

VICES IN CRISIS:
UNRAVELING MALE TOBACCO AND
ALCOHOL CONSUMPTION PATTERNS IN US HOUSEHOLDS
AMIDST THE GREAT RECESSION AND COVID-19 PANDEMIC

by

Mariia Atamaniuk

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Thesis Supervisor: _____ Professor Maksym Obrizan

Approved by _____
Head of the KSE Defense Committee, Professor

Date _____

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LIST OF ABBREVIATIONS

BLS U.S. Bureau of Labor Statistics

CEX Consumer Expenditures Survey

GDP Gross Domestic Product

PUMD Public Use Microdata

UCC Universal Classification Code

US United States

CHAPTER 1. INTRODUCTION

The lipstick effect is a term used to describe a phenomenon in consumer behavior where individuals tend to purchase small luxury items, such as cosmetics, during times of economic hardship or uncertainty. The term was first coined by Leonard Lauder, the chairman of Estée Lauder, who noticed an increase in lipstick sales during the 2001 recession in the United States by 11%. The theory behind the lipstick effect is that individuals are more likely to spend money on small indulgences during tough economic times as a means of coping or boosting their mood instead of spending money on big purchases that will hit their purchasing power (Schaefer 2008), as a means of maintaining some level of comfort or enjoyment (Koehn 2001).

Lipstick can be observed back in the Great Depression of the 1930s when despite a reduction in industrial production, sales of cosmetics continued to rise. Similar observations were made in more recent recessions, such as those in the 1990s and 2000s (Benson, French and Nardi 2011). Also, during Japan's long period of stagnation, sales of accessories like cosmetics continued to rise by 10%, while spending on clothes declined by 25%. All of this supports the hypothesis that during economic downturns, consumers may cut back on large purchases, but they will continue to buy small luxuries like cosmetics, creating a "lipstick effect" that benefits companies in the beauty industry (Elliott 2008).

The lipstick effect is traditionally associated with women's consumer behavior, particularly during economic downturns. However, the concept can be applied to men as well, although it may manifest differently. In fact, some studies have suggested that men may be more likely to engage in this type of "retail therapy" during economic downturns than women (Durante 2012, Gao and Kim 2017, Wagstaff 2018).

However, as more research papers appeared on the topic that discusses the concept of the lipstick effect and how it has evolved over time, they were still mainly concentrated on women's and household consumption patterns, therefore, creating a window of research opportunities for different categories of products that may be considered "recession-proof" and less affected by economic downturns (Allison and Martinez 2010, Netchaeva and Rees 2016). In this study, we explore whether men exhibit similar behavior and what types of products they tend to purchase during a recession.

Based on previous research, we hypothesize that men's consumption of tobacco and alcohol may increase during an economic downturn, as these items are often perceived as indulgences and provide a form of escape from financial stress (Kaiser et al. 2017, Bor et al. 2013). By analyzing data on men's consumption patterns during the three recession periods between 2000 and 2021, we aim to shed light on the existence and potential drivers of the lipstick effect in male consumers. Therefore, the purpose of this paper is to go deeper into the topic from a different perspective on the same US market examined in some of the papers (Bulla et al. 2016, Chiaroni 2016, Eksten, Petev and Pistaferri 2011).

However, there are also studies that show that during recessions, people involve more in healthier activities (Ariizumi and Schirle 2012). Therefore, it is essential to consider that the impact of a recession on consumption behavior might be two-sided, with factors that both increase and decrease the consumption of tobacco and alcohol.

Also, recessions may differ between themselves, as confirmed by studies (Mian, Rao and Sufi 2013). In this work, we take two recessions: the Great Recession (from December 2007 to July 2009) and the COVID-19 Recession (from February 2020 to April 2020) and compare male consumer behavior of tobacco and alcohol during these times. By doing so, we hope to uncover any unique patterns in men's consumption habits across these distinct economic downturns, providing a more nuanced understanding of the male "lipstick effect".

In conclusion, this study contributes to the growing body of research on the lipstick effect by examining men's consumption behavior during recessions, with a particular focus on tobacco and alcohol products. Understanding these patterns is crucial for businesses and marketers, as it highlights the potential for certain products or industries to be recession-resistant. This knowledge enables companies to anticipate better and respond to changes in consumer spending patterns during economic downturns, allowing them to adapt their marketing strategies and product offerings accordingly.

Furthermore, by recognizing the factors that drive the lipstick effect, businesses can potentially develop strategies to mitigate the effects of economic downturns on their sales and revenue. For instance, companies in the tobacco and alcohol industries might consider launching new product lines or targeted promotions that appeal to the preferences of consumers who are more likely to indulge in these products during challenging economic times. In addition, this information can be valuable for businesses looking to enter or expand their presence in these markets, as they can leverage the insights gained from this research to make more informed decisions about their growth strategies.

While this study also has implications for policymakers and public health professionals in designing targeted interventions and campaigns to address the negative consequences of tobacco and alcohol consumption, the primary focus remains on the business implications. By examining the lipstick effect and its impact on men's consumption behavior, this research not only sheds light on an under-explored area but also provides valuable insights for companies operating in the tobacco and alcohol sectors to navigate and thrive during economic recessions.

CHAPTER 2. LITERATURE REVIEW

Studying consumption patterns enables businesses and economists to comprehend consumer decision-making and gain insights into broader economic trends. Analyzing gender differences in consumption patterns, particularly during recessions, helps businesses tailor product offerings, pricing, and marketing strategies for diverse consumer groups while also identifying economic weaknesses and opportunities.

2.1 Studies on lipstick effect

The study by Hamilton et al. (2019) presents an integrative framework for understanding how financial constraints influence consumer behavior. The authors argue that consumers who are financially constrained may experience feelings of scarcity and stress, leading them to focus on the short-term, prioritize necessities over luxuries, and make trade-offs between different consumption categories. The study also highlights the role of situational and personal factors, such as perceived control and social support, in shaping the effects of financial constraints on consumer behavior. This study concentrates on how financial constraints can influence consumer behavior and develop more effective strategies for reaching and serving financially constrained consumers, which shows that, in theory, consumers should behave rationally and not spend scarce resources on unnecessary items.

