Economic Uncertainty and Unhealthy Choices

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Abstract

We hypothesize that higher economic uncertainty is associated with higher temporal discounting, an associated decline in impulse control, and a resultant increase in poor decisions. Based on 6.1 million interviews over 22 years, our analysis reveals a positive relation between economic uncertainty and individuals' propensity to make poor lifestyle choices including a greater fraction of the population drinking alcohol, a larger number of drinks consumed, higher levels of binge drinking, and higher smoking rates. Further consistent with our hypothesis, the relation is stronger in states with greater stock market participation and for individuals in prime working years. The evidence suggests that impulse control is one of the channels linking economic uncertainty and investors' behavior.

1. Introduction

We investigate how economic uncertainty relates to individuals' decisions to engage in unhealthy behaviors. Our hypothesis is motivated by evidence in health, economics, and psychology research that delayed reward discounting can help explain what appear to be poor choices (e.g., binge drinking) made by individuals. Delayed reward discounting demonstrates that one can frame an individual's decision to engage in a given behavior as a tradeoff between immediate gratification and the "present value" of not engaging in the behavior. Equivalently, the delayed reward discounting framework can be viewed as a model of how decisions relate to self-control/impulsiveness (see, e.g., da Matta, Goncalves, and Bizarro, 2012; Reed and Luiselli, 2011). A given individual's choice to binge drink, for instance, may be viewed as the immediate utility of binge drinking versus the present value (discounted at the person's delayed reward discount rate) of the costs associated with such behavior (e.g., future health costs, future employment costs, future psychological costs).

We hypothesize that economic uncertainty relates to poor health choices within the delayed reward discounting framework for two non-mutually exclusive reasons. First, if higher levels of economic uncertainty are associated with higher stress levels, the instant gratification (utility) of poor health choices (e.g., binge drinking) will rise with economic uncertainty. For instance, if high levels of uncertainty induce stress, an individual may have a greater urge for "another drink" in periods of high economic uncertainty. Consistent with this mechanism, medical research (e.g., Bolton, Robinson, and Sareen, 2009) suggests some individuals use alcohol as a legal psychoactive drug to "self-medicate" anxiety. Second, a number of previous studies suggest that an increase in stress is associated with higher levels of temporal discounting.[1] Thus, this mechanism suggests higher economic uncertainty will be associated with higher delayed reward discount rates, resulting in a

[1] For example, Giordano, Bickel, Loewenstein, Jacobs, Marsch, and Badger (2002) find that opioid addicts exhibit substantially greater temporal discount rates for both heroin and money when opiate-deprived. See also Cornelisse, Ast, Haushofer, Seinstra, and Joëls (2014); Delaney, Fink, and Harmon (2014); Haushofer, Jang, and Lynham (2017); and Koppel, Andersson, Morrison, Posadzy, Västfjäll, and Tinghög (2017).

decline in the present value of the future costs associated with a poor health choice. That is, when economic uncertainty is high, an individual will be less concerned about the future consequences of their poor decisions today. Moreover, the American Psychological Association reports that money and work are the two leading sources of stress.[2] Therefore, we also hypothesize that worrying about money and work are two of the channels through which economic uncertainty impacts individuals' behaviors.

Limitations of the delayed reward discounting model are well-recognized (e.g., see reviews by Frederick, Loewenstein, and O'Donoghue, 2002; Reynolds, 2006). For instance, inconsistent with the exponential discounting assumption of Samuelson's (1937) model, research (e.g., Thaler, 1981) suggests that individuals tend to use hyperbolic discounting (where the inferred constant discount rate declines with horizon). Regardless, a wide range of studies suggest that delayed reward discounting can help explain variation in obesity, gambling, alcohol use, tobacco use, and illegal drug use (see reviews by Barlow, Reeves, McKee, Galea, and Stuckler, 2016, 2017; MacKillop, Amlung, Few, Ray, Sweet, and Munafo, 2011). Importantly, however, our hypothesis linking economic uncertainty to impulse control does not rely on a specific form of discounting (e.g., exponential versus hyperbolic)—it only requires that variation in economic uncertainty is positively associated with: (i) the utility of immediate gratification from a poor health choice and/or (ii) individuals' discount rates used to assess the expected future costs associated with a poor health choice.

Using more than 6.1 million individual interviews from 22 years of the Behavioral Risk Factor Surveillance System (BRFSS) and the Economic Policy Uncertainty (EPU) index developed by Baker, Bloom, and Davis (2016), we find strong support for our hypothesis. Specifically, controlling for market returns, state fixed effects, state time-trends, state unemployment rates, state income, calendar month fixed effects, and individuals' demographics (such as gender, education,

[2] See http://www.apa.org/news/press/releases/2006/01/stress-management.aspx.

employment, and age), we find a strong positive relation between economic uncertainty and poor health choices—including the likelihood of engaging in drinking, the number of drinks consumed, the likelihood of engaging in binge drinking, and the likelihood of smoking.

