarities between the ex-smoker and the non-smoker may be due to selection bias; smokers with a low degree of discounting are successfully

able to quit smoking. The degree of discounting depends on the reward type and reflects the importance of drug reward relative to money. An explanation for this is withdrawal. Nicotine withdrawal includes: insomnia, increased appetite, dysphoria, irritability, restlessness, anxiety, difficulty concentrating, and insomnia (Bickel 1999).

Section 6- Discussion

Though most of the results are geared towards cigarette usage, these models can be applied to the usage of snus as well. Snus, as previously stated, is a substitute for cigarette smoking in the context of nicotine dependence and biological factors involved. A rational individual knows of the risks of snus usage, and is future-oriented, limiting his or her intake of the addictive good. Since nicotine is a highly addictive good, the individual will build tolerance and a reinforcing behavior. Life events may make the utility from consuming snus more appealing, and therefore give incentive for a rational individual to become a user. Rational choice amounts to comparing the benefit of snus usage to the total discounted costs of using snus, these include: monetary costs, health damages, and costs of increased usage in furthering addiction. The taxation of cigarettes was discussed earlier in the context that only cigarettes would be taxed, and therefore the demand in snus would rise. Though there would be a rise in the demand for snus, a tax does not necessarily need to be implemented for all tobacco products. The rational addiction model states that individuals are rational, and would therefore use snus to maximize their well beings. Since snus does not impose health risks to others, like second hand smoke, the taxation of snus may not be necessary. However, it may be necessary in the context of healthcare costs incurred by the population.

In terms of hyperbolic discounting, a snus user will discount future gains and losses in terms of the present intake of snus. Using snus today is valued relatively higher than using snus tomorrow. However, using snus tomorrow and the next day are valued similarly. These statements hold true when applied to tomorrow as well. With this being said, those who use snus will think about the short-term gains, rather than future health consequences. Individuals who would like to reduce or stop their intake of snus would be in favor of public policy changes like taxation. The non-user would support taxation as well; however, the snus user with no intention of quitting would not want taxes to be implemented.

From an economic perspective, there are times in which it makes sense to stop the usage of snus when applying these two models. The economic man wants to maximize his utility. The rational addiction model shows that an individual makes choices based on future consequences and thus limits his or her intake on addictive goods, while still trying to maximize utility. Therefore, no public policy or intervention is necessary unless negative externalities exist. For the hyperbolic model, the individual is not fully rational and has time inconsistency. The user will want to maximize utility in his or her present state by discounting future gains or losses. With that being said, the user is going to use snus unless there are control devices set in place. The hyperbolic model supports taxation on both goods if the user wants to quit using the two goods.

In an economic view, individuals are constantly striving to maximize their own utilities; therefore, the need to have government intervention is not necessary unless there are negative externalities and hyperbolic discounting involved. Individuals have different preferences and have different modes of maximizing their utilities. The usage of snus and cigarette smoking may

increase an individual's utility, so increasing taxes or creating a ban would only hurt the individual.

Section 7- Implications for Public Health

Physicians and counselors may motivate abstinence by making users more aware of delayed losses. Attempts to motivate abstinence through the usage of long-term consequences may not be effective. It may be best to focus efforts on short-term consequences or arranging short-term mediating consequences. In the present context, smokers discounted delayed health losses more steeply than health gains; this suggests that appeals to future health problems could be less effective than appeals to future health benefits. Thus, behavioral training to lessen the effect of delay on the reinforcing value could produce beneficial reductions in smoking and other risky behavior (Odum 2002). The implementation of a tax would also decrease the usage of tobacco related products. In terms of a Public Health view, the implementation of taxation on all tobacco products would decrease the amount of consumption of these goods. Also, the implementation of a public ban on all tobacco products may lower consumption as well as seen through cigarette usage.

Second-hand smoke is an externality that may not seem prominent in an economic sense; however, in public health it would be important to reduce smoking with the usage of public policies. Another negative externality that may be overlooked when applying an economics perspective is healthcare costs on the population in general. Healthcare costs are limited to just the individuals using the addictive goods. They extend to the greater public. The government pays for costs when individuals cannot pay for them; these funds come from insurance premiums and taxes. These funds are coming indirectly from the U.S. population in general.

Section 8- Conclusion

Though there are concerns for the number of tobacco users in the world, there are two different perspectives in which to analyze the actions to be taken. In a public health view, limitations on smoking and tobacco usage are highly favored. However, in an economic sense, the utility of the user is valued more greatly. These two views have contradictory actions in that public health fully supports the implementation of public policies against tobacco usage, whereas economic supports the individual's decision to smoke or use tobacco products. Snus is indeed a healthier alternative than cigarettes, so switching from cigarettes to snus may be beneficial in both a public health and economics view. People are less exposed to second-hand smoke and health risks, and still maximizing their utility for nicotine/ tobacco intake.

Appendix A

Tobacco- Related Costs: A Comparison Between Snus Users and Smokers

Disease	Cost (M€)	Cost per smoker per year (€)	Relative Risk	Cost per snus user per year (€)
Cancer:				
Upper aerodigestive	71.6	79.6	0.22	17.5
Lung	234.7	260.8	0	0.0
Pancreatic	23.8	26.5	0.22	5.8
Renal	12.0	13.4	0.22	2.9
Bladder	13.2	14.7	0.22	3.2
COPD	194.0	215.5	0	0.0
Pneumonia	26.7	29.7	0	0.0
Cardiovascular Diseases	418.8	465.4	0.1	46.6
Sum	994.9	1105.5		76.1

Source: Hortlund &Arnberg (2010)

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