The study by Durante et al. (2012) examined the relationship between economic recessions, mating strategies, and consumer behavior, specifically the “lipstick effect”. The results showed that when the economy is in decline, women tend to enhance their physical attractiveness through the use of cosmetics, such as lipstick, as a way to increase their mating opportunities. Additionally, the study found evidence for the lipstick effect, where consumers may shift their spending from larger luxury items to smaller indulgences, such as cosmetics, during times of economic uncertainty. The authors suggest that this shift in consumer behavior may reflect an evolutionary strategy to increase reproductive success during times of economic stress.

Studies on the lipstick effect have explored several possible explanations for why women may increase their spending on cosmetics during economic downturns. The study by Wagstaff (2018) found that women turn to cosmetics as a way to boost their mood or self-esteem during stressful times, as well as to attract better males through beauty-enhancing practices in difficult economic times.

The study by Netchaeva and Rees (2016) suggests that women use cosmetics to enhance their appearance and increase their attractiveness in the job market, particularly when facing competition from other job seekers. Some studies have focused specifically on the impact of marital and employment status on the lipstick effect, finding that women who are single or unemployed may be more likely to increase their spending on cosmetics during recessions.

These findings suggest that cosmetics consumption may be driven by a combination of emotional and economic factors and that policies aimed at addressing these underlying issues could be effective in reducing the prevalence of the lipstick effect.

The main study that was taken as a model for this research was Dildar and MacDonald (2020). It uses similar data from the Customer Expenditures Survey (CEX) in 2000-2021 to build a logit model to investigate the probability of buying cosmetics products among younger women (age 18-40) to different household characteristics, including age, employment, education, etc. As a result, it has been proved that a significant increase in average cosmetics expenditures was not affected by employment or marital status. This suggests that the popular explanations for the lipstick effect, such as women buying more lipstick to attract a mate or secure employment, are not accurate. Instead, these findings support the theory that the lipstick effect is caused by a substitution away from spending on women's clothes.

2.2 Papers on tobacco and alcohol consumption

The paper by Kaiser et al. (2017) investigates the relationship between economic conditions and smoking behavior in Germany using data from the German Socio-Economic Panel. The authors find that smoking rates decrease during economic downturns and increase during periods of economic growth. The effect is larger for low-educated individuals and those who work in blue-collar occupations. The paper also examines potential mechanisms driving this relationship and suggests that job loss and increased stress during economic downturns may lead to decreased smoking rates, while increased income during economic growth may lead to increased smoking rates. Overall, the results indicate that economic conditions have a significant impact on smoking behavior in Germany.

The paper by Kenkel, Schmeiser, and Urban (2013) examines whether smoking is an inferior good, meaning that consumption decreases as income increases. Using data from the National Health Interview Survey and the variation in the Earned Income Tax Credit, the authors find that smoking is an inferior good. Specifically, the paper shows that an increase in income is associated with a decrease in smoking prevalence, and that the income elasticity of smoking is greater for low-income individuals. These results suggest that policies aimed at increasing income may also help reduce smoking rates.

The paper by Bor et al. (2013) investigates the impact of the Great Recession of 2008-2009 on alcohol consumption. The authors used data from the European Union and found that alcohol consumption fell during the recession period, particularly among men and in countries with greater economic hardship. The paper discusses several potential mechanisms for this effect, including changes in income, changes in social norms, and changes in psychological stress. The authors also highlight some of the potential public health implications of changes in alcohol consumption during times of economic hardship. Overall, the paper provides insight into the relationship between economic conditions and health behaviors.

Crombie et al (1990) examined the association between cigarette smoking and employment status, finding that unemployed individuals are more likely to smoke than their employed counterparts. The results suggest that tobacco consumption may be resistant to the negative effects of economic downturns, as individuals may continue to smoke despite experiencing financial stress or job loss.

Black and Ruhm (2002) investigated the relationship between alcohol consumption and macroeconomic conditions, finding that alcohol consumption tends to be less responsive to economic downturns than other types of goods. The authors suggest that alcohol may serve as a coping mechanism for individuals during difficult economic times, making it a relatively recession-proof category of goods.

Decker and Schwartz (2000) examined the relationship between cigarette and alcohol consumption, arguing that these goods can be both substitutes and complements. The study finds that cigarette consumption is relatively stable during economic downturns, while alcohol consumption may increase or decrease depending on the specific circumstances. This suggests that tobacco and alcohol may be somewhat recession-proof categories of goods, particularly in men's consumer behavior.

Gallet's (2007) meta-analysis of alcohol demand studies finds that alcohol consumption is relatively unresponsive to changes in income or prices, indicating that it may be a recession-proof category of goods. The paper suggests that men's consumption of alcohol may be particularly resistant to economic downturns, as their demand for alcohol tends to be less elastic than that of women.

2.3 Papers on health implications of recessions

Ruhm (2000) explores the relationship between macroeconomic conditions and health, providing evidence that mortality rates tend to decline during economic downturns. The study analyzes data from 1972 to 1991, covering 50 U.S. states and the District of Columbia. Ruhm's findings reveal that a one percentage point increase in the

unemployment rate is associated with a 0.5% reduction in total mortality, suggesting that individuals may engage in healthier behaviors during recessions, such as reduced smoking and alcohol consumption. However, the paper highlights that suicide rates tend to increase during recessions, indicating the need for targeted mental health interventions during such periods.

Health might decline during temporary upturns for at least four reasons: the increased opportunity cost of time, potential reduction in medical care, unhealthy behaviors, and stress. However, the paper also acknowledges the potential negative long-term consequences of economic downturns on health, emphasizing the need for further research to understand the complex interplay between economic conditions and public health. Additional insights on this can be taken from Ruhm (2003).

However, finding about increased health during a recession is not common among research papers. For example, Brand, Burgard and House (2007) investigated the health implications of job loss during economic recessions, examining both the immediate and long-term consequences of unemployment. The study finds that job loss can have significant negative effects on physical and mental health, with the potential for lasting consequences even after re-employment. The authors emphasize the importance of understanding the health implications of economic downturns and developing appropriate policies and interventions to mitigate these adverse effects.