If worrying about money and employment are the mechanism linking economic uncertainty and unhealthy choices, the relations should be stronger for individuals with greater participation in equity markets and individuals in prime working years. Further consistent with our hypothesis, the positive relation between economic uncertainty and unhealthy choices are stronger in states with greater stock market participation and for individuals in prime working years (between 25 and 64).

The positive relation between economic uncertainty and unhealthy choices is also materially large. For example, our most conservative estimates suggest a one standard deviation larger *EPU* is associated with an increase in binge drinking of 18% of the time-series standard deviation in this metric. According to Sacks et al. (2015), binge drinking cost the U.S. economy $249 billion in 2010, which represents 20% of the Federal Budget Deficit for 2010 ($1.3 trillion).

Note that our analysis does not require that individuals know the value of, or understand the construction of, EPU. Rather EPU is a measure of individuals' assessment of economic uncertainty levels. That is, although it is unlikely a factory worker or a medical doctor would know the value of EPU, both would likely have opinions regarding whether the overall economic uncertainty is high or low. Consistent with this view, previous work demonstrates that individuals are largely aware of economic uncertainty levels (e.g., Gábor-Tóth and Georgarakos, 2017; Da, Engelberg, and Gao, 2014; Smales, 2014; Dzielinski, 2012; Goidel, Procopio, Terrell, and Wu, 2010; Hester and Gibson, 2003). We further examine the relation between economic uncertainty and impulse control using the news-based EPU. These tests continue to reveal an inverse relation between economic uncertainty and impulse control.

Our results have a number of implications. First, the relation between economic uncertainty and impulse control may help explain individuals' financial decisions. For instance, a decline in impulse control can help explain why behavioral biases are more severe in economic downturns (Kumar, 2009) and could help explain why higher expected market volatility is associated with money flowing from equity mutual funds to bond mutual funds (Ben-Rephael, Kandel, and Wohl, 2012). In a broader sense, as Engelberg and Parsons (2016) point out, if behavioral factors impact prices, then anything that influences widespread changes in individuals' behavior has asset pricing implications. That is, understanding what drives individuals' choices is a key to understanding behavioral finance. Our results suggest that the relation between economic uncertainty and impulse control may be one of the channels that link economic conditions to investors' behavior.

Second, our results provide support for models that suggest anticipatory feelings (e.g., Loewenstein, 1987) lead to time inconsistency of individual preferences and, therefore, behaviors.[3] Caplin and Leahy (2001) demonstrate, for example, that adding anxiety (in addition to consumption) to the utility function can help explain time inconsistency in preferences and both the equity premium puzzle and the risk-free rate puzzle. Specifically (in the Caplin and Leahy model), holding risk aversion constant, safe assets provide an additional benefit (beyond the utility generated from smoothing consumption over states) of reducing anxiety. Similarly, risky assets require additional expected return to account for the disutility of the extra anxiety they provide. The authors argue that risk aversion and anxiety are different concepts—risk aversion is related to the curvature of the utility function (and static) whereas anxiety is an emotion associated with uncertainty (and therefore

[3] With time-consistent preferences, if it is beneficial to do an action in the future, it is even more beneficial to do it today (e.g., quit smoking). In contrast, individuals usually demonstrate a present-value bias (favoring instant gratification over future gratification). Read, Loewenstein, and Kalyanaraman (1999) provide a simple example of this phenomenon in which subjects of their study were offered free rentals of movies which were classified into two categories: "lowbrow," such as a comedy and "highbrow," such as a documentary. If a subject's behavior is time consistent then the choice between a comedy and a documentary should be the same regardless of the delay between when the decision is made and when the consumption occurs. However, when subjects were asked to choose a movie to watch immediately, the majority of the subjects chose lowbrow and when they were asked to pick a movie to be watched later, the majority of subjects chose highbrow.

time-varying). Thus, as uncertainty increases, so does anxiety. The Caplin and Leahy mechanism is consistent with Guiso, Sapienza, and Zingales' (2017) finding that qualitative and quantitative measures of risk aversion increased dramatically (in Italy) following the 2008 financial crisis. Our results support these prior theoretical underpinnings and empirical evidence. Our results also buttress Guiso, Sapienza, and Zingales' conclusion that "emotion based changes in the utility function" drive changes in the risk aversion measures.[4]

Third, our results provide a potential link for feedback models (e.g., Shiller, 2002). Specifically, as further pointed out by Engelberg and Parsons (2016), most behavioral finance work focuses on how investor behavior impacts markets and ignores the other half of the feedback loop—how markets impact individuals' behavior. Thus, our results provide a new link—higher economic uncertainty is associated with a decline in impulse control.