Basu et al. (2009) wrote an influential paper that examines the public health effects of economic crises in Europe and explores the impact of different policy responses on health outcomes. The authors find that recessions can have substantial negative effects on public health, including increased mortality rates and reduced access to healthcare services. The study also shows that certain policy responses, such as increased social spending and investment in public health programs, can help mitigate the negative health consequences of economic downturns. This paper underscores the importance of understanding the

health implications of recessions and developing appropriate policy responses to protect public health during challenging economic times.

There are also many other papers that were used to create the best model for this research, which can be found in the references.

CHAPTER 3. METHODOLOGY

The methodology, which is employed in this paper, relies on the approach developed by Dildar and MacDonald (2020) and used with the aim of shifting the research questions based on the extended data. As mentioned, this research uses BLS data on customer expenditures collected between 2000 and 2021 years, pooled together.

The logit model will be estimated to capture a probability of a household reporting a tobacco purchase. In our sample of about 252,087 households across the 2000–2021 period, about 83% did not report making any tobacco expenditure in the two weeks span in which they completed their diary.

The first regression model will be a simple one, without any interaction term, to see the baseline of what influences the decision to make a tobacco purchase. The dependent variable is the dummy variable for tobacco purchase (tobacco is the regression model), which can denote either 0, as “no purchase of tobacco products”, or 1, as “any non-zero tobacco purchase”.

This regression model is composed as follows:

$$\begin{aligned} tobacco = & \beta_0 + \beta_1 * AGE_{18_40} + \beta_2 * MALE + \beta_3 * MARRIED + \\ & + \beta_4 * EDUC_FACTOR + \beta_5 * EMP_STATUS + \\ & + \beta_6 * \log(EXP_TOTAL + 1) + \beta_7 * GREAT_RECESSION + \\ & + \beta_8 * COVID_RECESSION + \beta_9 * yeardum \end{aligned} \quad (3.1)$$

Observable determinants for the regression model are chosen to be:

1. **AGE_18_40** - dummy variable for age, 1 if reference person is between 18 and 40 years, 0 otherwise,
2. **MALE** - sex of the reference person, 1 if male, 0 if female,

3. **MARRIED** - marital status of the reference person, 1 if married, 0 if otherwise (widowed, divorced, single, etc.),
4. **EDUC_FACTOR** - factor variable for education, 1 if "Never attended", 2 if "High school graduate" or "High school (grades 9-12), no degree" or "Nursery, kindergarten, and elementary (grades 1-8)", 3 if "Some college, no degree" or "Associate's degree in college", 4 if "Bachelor's degree" or "Master's, professional or doctorate degree",
5. **EMP_STATUS** - employment status, 1 if the person reported working at least 1 week for the past 12 months, 0 otherwise,
6. **log(EXP_TOTAL+1)** - total expenditures in logarithmic form,
7. **GREAT RECESSION** - dummy variable for Great Recession period, from December 2007 to July 2009: 1 if yes, 0 if no,
8. **COVID RECESSION** - dummy variable for Covid Recession period, from February 2020 to April 2020: 1 if yes, 0 if no,
9. **yearnum** - represents the year of the observation as a continuous variable, assigning a unique numerical value from 1 to 22 to each year from 2000 to 2021.

These variables have been determined as key factors in the study of Dildar and MacDonald (2020), which we take as a base for this research.

However, in our opinion, the methodology of the abovementioned papers should be modified to fit our research goal better. First, we should add at least one continuous variable to the model. Having only dummy and factor variables in a regression model can be problematic because it makes it difficult to model the relationships between the variables and the outcome in a meaningful way because there is no continuous scale to measure the strength or direction of the relationships. Additionally, the lack of continuous variables in the model can lead to issues with multicollinearity, which occurs when two or more independent variables are highly correlated with each other. This can make it difficult to identify the true effect of each variable on the outcome. In general, it is important to include a mix of both categorical and continuous variables in a regression model to capture the complexity of real-world relationships better.

Second, adding a race variable into a regression model may lead to problems of discrimination or bias. The reason is that race can be highly correlated with other variables that may affect the outcome being measured, such as income, total expenditures, or education level. It can also be a marker of underlying discrimination. By including a race variable in the model, the model may capture some of the effects of these other variables, which can lead to spurious or misleading results. Additionally, there may be ethical concerns around using race as a predictor variable, as it can reinforce existing stereotypes and perpetuate discrimination. Therefore, we will not add race variables to the regression models.

Third, we will eliminate any triple interaction variables as they can be redundant because including too many interaction terms can lead to overfitting, which means the model becomes too complex and fits the noise in the data rather than the true underlying relationships. Also, including triple interaction terms makes interpreting the model more difficult, as it can be challenging to understand the combined effect of three variables interacting with each other. Finally, including triple interaction terms may not add much explanatory power to the model beyond the main effects and two-way interactions, making them unnecessary and redundant.

By separating recession variables, we assume that consumers may have different consumption habits shifts during recession periods, which we want to control for. For context, a recession is a period of significant economic decline that is characterized by a significant decrease in the gross domestic product (GDP), a rise in unemployment rates, a decline in consumer and business spending, reduced manufacturing and production, a decline in stock market values, etc. As people are being laid off and total household income decreases, consumer confidence also decreases, and people tend to save more rather than spend on unessential goods.

For this model, we assume that all households are homogenous in their consumption patterns, disregarding their properties. However, to ensure the reliability of the regression

results, the Breusch-Pagan test will be performed to detect heteroskedasticity and, if there are any, fix coefficients for robustness. The task of the regression model is to find statistically significant observable factors that are important for households to report tobacco spending while controlling for recession.

The next step is to add interaction terms to the abovementioned regression model to understand better relationships among the variables in the model, especially with the recession variables. It may give us more insights into how recession influences the consumption choices of US households. Three new interaction variables were added for (1) Great Recession dummy and male, (2) Covid Recession dummy and male, (3) married and male, and (4) age between 18-40 and male.

$$\begin{aligned}
 tobacco = & \beta_0 + \beta_1 * AGE_{18_40} + \beta_2 * MALE + \beta_3 * MARRIED + \\
 & + \beta_4 * EDUC_FACTOR + \beta_5 * EMP_STATUS + \\
 & + \beta_6 * \log(EXP_TOTAL + 1) + \beta_7 * GREAT_RECESSION + \quad (3.2) \\
 & + \beta_8 * COVID_RECESSION + \beta_9 * MALE * GREAT_RECESSION + \\
 & + \beta_{10} * MALE * COVID_RECESSION + \beta_{11} * MALE * MARRIED + \\
 & + \beta_{12} * MALE * AGE_{18_40} + \beta_{13} * yeardum
 \end{aligned}$$

Then, the same models will be estimated for alcohol consumption. All methodology and reasoning behind variables remain unchanged, which allows us to compare these two models.

First, a simple model is as follows:

$$\begin{aligned}
 alcohol = & \beta_0 + \beta_1 * AGE_{18_40} + \beta_2 * MALE + \beta_3 * MARRIED + \\
 & + \beta_4 * EDUC_FACTOR + \beta_5 * EMP_STATUS + \quad (3.3) \\
 & + \beta_6 * \log(EXP_TOTAL + 1) + \beta_7 * GREAT_RECESSION + \\
 & + \beta_8 * COVID_RECESSION + \beta_9 * yeardum
 \end{aligned}$$

Dependent variable called alcohol is also in the binary form, with 1 as “any purchase of alcohol products” and 0 as “no alcohol purchase”. Independent variables are the same as in the tobacco model.

The next model is augmented with interaction terms in the same way as for tobacco purchase:

$$\begin{aligned}
 alcohol = & \beta_0 + \beta_1 * AGE_{18_40} + \beta_2 * MALE + \beta_3 * MARRIED + \\
 & + \beta_4 * EDUC_FACTOR + \beta_5 * EMP_STATUS + \\
 & + \beta_6 * \log(EXP_TOTAL + 1) + \beta_7 * GREAT_RECESSION + \quad (3.4) \\
 & + \beta_8 * COVID_RECESSION + \beta_9 * MALE * GREAT_RECESSION + \\
 & + \beta_{10} * MALE * COVID_RECESSION + \beta_{11} * MALE * MARRIED + \\
 & + \beta_{12} * MALE * AGE_{18_40} + \beta_{13} * yeardum
 \end{aligned}$$

CHAPTER 4. DATA

4.1 General overview of CEX data

The Consumer Expenditure Survey (CEX) is conducted by the Census Bureau for the Bureau of Labor Statistics (BLS) to collect information on the spending habits of American households. The survey is conducted on a quarterly basis and aims to provide data on the expenditures, income, and consumer unit characteristics of American households. The CEX program is the only federal household survey that covers the entire spectrum of consumer spending and income. Every household is weighted to make data representative of the population.

CEX data are collected in two surveys. The first one is the Interview Survey which is conducted through in-person or telephone interviews and collects data on major sources of household expenditures (such as housing and vehicles), as well as household characteristics. Participants are asked to report their spending for a three-month period.

The second one is the Diary Survey, where participants are asked to record their spending in a diary for two consecutive weeks. It better captures more minor items, such as food and personal care products.

Both surveys have their strengths and weaknesses. The diary survey provides a more detailed and accurate record of daily spending but may not capture all expenditures, particularly larger ones. The interview survey captures a broader range of expenditures but relies on participant recall, which may be less accurate (especially for small expenditures, as people rarely save grocery bills).

Overall, both surveys are valuable tools for understanding consumer spending patterns, and which one to use may depend on the specific research question and data needs. In this research as it aims at investigating small personal purchases such as tobacco and alcohol, etc. I will use only Diary data.

Diary data consists of five files, stored separately for each quarter:

- DTBD - Income File (annual)
- DTID - Imputed Income File
- EXPD - Detailed Expenditures File (weekly)
- FMLD - Consumer Unit (CU) Characteristics and Income File
- MEMD - Member Characteristics and Income File

Variables relevant to this research are located in FMLD and EXPD files. Expenditures data are categorized by a Universal Classification Code (UCC).

The paper by Bee, Meyer, and Sullivan (2012) examines the quality and accuracy of consumption data obtained from two surveys conducted by the Bureau of Labor Statistics in the United States: the Consumer Expenditure Interview Survey and the CEX Diary Survey. The authors compare the two surveys in terms of their ability to capture detailed expenditure patterns over time and assess their overall validity as a measure of household consumption. The paper finds that the Diary Survey provides more accurate information about household consumption than the Interview Survey, which tends to produce biased estimates due to measurement error and recall bias. The authors argue that the findings have important implications for policymakers and researchers who rely on consumption data to inform their work and suggest that further research is needed to improve the quality and reliability of consumption surveys.

The individual who owns or rents the household where the consumption unit resides is considered the survey respondent and is presumed to be the primary decision-maker for household financial and consumption matters.

4.2 Description of data

The Table 1 shows the total number of observations and the percentage breakdown of three demographic variables (marital status, gender, and employment status) for two-period types: non-recession and recession.

Table 1. Sample sizes for diary data (total, married, male, employed) per period type

Period type	Total	Married	% of married	Male	% of male	Employed	% of employed
Non-recession	219,701	120,049	54.64%	104,902	47.75%	151,642	69.02%
Recession	32,386	17,966	55.47%	15,819	48.85%	22,851	70.56%

Source: the author's calculations are based on Consumer Expenditure Survey data collected by the Census Bureau for the Bureau of Labor Statistics.

During the non-recession period, out of 219,701 observations, 54.64% of reference people were married, 47.75% were male, and 69.02% were employed. On the other hand, during the recession period, out of 32,386 observations, 55.47% of reference people were married, 48.85% were male, and 70.56% were employed.

The Table 2 compares the means and standard deviations of various variables during a recession and non-recession periods. During a recession, the proportion of tobacco purchases is slightly higher (0.189) than in non-recession periods (0.167), while the proportion of alcohol purchases is much higher in a recession (0.668) than in non-recession periods (0.385). The demographic characteristics of the sample, such as the proportion of males, married individuals, and employed individuals, are relatively similar across both periods. The age distribution, as represented by the proportion of individuals aged 18-40, is also fairly similar between recession and non-recession periods. The mean log total expenditure is slightly higher during a recession (6.301) than in non-recession periods

(6.245), while the mean log income is lower in a recession (10.262) than in non-recession periods (10.535). Family size remains relatively constant across both periods. The sample size includes 32,386 observations during a recession and 219,701 observations during non-recession periods.