Fourth, our study adds to the growing literature linking investors' emotions with their preferences and choices. For example, evidence suggests that investor decisions and/or stock returns are impacted by seasonal affective disorder (SAD) (e.g., Kramer and Weber, 2012; Kamstra, Kramer, and Levi, 2003, 2015), cortisol levels (Kandasamy et al., 2014), testosterone (Nadler, Jiao, Alexander, Johnson, and Zak, 2017), weather (e.g., Saunders, 1993; Hirshleifer and Shumway, 2003; Bassi, Colacito, and Fulghieri, 2013), sporting event results (Edmans, Garcia, and Norli, 2007), and general mood (e.g., Bollen, Mao, and Zeng, 2011).

Last, our study contributes to the literature that links health decisions to economic factors. Society faces enormous economic and emotional costs associated with suboptimal health choices. Therefore, as much of the health literature points out (e.g., Barlow, Reeves, McKee, Galea, and

[4] Although the semantics differ, the Guiso, Sapienza, and Zingales' (2017) study (that addresses "emotion-based changes of the utility function") is complementary to Caplin and Leahy's (2001) model that formally adds an emotional component (anxiety) to the utility function (i.e., both suggest that time-varying emotions drive time-series variation in preferences).

Stuckler, 2016), understanding the factors that contribute to poor health decisions is critical to developing policies and programs that encourage better health choices.

As far as we are aware, our study is the first that investigates the relation between economic uncertainty and individuals' unhealthy choices. Several recent studies examine the impact of realized stock returns on health outcomes. For instance, Cotti, Dunn, and Tefft's (2015) find that large negative market returns may be associated with increases in smoking and binge drinking, declines in self-reported mental health, and increases in fatal car accidents involving alcohol. Similarly, McInerney, Mellor, and Nichols (2013) find the 2008 stock market crash was associated with increased feelings of depression and use of antidepressant drugs. Fiuzat, Shaw, Thomas, Felker, and O'Connor (2010) report that acute myocardial infractions (i.e., heart attacks) negatively relate to stock returns.[5]

In the finance literature, our paper is most closely related to Engelberg and Parsons' (2016) finding that California hospital admissions (especially admissions related to psychological conditions such as anxiety and panic disorders) are inversely related to stock returns of California companies. We differ from their study in the following important ways. First, we focus on economy-wide uncertainty whereas Engelberg and Parsons (and the studies mentioned above) focus on realized (i.e., certain) stock returns. Specifically, we examine if higher levels of economic uncertainty are associated with poor choices after controlling for stock market returns, local economic conditions, individual demographics, and other factors. Second, we focus on a *decision* made by individuals, rather than an involuntary reaction by individuals—individuals choose to have another drink or a cigarette; yet, they do not decide to have an anxiety attack. Third, we study the relation between a

[5] A related literature focuses on health issues and state unemployment rates or employment status (see, for example, Ruhm and Black, 2002; Dee, 2001). As Cotti, Dunn, and Tefft (2015) point out, it is hard to compare the literature using unemployment rates with the literature using stock returns because (i) unemployment is a lagging indicator whereas stock market valuations are a leading indicator and (ii) unemployment shocks may have both income and substitution effects.

national measure of uncertainty and individuals' choices across all 50 states rather than the relation between local (i.e., California) stock returns and local reactions (i.e., California hospital admissions).

2. Methodology and Data

Following the framework of previous studies (e.g., Ruhm and Black, 2002), our baseline regression specification to examine the relation between economic uncertainty and individuals' unhealthy choices is:

$$Unhealthy\ choice_{i,s,t} = \alpha + \beta_1 Economic\ uncertainty_t + \beta_2 Stock\ market\ return_t + \beta_X X_{i,s,t} + \beta_s X_{s,t} + \tau_t + \gamma_s + \gamma_s * t + \varepsilon_{i,s,t} \quad (1)$$

The dependent variable, *Unhealthy choice*$_{i,s,t}$, is a measure of an unhealthy choice (e.g., binge drinking) made by an individual *i* in state *s* in month *t*. *Economic uncertainty*$_t$ is a measure of overall economic uncertainty. We use the Economic Policy Uncertainty index (EPU) developed by Baker, Bloom, and Davis (2016) as the primary economic uncertainty metric. Equation (1) also controls for factors that previous work suggests may influence unhealthy choices (see, e.g., Engelberg and Parsons, 2016; Cotti, Dunn, and Tefft, 2015; Dávalos, Fang, and French, 2011; Fiuzat, Shaw, Thomas, Felker and O'Connor, 2010; Ruhm, 2005; Ruhm and Black, 2002). Specifically, *Stock market return*$_t$ is the contemporaneous monthly value-weighted stock market return; $X_{i,s,t}$ is a matrix of individual-level demographic data (including gender, marital status, age groups, employment status, race, and education), $X_{s,t}$ is a matrix of state-level per-capita income (in 1990 dollars) and unemployment in month *t*, τ_t are indicator variables for calendar months, γ_s are state fixed effects, $\gamma_s * t$ are state-specific time-trends, and α is the intercept. The standard errors are clustered at the state and at the year-month level. Appendix A contains details regarding definitions, data sources, and construction of the variables used in this study.