Table 2. Sample summary statistics per variable, separated for recession (combined) and non-recession periods

Variable	RECESSION		NON-RECESSION	
	Mean	Standard Deviation	Mean	Standard Deviation
Tobacco purchase (1/0)	0.189	0.392	0.167	0.373
Alcohol purchase (1/0)	0.668	0.471	0.385	0.487
Male	0.488	0.5	0.477	0.5
Married	0.555	0.497	0.546	0.498
Employed	0.706	0.456	0.69	0.462
Age 18-40	0.348	0.477	0.337	0.473
Log total expenditure	6.301	1.203	6.245	1.209
Log income	10.262	2.825	10.535	2.321
Fam size	2.56	1.466	2.533	1.467
Total observations	32,386		219,701	

Source: the author's calculations are based on Consumer Expenditure Survey data collected by the Census Bureau for the Bureau of Labor Statistics.

The table in Annex B shows the percentage of respondents who reported purchasing tobacco and alcohol within a specified year. The frequency of tobacco purchases decreased over time from 27.72% in 2000 to 8.22% in 2021. The frequency of alcohol purchases remained relatively stable from 2000 to 2014, with a slight increase in 2015, followed by a gradual decrease until 2021. Overall, the frequency of alcohol purchase was higher than that of tobacco purchase throughout the time period covered by the table.

The Table 3 shows the distribution of tobacco and alcohol consumption in the dataset, with values given in USD. The values in each row represent the consumption level at the corresponding percentile of the distribution. The median value of tobacco consumption is \$27.39, while the maximum value is \$1,257.50, from which we can see that the distribution of tobacco consumption is highly skewed to the right, with a very large range of consumption levels. The majority of the population (up to the 75% percentile) consumes relatively low levels of tobacco, while a small proportion of the population (above the 75% percentile) consumes very high levels of tobacco.

Table 3. Expenditures quantiles per category (filtered for household who has non-zero purchase for the respective category)

Quantiles	0%	25%	50%	75%	100%
Tobacco	\$0.01	\$11.45	\$27.39	\$51.31	\$1,257.50
Alcohol	\$0.32	\$10.70	\$17.64	\$27.56	\$978.93

Source: the author's calculations are based on Consumer Expenditure Survey data collected by the Census Bureau for the Bureau of Labor Statistics.

Regarding alcohol consumption in the US, maximum alcohol consumption observed in the population is 978.93 USD, while median consumption is 17.64 USD. The dataset for alcohol consumption is also skewed to the right because the difference between the median and the 75% quantile is smaller than the difference between the 25% quantile and the median. This suggests that some high values in the dataset pull the mean towards the right.

CHAPTER 5. RESULTS

The presented results are based on the methodology and data outlined in the preceding chapters. Additionally, robustness checks are provided to account for the approximations, model specifications, and potential issues.

5.1. Regression models analysis

5.1.1 Models for tobacco consumption

In the simple logit model, we analyze the factors that influence the likelihood of tobacco purchases. All the coefficients are statistically significant, as indicated by their respective p-values. The results suggest that being in the age group 18-40, being male, and being employed are all associated with a higher likelihood of purchasing tobacco, while being married and having a bachelor's degree or higher are associated with a lower likelihood of purchasing tobacco. Additionally, log total expenditure has a positive association with tobacco purchases. Experiencing COVID-19 decreases the odds of purchasing tobacco products in contrast to the Great Recession, which increases the odds. The dataset spans many years over which tobacco consumption has been decreasing. Therefore a linear trend was added to model specifications to capture this downward trend - and the passage of time is associated with decreasing probability of tobacco purchase.

The negative coefficient for the COVID-19 pandemic variable indicates that the pandemic has led to a decrease in the likelihood of tobacco purchases, possibly due to changes in consumption patterns (people care more about their lungs because of pneumonia risk) or restrictions on social activities. The negative coefficient for yeardum might reflect long-term trends in tobacco consumption, such as public health campaigns and changing social norms.

In the second model for tobacco purchase, the interaction terms between the MALE variable and other variables are included, along with the main effects of each variable. The coefficient for the interaction between being male and experiencing any of two

recessions implies that their joint effect on the likelihood of tobacco purchase is not statistically significant either.

In contrast, the coefficients for the interaction between being male and married and being male and aged 18-40 are statistically significant, indicating that the combined effect on tobacco purchase is different from the sum of their separate effects, with a lower likelihood of tobacco purchase for married males compared to their unmarried ones and for males aged 18-40 compared to their older counterparts.

A more detailed interpretation will be outlined after calculating the marginal effects for all variables in the model.

Recalculating these models for robustness did not change the significance of the coefficients in the model. Even though there is heteroskedasticity in the model, as confirmed by Breusch-Pagan tests for both models with p-values of less than 0.05, it is fixed and does not influence the model's results.

5.1.2 Models for alcohol consumption

For alcohol consumption, we also estimated two similar models.

In the simple model, the positive and statistically significant coefficients for being between 18 and 40 years old, being male, and having employed status suggest that individuals within these categories have a higher probability of buying alcohol compared to those outside these groups. On the other hand, the negative and statistically significant coefficient for being married indicates that married individuals are less likely to purchase alcohol than unmarried individuals.

As total expenditure increases, the likelihood of purchasing alcohol also rises, as evidenced by the positive and statistically significant coefficient for this variable. The positive and significant coefficients for the elementary and college levels of education suggest that individuals with these education levels are more likely to buy alcohol than

those with the lowest education level. However, the effect on the alcohol purchasing behavior of the bachelor's education level or higher is not statistically significant. The relationship between experiencing a Great Recession and purchasing alcohol is inconclusive, as indicated by the non-significant coefficient for this variable. The negative and significant coefficient for the COVID-19 pandemic variable implies that people were less likely to purchase alcohol during the pandemic. Lastly, the negative and significant coefficient for the year dummy variable indicates a decreasing trend in the likelihood of purchasing alcohol over the years included in the dataset.

From the second model for alcohol purchase, we see that the main effects of age, being male, being married, having employed status, total expenditure, and education levels remain largely consistent with the previous model.

The effects of experiencing a Great Recession and the COVID-19 pandemic on alcohol purchasing behavior are still inconclusive and negative, respectively. The interaction terms between being male and experiencing a recession or the COVID-19 pandemic are not statistically significant, indicating that these factors do not have a differential impact on men's likelihood to purchase alcohol compared to women. Additionally, the interaction term between being male and being in the 18-40 age group is not significant, suggesting that the effect of age on alcohol purchasing behavior does not differ significantly between men and women.