Our primary measure of economic uncertainty, EPU, is a weighted combination of (1) news-based (updated monthly, 50% weight) policy uncertainty, (2) a measure of disagreement on forecasts for the consumer price index (CPI), federal expenditures, and state and local expenditures (held constant over each calendar quarter, 16.67% weight), and (3) a measure of discounted dollar weighted tax code expirations (held constant over each calendar year, 16.67% weight).[6] The news-based component is based on an article count from major newspapers containing the words (i) "uncertainty" or "uncertain," (ii) "economic" or "economy," and (iii) "congress," or "legislation," or "white house," or "regulation," or "federal reserve," or "deficit." An article must contain at least one word from each of the three groups to be included.

A growing literature suggests that EPU can help explain economic activity and therefore may also capture time-series variation in individuals' impulse control (Pastor and Veronesi, 2012; Julio and Yook, 2012, 2016; Atanassov, Julio, and Leng, 2016; Baker, Bloom, and Davis, 2016; Gulen and Ion, 2016). Thus, we use EPU as the main measure of economic uncertainty and examine its relation to individuals' unhealthy choices.

2.1 Sample and Measures of Unhealthy Choices

Our measures of unhealthy choices come from the Behavioral Risk Factor Surveillance System (BRFSS), maintained by the Center for Disease Control and Prevention (CDC) to monitor health and behavioral risk in the U.S. The survey is conducted using random digit dialing techniques on both landlines and cell phones. Therefore, there is an extremely low probability that the same person is sampled more than once. The phone survey has been administered each year since 1984. Our sample period starts in 1990—the first year at least 45 states participated in the survey—and ends in 2015. Moreover, some modules (such as questions related to alcohol) were optional (at the state

[6] See www.policyuncertainty.com for additional information regarding construction of EPU index.

level) for those states participating in the early years.[7] Table 1 reports the number of states participating (and completing the alcohol module) each year and the number of individuals surveyed regarding their alcohol consumption over last month. Because only a small number of states collected information on alcohol consumption in 1994, 1996, 1998, and 2000, we exclude these four years from our sample.[8] The final sample we use in our alcohol analyses consists of 264 months and 6,143,729 individual surveys. In addition to collecting behavioral risk factors, the surveys are also the source of individuals' demographic variables used as controls in our regression analyses.

[Insert Table 1 about here]

Using the BRFSS data, we construct three measures of each individual's alcohol use: (i) an indicator variable (*Drinker*) for whether a person had at least one alcoholic drink over the past 30 days; (ii) the natural logarithm of one plus the total number of alcoholic beverages consumed over the past 30 days (*ln*(*1+no. drinks*));[9] and (iii) an indicator for whether a person engaged in binge drinking on at least one occasion over the past 30 days (*Binge*).[10] We acknowledge that responsible alcohol use is not necessarily a poor health decision, i.e., that an increase in the fraction of the population that drinks alcohol does not necessarily imply poor health choices. Nonetheless, we expect the decision to have any alcohol is related to impulse control/temporal discounting for some individuals.

Panel A of Table 2 reports summary statistics for the dependent variables used in the individual-level regressions for the sample including both drinkers and nondrinkers. Approximately half of the

[7] See https://www.cdc.gov/brfss/about/about_brfss.htm for additional details.
[8] Our results remain intact when including these four years.
[9] Following Ruhm and Black (2002), we winsorize the number of drinks per month at 450 (15 drinks per day). The average number of monthly drinks is 10 for the sample of both drinkers and nondrinkers and 21 for the sample of drinkers only.
[10] There is some variation over time in the exact questions asked and in the recorded metrics. Details are provided in Appendix A. In addition, in the early years of the sample, binge drinking is defined as five or more drinks on one occasion for all respondents; in the later part of the sample period binge drinking is defined as five or more drinks for men or four or more drinks for women. In untabulated analysis, we re-estimate our primary tests including an indicator for the interaction of gender and the later part of the sample period (with the modified binge drinking definition). Our results remain qualitatively identical.

participants drank some alcohol (the mean for *Drinker* is 0.49). Panel B reports analogous statistics when the sample is limited to drinkers only, e.g., 24% of drinkers report binge drinking over the previous month. Given our goal is to examine the relation between time-series variation in economic uncertainty and time-series variation in unhealthy decisions, Table 2 Panels C and D report the time-series descriptive statistics of cross-sectional means of drinking, number of drinks, and binge drinking. The results reveal substantial time-series variations in these metrics. For example, although, on average, 24% of drinkers report binge drinking in the previous 30 days, that value ranges from 21% to 29% over the 264 months in our sample period with a monthly standard deviation of 1.73%.

[Insert Table 2 about here]

Although our primary tests focus on decisions related to alcohol consumption, we also explore smoking behavior as an unhealthy choice. Specifically, we create an indicator variable (*Smoker*) (mean=0.19 for the individual-level analysis) for BRFSS survey respondents identified as a current smoker. Because the survey question to construct *Smoker* populates throughout our sample period, the smoker sample size (n=6,810,614) is slightly greater than the sample size for the alcohol measures.

2.2 Independent Variables

The first three rows in Table 2 Panel E report summary statistics for variables with monthly data—the Economic Policy Uncertainty (EPU), the news-based EPU, and the value-weighted market return from the Center for Research in Security Prices (CRSP). The second to last row in Panel E reports descriptive statistics for per capital income which is observed at the state-year level and the last row reports descriptive statistics for state unemployment rate which is observed at the state-month level. Panel F reports demographic descriptive statistics including survey participants' gender, age, employment status, marital status, education level, and race for the sample including

both drinkers and nondrinkers. Appendix B reports analogous statistics for the sample limited to drinkers only

3. Empirical Results

3.1 Economic Uncertainty and Alcohol Consumption

We begin by estimating a pooled panel ordinary least squares (Equation (1)) of drinking behaviors on economic uncertainty (EPU), state fixed effects, month fixed effects, and state-specific time-trends. Standard errors are heteroscedasticity-consistent, and two-way clustered by both year-month and state. The three dependent variables for individual *i* in state *s* in month *t* are the drinker indicator (*Drinker)*, the number of drinks (*ln*(*1+no. drinks*)), and the binge drinking indicator (*Binge).*

The first three columns of Table 3 report the results for the sample that includes both drinkers and nondrinkers. Consistent with the hypothesis that higher economic uncertainty is associated with lower impulse control, the coefficient associated with *EPU* is positive and statistically significant at the 1% level for two out of three alcohol-related measures. The last two columns repeat the tests examining the relations between *EPU* and both the number of drinks and binge drinking for the sample limited to drinkers. Once again, the coefficients associated with *EPU* are positive and statistically significant at the 1% level. In short, the initial analysis in Table 3 suggests a meaningful relation between economic uncertainty and poor health choices.

[Insert Table 3 about here]

We next include macroeconomic variables and individual demographic variables as controls following Eq. (1). The coefficients associated with the control variables are largely consistent with previous work.[11] For instance, men, white, employed, and well-educated are less likely to completely

[11] We exclude the following indicator variables *Marriage not reported*, *Age group > 65*, *Race not reported*, *Education not reported*, *January* indicator, and *Alaska* indicator to avoid perfect multicollinearity.

abstain from alcohol than women, non-white, unemployed, and less well-educated.[12] Further consistent with our hypothesis, Table 4 reports that the coefficient associated with *EPU* is positive and statistically significant at the 1% level for all five model specifications.

The results are also materially large. Given *EPU* is a time-series variable, we evaluate the magnitude of the relation between time-series variation in *EPU* and time-series variation in poor decision making. Recall from Table 2 that the time-series standard deviation of *EPU* is 0.3513 (Panel E) and the time-series standard deviation in fraction of survey respondents drinking any alcohol is 0.0215 (Pane C). Therefore, the coefficient in Columns (1)-(3) of Table 4 shows that a one standard deviation higher *EPU* is associated with a 26% standard deviation higher level of drinking, i.e., (0.016*0.3513)/0.0215=0.2614. Analogous calculations show that a one standard deviation higher *EPU* is associated with a 38% (estimated as (0.064*0.3513)/0.0591 =0.3804) standard deviation higher level of number of drinks consumed and a 31% (estimated as (0.009*0.3513)/0.0103=0.3070) standard deviation higher level of binge drinking.