Please see the marginal effects for more detailed calculations of the effects. These models also suffered from heteroskedasticity (which is confirmed by Breusch-Pagan tests). Therefore, we calculated robust coefficients for them to fix this.

5.2. Calculation of marginal effects

5.2.1 Models for tobacco consumption

All independent variables are statistically significant predictors of the dependent variable, based on the p-values in the table.

Table 4. Marginal effects for simple and interaction models for tobacco consumption along with their significance (based on p-values), corrected for robustness

Variable	Simple model	Significance	Interaction model	Significance
AGE_18_40	0.0234	***	0.0356	***
MALE	0.0215	***	0.0669	***
MARRIED	-0.0432	***	-0.0125	***
EMP_STATUS	0.0309	***	0.0324	***
log(EXP_TOTAL + 1)	0.037	***	0.0371	***
educ_factor2	0.0957	***	0.0924	
educ_factor3	0.0651	***	0.0609	*
educ_factor4	-0.0423	**	-0.0452	
GREAT RECESSION	0.0101	***	0.0133	***
COVID RECESSION	-0.0269	**	-0.037	***
year dum	-0.0054	***	-0.0055	***
MALE:GREAT RECESSION			-0.0072	***
MALE:COVID RECESSION			0.0288	
MALE:MARRIED			-0.06	***
MALE:AGE_18_40			-0.0284	

Significance codes: 0 ‘***’, 0.001 ‘**’, 0.01 ‘*’, 0.05 ‘.’

Source: the author's calculations are based on Consumer Expenditure Survey data collected by the Census Bureau for the Bureau of Labor Statistics.

Interpretation of the marginal effects for each variable in a logit model for tobacco consumption in the US is as follows (all assuming that we hold other variables constant):

1. **AGE_18_40:** Being of age between 18 and 40 years is associated with a 2.34 percentage points (p.p.) increase in the probability of consuming tobacco compared to being other ages.
2. **MALE:** Being male is associated with a 2.15 p.p. increase in the probability of consuming tobacco compared to being female.
3. **MARRIED:** Being married is associated with a 4.32 p.p. decrease in the probability of consuming tobacco compared to being single.

4. **EMP_STATUS:** Being employed is associated with a 3.09 p.p. increase in the probability of consuming tobacco compared to being unemployed.
5. **GREAT_RECESSION:** Consumption during the Great Recession is associated with a 1.01 p.p. increase in the probability of consuming tobacco compared to other periods.
6. **COVID_RECESSION:** Consumption during the COVID-19 pandemic is associated with a 2.69 p.p. decrease in the probability of consuming tobacco compared to other periods.
7. **log(EXP_TOTAL + 1):** A 1% increase in this variable (natural logarithm of total household expenditure on all goods and services) is associated with a 3.70 p.p. increase in the probability of consuming tobacco.
8. **educ_factor:** Having a high school education is associated with a 9.57 p.p. increase in the probability of consuming tobacco compared to having no education at all. Having a college degree is associated with a 6.51 p.p. increase in the probability of consuming tobacco compared to having no education at all. Having a bachelor's or master's degree is associated with a 4.23 p.p. decrease in the probability of consuming tobacco, compared to having no education at all.
9. **year dum:** A one-unit increase in the year dummy variable is associated with a 0.54 p.p. decrease in the probability of consuming tobacco.

In the second model with interaction terms, we will focus on the interaction effects (holding other variables constant):

1. **MALE:GREAT_RECESSION** and **MALE:COVID_RECESSION:** The interaction effects between being male and both economic recession dummies are not significant, meaning it does not bear additional information - other than there is in the single variables effects.
2. **MALE:MARRIED:** The interaction effect between being male and being married decreases the probability of tobacco consumption by 5.6 percentage points. So, if a consumer is both male and married, the probability of tobacco consumption decreases by 0.16 p.p.
3. **MALE:AGE_18_40:** The interaction effect between being between the ages of 18 and 40 and being male decreases the probability of tobacco consumption by 2.842 percentage points. Thus, if a consumer is both male and between 18 and 40 years, the probability of tobacco consumption increases by 7.41 p.p.

5.2.2 Models for alcohol consumption

The Table 5 indicates that being younger, male, employed, and having higher education levels are positively associated with the probability of purchasing alcohol while being married is negatively associated with this probability. The variable indicating the economic recession periods are highly significant: the Great Recession variable is positively associated with the probability of purchasing alcohol, while COVID-19 Recession is negatively associated with this.

Table 5. Marginal effects for simple and interaction models for alcohol consumption along with their significance (based on p-values), corrected for robustness

Variable	Simple model	Significance	Interaction model	Significance
AGE_18_40	0.0185	***	0.0164	***
MALE	0.0346	***	0.0745	***
MARRIED	-0.0039	*	0.0292	***
EMP_STATUS	0.0249	***	0.0264	***
log(EXP_TOTAL + 1)	0.0248	***	0.0249	***
educ_factor2	0.0403	*	0.0366	.
educ_factor3	0.0446	*	0.0403	*
educ_factor4	0.03		0.026	
GREAT RECESSION	0.6337	***	0.6355	***
COVID RECESSION	-0.2258	***	-0.2206	***
year dum	-0.0128	***	-0.013	***
MALE:GREAT RECESSION			-0.0414	***
MALE:COVID RECESSION			-0.007	
MALE:MARRIED			-0.0727	***
MALE:AGE_18_40			-0.0028	

Significance codes: 0 '***', 0.001 '**', 0.01 '*', 0.05 '.'

Source: the author's calculations are based on Consumer Expenditure Survey data collected by the Census Bureau for the Bureau of Labor Statistics.