[Insert Table 4 about here]

The last two columns of Table 4 repeat the tests examining the relations between *EPU* and both the number of drinks and binge drinking for the sample limited to drinkers. Once again, the coefficients associated with *EPU* are positive and statistically significant at the 1% level indicating that drinkers tend to both drink more and be more likely to engage in binge drinking when expected market volatility is high. Moreover, the magnitudes remain substantial—a one standard deviation

[12] Although not the focus of our study, a substantial literature examines the relation between drinking behaviors and these variables. Consistent with the results for our control variables, for instance, previous studies (e.g., Cutler and Lleras-Muney, 2010) suggest that better educated drinkers are less likely to binge drink than poorly educated. Similarly, consistent with the explanation (see Dávalos, Fang and French, 2012) that alcohol is a normal good (because "income" in our model is per capita state income, employment likely correlates with variation in income across participants) and that alcohol-related social activities are often associated with work (e.g., happy hours), employment is positively related to drinking behaviors. Our results suggesting a positive relation between state unemployment levels and drinking behaviors is consistent with recent work such as Dávalos, Fang and French (2012) but inconsistent with earlier work such as Ruhm and Black (2002). Nonetheless, in untabulated analysis we repeat our tests limiting the sample to Ruhm and Black's sample period (ending in 1999) and find evidence consistent with Ruhm and Black for this subsample.

higher *EPU* is associated with a 31% standard deviation higher number of drinks and 18% standard deviation higher level of binge drinking.[13]

3.2 Channel Analysis – Money and Job

The American Psychological Association reports that money and work are the two leading sources of stress.[14] Thus, if economic uncertainty impacts poor health decisions, then the impact is likely to be larger for those with greater exposure to economic uncertainty. In this section we investigate two potential channels through which economic uncertainty affects individuals' poor decision making behavior. First, we propose that, ceteris paribus, the impact of economic uncertainty will be larger for individuals with greater exposure to equity markets—an increase in economic uncertainty will likely increase the risk premium and drive current stock valuations lower (Pástor and Veronesi, 2012, 2013; Kang and Ratti, 2013). Second, we expect that economic uncertainty will have greater impact on individuals in the prime working age group (after college and before retirement). For instance, higher economic uncertainty is likely to increase concerns of losing the job for an employed person. Similarly, for an unemployed person in the labor pool, higher economic uncertainty likely increases the worries about finding satisfactory employment.

We use stock market participation rates at the state level for 38 states collected from Hong, Kubik, and Stein (2004, Table 5), *Market participation.*[15] We identify survey participants in prime employment years via a dummy variable (*Workage*) that takes a value of one if the survey participant

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[13] The time-series standard deviation of *EPU* is 0.3513 (Panel E, Table 2). For the sample of drinkers, the standard deviation of natural logarithm of the number of drinks and binge drinking are 0.0592 and 0.0173, respectively (Panel D, Table 2). Thus, given the coefficients of 0.052 and 0.009, a one standard deviation greater *EPU* is associated with a 31% standard deviation higher number of drinks ((0.052*0.3513)/0.0592) and a 18% standard deviation higher level of binge drinking ((0.009*0.3513)/0.0173).

[14] See http://www.apa.org/news/press/releases/2006/01/stress-management.aspx.

[15] The data for Hong, Kubik, and Stein (2004) come from Health and Retirement Study (HRS) administered by the Institute for Social Research at the University of Michigan. See www.umich.edu/~hrswww/.

is between 25 and 64 years. We then repeat the analysis in Table 4, but include an interaction term for EPU**Market participation* or *EPU*Workage*.

The results, reported in Panels A and B of Table 5, reveal the relation between poor health choices and economic uncertainty is stronger for survey respondents from states with higher equity market participation rates and for survey respondents of the prime working age group. In short, the results in Table 5 support our hypothesis that higher levels of economic uncertainty impact individuals' impulse control and poor lifestyle choices due to increased stress associated with money and employment.

[Insert Table 5 about here]

4. Robustness Tests

4.1 Model Specification – Logistic Regressions

Because two of the dependent variables (*Drinker* and *Binge*) are binary, we repeat our tests in Table 4 with a logistic regression model and the same set of control variables. The results reported in the first two columns of Table 6 are based on the sample of drinkers and nondrinkers. The last column in Table 6 estimates a logistic regression when the dependent variable is binge drinking using the sample limited to drinkers. The analysis continues to reveal a strong positive relation (statistically significant at the 1% level) between economic uncertainty and the likelihood of alcohol consumption and binge drinking.

[Insert Table 6 about here]

4.2 Data Aggregation – State-Month Level Regression

As noted above, sample sizes vary over time and by state. To ensure the results are not driven by variations in the sample size through time or by a few large states, we aggregate the

individual-level data to state-month-level averages, and re-examine the relation between economic uncertainty and unhealthy choices at the state-month level. Specifically, for each state-month, we compute: (i) the fraction of survey participants who report dinking (*%Drinkers*), (ii) the average number of drinks (*Avg. ln*(*1+ no. drinks*)) across survey participants, and (iii) the fraction of survey participants who report binge drinking (*%Binge*).[16]

The first three columns of Table 7 report state-month-level panel OLS regression results for the sample including both drinkers and nondrinkers. As before, all models include macroeconomic controls (e.g., state unemployment rate), demographic data (e.g., percentage female), state specific time trends, calendar month fixed effects, and state fixed effects. Standard errors are heteroscedasticity-consistent and double-clustered by state and year-month. The results continue to support our hypothesis.[17] Specifically, the coefficient associated with *EPU* is positive and statistically significant at the 1% level in all three cases indicating a positive relation between overall economic uncertainty and individuals' propensity to make unhealthy alcohol consumption decisions. The next two columns in Table 7 repeat the analysis for the sample limited to drinkers. We continue to find a strong positive relation between poor health choices and expected market volatility.

[Insert Table 7 about here]

4.3 Alternative Measures of Economic Uncertainty – News-Based EPU

As noted above, EPU is comprised of three components—one component (News-based EPU) is measured monthly, one component is updated quarterly (CPI and expenditure forecast dispersion), and one component is updated annually (tax code expirations). Given our dependent

[16] We compute *%Drinkers*, *Avg. ln(1+no.drinks)*, and *%Binge* for the sample of drinkers and nondrinkers. We computer *Avg. ln(1+no.drinks)* and *%Binge* for the sample limited to nondrinkers only.

[17] For the state-month-level analysis, we require at least 100 observations to compute the state-month average. As a result, the drinking sample has 12,700 state-months observations after excluding 221 state-months observations with less than 100 surveys. Note that not all fifty states participate in the survey in each year during our sample period (Table 1).

variables are measured monthly, as robustness check we examine the relation between alcohol consumption and economic uncertainty as captured by the monthly component—*News-based EPU*. Specifically, the *News-based EPU* is based on an article count from major newspapers containing the words (i) "uncertainty" or "uncertain," (ii) "economic" or "economy," and (iii) "congress," or "legislation," or "white house," or "regulation," or "federal reserve," or "deficit." An article must contain at least one word from each of the three groups to be included (Baker, Bloom, and Davis, 2016).

Using *News-based EPU* (News-based EPU divided by 100) as the measure of economic uncertainty, we redo the main test of Table 4 and report the results in Table 8. The same set of control variables is included. Standard errors are heteroscedasticity-consistent and double-clustered by state and year-month. The results continue to demonstrate a strong positive relation (statistically significant at the 1% level in all cases) between economic uncertainty and the fraction of the population having any alcohol (%drinker), the number of drinks consumed, and the fraction of the population binge drinking (%binge) for the sample including all individuals. For the sample limited to drinkers only, we find a strong positive relation between the number of drinks consumed (but not binge drinking) and economic uncertainty as captured by the news based component.[18]

[Insert Table 8 about here]

[18] We also considered Chicago Board Options Exchange (CBOE) Volatility Index (VIX) as an alternative measure of economic uncertainty. By construction, VIX captures the expected volatility of the S&P 500 over the next 30 days. We re-estimated all ten models in Tables 3 and 7, substituting EPU with VIX. We find that the coefficient associate with VIX is positive for all ten models and is statistically significant in five models. Recent empirical literature that looks at EPU and VIX in different settings argue that VIX measures short-term uncertainty (30 days ahead by construction) while EPU measures uncertainty over a longer-horizon. Bonaime, Gulen, and Ion (2017) find that VIX predicts one-month-ahead mergers and acquisition (M&A) activity while policy uncertainty predicts one-year-ahead M&A activity. Our results suggest that short-term uncertainty effects people's behavior less than longer-term uncertainty. We also performed a test where we included both EPU and VIX in one regression to evaluate the relative importance of each measure in relation to individuals' behavior. We find a consistent positive and significant relation between EPU and individuals' behavior. The parameter estimate for VIX is not significant. These results are not reported for brevity and available upon request.

4.4 Alternative Measures of Unhealthy Choice – Smoking

As a further robustness check, we use tobacco consumption as an alternative measure of unhealthy choice. Specifically, *Smoker* is an indicator variable that equals one if individual *i* in state *s* is a smoker in month *t*. Table 9 reports the panel regression results using *Smoker* as the dependent variable with the same set of controls. Heteroscedasticity-consistent standard errors are doubled-clustered by state and year-month. As mentioned above, the smoker sample is slightly larger as more states include that module in the early years (relative to the alcohol module). The results reveal that smoking rates are strongly positively related (statistically significant at the 5% level or better in all cases) to economic uncertainty as captured by *EPU* and *News-based EPU*.

[Insert Table 9 about here]

4.5 Market Return and Unhealthy Choices

As noted above, several previous studies (e.g., Cotti, Dunn, and Tefft (2014)) find a meaningful relation between equity market returns and health outcomes. In addition, one may expect a negative relation between economic uncertainty and equity returns. Empirically, we find such a relation—the correlations between *Stock market return* and *EPU* and *News-based EPU* are -0.13 and -0.19, respectively.