According to the marginal effects table, the variables that influence the decision to purchase alcohol in the binary logit model are (holding other variables constant) :

1. **AGE_18_40**: Being aged between 18-40 years increases the probability of alcohol purchase by 1.85 p.p. compared to other ages.
2. **MALE**: Being male increases the probability of alcohol purchase by 3.46 p.p. compared to being female.
3. **MARRIED**: Being married decreases the probability of alcohol purchase by 0.39 p.p.
4. **EMP_STATUS**: Being employed increases the probability of alcohol purchase by 2.49 p.p. compared to being unemployed.
5. **log(EXP_TOTAL + 1)**: A 1% increase in the expenditures variable increases the probability of alcohol purchase by 2.47 p.p.
6. **education factor**: Having a school education increases the probability of alcohol purchase by 4.03 p.p., compared to having no education. Having a college education increases the probability of alcohol purchase by 4.46 p.p., compared to having no education. Having a bachelor's or master's degree is not statistically significant at the 5% significance level for influencing the probability of alcohol purchase.
7. **GREAT RECESSION**: Holding other factors constant, living in Great Recession increases the probability of alcohol purchase by 63.37 p.p. compared to non-recession periods.
8. **COVID RECESSION**: During the COVID period, the probability of alcohol purchase decreases by 22.58 p.p.
9. **yeardum**: With each passing year, the probability of alcohol purchase decreases by 1.28 p.p.

For the model with interaction terms, the interpretation of variables is very similar with the addition of:

1. **MALE:AGE_18_40** and **MALE:COVID RECESSION**: Interaction terms for these variables do not bear additional information on the effect of the decision to buy alcohol.

2. **MALE:MARRIED:** The interaction effect between being male and being married decreases the probability of tobacco consumption by 7.3 percentage points. So, if a consumer is both male and married, the probability of tobacco consumption increases by 3.1 p.p.
3. **MALE:GREAT_RECESSION:** The interaction effect between living in Great Recession and being male decreases the probability of tobacco consumption by 0.7 percentage points. Thus, if a consumer is both male and lives during the Great Recession, the probability of alcohol consumption increases by 66.86 p.p.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

This study sought to explore the potential presence of a “lipstick effect” for males, a phenomenon traditionally associated with females, where consumption of cosmetic products increases during economic downturns. We aimed to understand whether men exhibit specific changes in consumption behavior compared to women during recessions, with particular emphasis on the impact of two types of recession - the Great Recession and the COVID-19 pandemic. In this study, we focused on tobacco and alcohol as the products of interest.

We used data from the CEX (collected by BLS) to estimate the probability of purchasing tobacco and alcohol products. Two logistic models were used to examine this probability - a simple model and a model with three interaction terms. The simple model included basic variables like age, gender, education, employment status, marital status, and the presence of a Great Recession or COVID-19 recession. The model with interaction terms included the same variables but also considered the interaction of gender and age, gender and marital status, as well as gender and recession dummies, to capture any additional information.

The results for tobacco models show that being aged between 18 and 40, being male, being employed, and having a high school or college education are associated with higher probabilities of consuming tobacco. In contrast, being married and having a bachelor's or master's degree are associated with lower probabilities of tobacco consumption. Also, the probability of tobacco consumption decreases from year to year from 2000 to 2021.

The Great Recession and the COVID-19 pandemic exhibit contrasting effects on the probability of tobacco consumption. The Great Recession is associated with a slight increase in the probability of consuming tobacco, while the COVID-19 pandemic is associated with a decrease in the probability of tobacco consumption.

The interaction terms provide additional insights. The interaction effects between being male and both economic recession dummies are insignificant, meaning no additional information is gained by considering these factors jointly. However, the interaction effect between being male and being married and between being male and aged 18-40 provide valuable insights. Married men are less likely to consume tobacco, while younger men (18-40 years old) have a higher probability of tobacco consumption.

The results for alcohol consumption models show that being younger, male, employed, and having higher education levels are positively associated with the probability of purchasing alcohol, while being married is negatively associated with this probability. Interestingly, the two types of recession also have contrasting effects on alcohol purchasing behavior. The Great Recession is positively associated with the probability of purchasing alcohol, while the COVID-19 recession is negatively associated with this probability.

The interaction effects can tell us that a married male consumer has a higher probability of purchasing alcohol compared to an unmarried male, and if a consumer is both male and lives during the Great Recession, the probability of alcohol consumption increases substantially.

The contrasting effects of the two types of recession on both tobacco and alcohol purchasing behavior can be hypothesized to result from various factors. During the Great Recession, increased financial stress and uncertainty might have led to higher consumption of these products as a coping mechanism. However, during the COVID-19 pandemic, lockdown measures, social distancing restrictions, and the focus on health could have limited access to tobacco and alcohol products, reduced social settings where their consumption is common, or shifted priorities towards health, resulting in decreased tobacco and alcohol purchasing.

In conclusion, this study demonstrates that socio-economic factors are crucial in determining the probability of tobacco and alcohol purchasing among US households. Furthermore, the impact of different types of recession on tobacco and alcohol purchasing behavior varies, possibly due to the unique stressors and circumstances associated with each economic downturn.

Businesses can use the insights from this study to tailor their marketing strategies and product offerings during economic downturns. For example, tobacco and alcohol companies may need to adjust their marketing efforts to target specific demographics, such as younger men and employed individuals, who are more likely to consume these products during recessions. Additionally, businesses can also consider developing and promoting healthier alternatives, as consumers may become more health-conscious during periods of economic uncertainty, like the COVID-19 pandemic. Furthermore, understanding the distinct effects of the Great Recession and the COVID-19 recession on consumption patterns can help businesses adapt their approach to account for the unique circumstances associated with each type of economic downturn.

Policymakers can use the information from this study to design more targeted and effective public health interventions and policies, particularly during economic recessions. For instance, they can develop targeted campaigns aimed at reducing tobacco and alcohol consumption among younger and employed individuals, who are more likely to consume these products during downturns. Policymakers can also focus on implementing support programs and resources for those experiencing financial stress or unemployment, as these factors can influence consumer behavior. Moreover, as the COVID-19 pandemic has shown a decrease in tobacco and alcohol purchasing, policymakers may consider leveraging heightened health awareness during such crises to promote healthier lifestyles and discourage the consumption of harmful products. By understanding the specific demographic factors and recession types that influence consumption patterns, policymakers can create more effective strategies to address public health concerns related to tobacco and alcohol use.

Future work in this area could focus on several aspects to further our understanding of the factors influencing tobacco and alcohol consumption during economic downturns:

1. Expanding the analysis to include additional product categories, such as non-alcoholic beverages, fast food, or over-the-counter medications, to investigate whether similar consumption patterns exist for other products during recessions.
2. Conducting longitudinal studies to track the changes in tobacco and alcohol consumption among the same individuals over time, as this would provide more detailed insights into the factors driving changes in consumption patterns during economic downturns.
3. Investigating the potential long-term health consequences of increased tobacco and alcohol consumption during economic downturns, as well as the associated economic and societal costs.

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APPENDIX A

SAMPLE SIZES FOR DIARY DATA

Table A.1. Sample sizes for selected variables: total, married, male, employed

Year	Total	Married	% of married	Male	% of male	Employed	% of employed
2000	13,340	7,459	55.91%	7,214	54.08%	9,762	73.18%
2001	13,298	7,491	56.33%	7,069	53.16%	9,668	72.70%
2002	13,657	7,546	55.25%	7,047	51.60%	9,904	72.52%
2003	13,593	7,669	56.42%	6,746	49.63%	9,651	71.00%
2004	12,974	7,236	55.77%	6,255	48.21%	9,282	71.54%
2005	12,901	7,159	55.49%	5,996	46.48%	9,210	71.39%
2006	12,361	6,866	55.55%	5,850	47.33%	8,809	71.26%
2007	11,594	6,428	55.44%	5,634	48.59%	8,441	72.80%
2008	11,855	6,546	55.22%	5,577	47.04%	8,231	69.43%
2009	12,103	6,640	54.86%	5,578	46.09%	8,388	69.31%
2010	11,744	6,346	54.04%	5,471	46.59%	7,857	66.90%
2011	11,479	6,234	54.31%	5,271	45.92%	7,709	67.16%
2012	11,285	5,963	52.84%	5,234	46.38%	7,599	67.34%
2013	10,159	5,433	53.48%	4,767	46.92%	6,733	66.28%
2014	10,974	5,842	53.23%	5,176	47.17%	7,429	67.70%
2015	9,761	5,227	53.55%	4,461	45.70%	6,472	66.30%
2016	9,623	5,246	54.52%	4,522	46.99%	6,443	66.95%
2017	10,464	5,688	54.36%	4,759	45.48%	6,986	66.76%
2018	9,910	5,313	53.61%	4,602	46.44%	6,622	66.82%
2019	9,541	5,197	54.47%	4,462	46.77%	6,408	67.16%
2020	9,049	4,979	55.02%	4,239	46.84%	6,150	67.96%
2021	10,422	5,507	52.84%	4,791	45.97%	6,739	64.66%
TOTAL	252,087	138,015		120,721		174,493	

Source: the author's calculations are based on Consumer Expenditure Survey data collected by the Census Bureau for the Bureau of Labor Statistics.

APPENDIX B

PURCHASE FREQUENCIES FOR ALCOHOL AND TOBACCO

Table B.1. Tobacco and alcohol purchase frequencies

Year	Tobacco purchase frequency %	Alcohol purchase frequency %	Year	Tobacco purchase frequency %	Alcohol purchase frequency %
2000	27.72%	30.94%	2011	19.06%	27.85%
2001	27.95%	30.64%	2012	18.48%	28.49%
2002	27.31%	31.65%	2013	18.28%	27.55%
2003	25.09%	30.39%	2014	16.24%	28.40%
2004	31.46%	32.95%	2015	16.63%	29.17%
2005	28.66%	29.70%	2016	17.00%	28.45%
2006	27.50%	30.87%	2017	16.12%	29.12%
2007	25.63%	29.05%	2018	12.91%	29.13%
2008	24.70%	29.05%	2019	11.46%	29.57%
2009	21.14%	28.04%	2020	8.28%	24.72%
2010	19.39%	26.65%	2021	8.22%	26.30%

Source: the author's calculations are based on Consumer Expenditure Survey data collected by the Census Bureau for the Bureau of Labor Statistics.

APPENDIX C

RESULTS OF THE REGRESSION ANALYSIS

Table C.1. Results of the regression analysis for tobacco consumption for two models: simple and with interaction terms

Variable	Simple model	Significance	Interaction model	Significance
(Intercept)	-3.4456	***	-3.573	***
AGE_18_40	0.1758	***	0.2658	***
MALE	0.164	***	0.5082	***
MARRIED	-0.3271	***	-0.0959	***
EMP_STATUS	0.2442	***	0.2577	***
log(EXP_TOTAL + 1)	0.2833	***	0.2852	***
educ_factor2	0.6874	***	0.6676	***
educ_factor3	0.4679	***	0.4408	**
educ_factor4	-0.3373	*	-0.3633	**
GREAT RECESSION	0.0755	***	0.0992	***
COVID RECESSION	-0.2225	**	-0.3172	**
year dum	-0.0411	***	-0.0423	***
MALE:GREAT RECESSION			-0.056	
MALE:COVID RECESSION			0.2063	
MALE:MARRIED			-0.4936	***
MALE:AGE_18_40			-0.2305	***

Significance codes: 0 '***', 0.001 '**', 0.01 '*', 0.05 '.'

Source: the author's calculations are based on Consumer Expenditure Survey data collected by the Census Bureau for the Bureau of Labor Statistics.

Table C.2. Results of the regression analysis for alcohol consumption for two models: simple and with interaction terms

Variable	Simple model	Significance	Interaction model	Significance
(Intercept)	-0.9752	***	-1.0305	***
AGE_18_40	0.0884	***	0.0785	***
MALE	0.1649	***	0.3565	***
MARRIED	-0.0184	*	0.1391	***
EMP_STATUS	0.2442	***	0.1243	***
log(EXP_TOTAL + 1)	0.1177	***	0.1183	***
educ_factor2	0.194	*	0.176	.
educ_factor3	0.2163	*	0.195	*
educ_factor4	0.1438		-0.1247	
GREAT RECESSION	18.0062		18.0931	
COVID RECESSION	-0.952	***	-0.9308	***
year dum	-0.061	***	-0.0617	***
MALE:GREAT RECESSION			-0.1905	
MALE:COVID RECESSION			0.0331	
MALE:MARRIED			-0.3374	***
MALE:AGE_18_40			-0.0135	

Significance codes: 0 '***', 0.001 '**', 0.01 '*', 0.05 '.'

Source: the author's calculations are based on Consumer Expenditure Survey data collected by the Census Bureau for the Bureau of Labor Statistics.