Thus, to ensure our results are not driven by economic uncertainty proxying for equity returns, we re-estimate the models in Table 4 excluding the proxies for economic uncertainty. The results, reported in Table 10, reveal that the parameter estimates associated with *Stock market return* do not differ meaningfully from zero with the exception that when limited to drinkers only, the number of drinks is marginally (10% significance level) related to market returns. In short, we find no evidence that the relation between health outcomes and stock market returns documented in previous work

drives our results. Rather, our evidence uniformly suggests that higher economic uncertainty is associated with lower impulse control and poor health choices.

[Insert Table 10 about here]

5. Conclusion

We examine the relation between economic uncertainty and individuals' propensity to make unhealthy choices. We hypothesize that higher expected economic uncertainty is associated with lower levels of impulse control because higher uncertainty is likely to (i) increase stress and the immediate utility of a poor health decisions and/or (ii) decrease (via higher time-discounting rate) the present value of the future costs associated with a poor health choice. Our empirical results uniformly support the hypothesis that higher economic uncertainty is associated with a higher level of temporal discounting, an associated decline in impulse control, and a resulting increase in poor health choices.

Our results provide evidence of a behavioral link between economic uncertainty and individuals' choices. For instance, our results can help explain why behavioral biases are more severe when economic uncertainty is high (Kumar, 2009). Further, the results provide support for the explanation that variation in economic conditions contributes to variation in anticipatory feelings that could help explain, for example, why investors exhibit different risk preferences pre- and post- the financial crisis (Guiso, Sapienza, and Zingales, 2017). Related, the results provide empirical support for Caplin and Leahy's (2001) model that demonstrates adding anxiety to the utility function can help explain a number of market phenomena including the equity premium puzzle and the risk-free rate puzzle. Our analysis also provides evidence of a link for feedback models as economic uncertainty is associated with individuals' choices and individuals' choices may impact market volatility, e.g., money flows from equity to debt mutual fund when economic uncertainty is high (Ben-Rephael,

Kandel, and Wohl, 2012). Last, our results provide evidence of an important new link between economic conditions and individuals' health decisions.

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Table 1: Sample Distribution

This table reports the number of states and individuals participating in the Behavioral Risk Factor Surveillance System (BRFSS) survey in each year with adequate data related to alcohol consumption.

(1)	(2)	(3)
Year	Number of States	Number of Participants
1990	44	78,021
1991	47	84,143
1992	48	92,392
1993	49	98,234
1994	11	20,239
1995	50	109,700
1996	15	36,615
1997	49	122,771
1998	11	30,363
1999	49	145,334
2000	12	37,217
2001	50	196,233
2002	50	232,431
2003	50	249,980
2004	49	288,901
2005	50	335,519
2006	50	329,215
2007	50	402,122
2008	50	385,970
2009	50	401,381
2010	50	427,233
2011	50	453,366
2012	50	440,753
2013	50	451,070
2014	50	418,831
2015	50	400,129

Table 2: Summary Statistics

Panel A reports summary statistics for the alcohol use variables for individual-level analysis using the sample of both drinkers and nondrinkers. Panel B reports analogous figures for the sample limited to drinkers only. Panels C and D report time-series descriptive statistics of the cross-sectional means of the alcohol consumption measures over the 264 months in our alcohol sample (1990-2015, excluding 1994, 1996, 1998, and 2000). Panels E and F report descriptive statistics for the independent variables. See Appendix A for detailed definitions, sources, and construction of all variables.

Variable	N	Mean	Median	Std. dev.	Min.	Max.
Panel A: Dependent Variables for Individual-Level Regressions –Drinkers and Nondrinkers						
Drinker	6,143,729	0.49	0	0.5	0	1
ln(1+no. drinks)	6,143,729	1.17	0	1.44	0	6.11
Binge	6,143,729	0.12	0	0.32	0	1
Panel B: Dependent Variables for Individual-Level Regressions – Drinkers Only						
ln(1+no. drinks)	3,019,395	2.38	2.3	1.16	0.69	6.11
Binge	3,019,395	0.24	0	0.43	0	1
Panel C: Summary Statistics of Monthly Cross-Sectional Average of Dependent Variables–Drinkers and Nondrinkers						
Drinker	264	0.4911	0.4885	0.0215	0.4519	0.5452
ln(1+no. drinks)	264	1.1627	1.1578	0.0591	1.0625	1.306
Binge	264	0.1202	0.1217	0.0103	0.0975	0.1507
Panel D: Summary Statistics of Monthly Cross-Sectional Average of Dependent Variables–Drinkers Only						
ln(1+no. drinks)	264	2.3676	2.3749	0.0592	2.1874	2.5147
Binge	264	0.2448	0.2454	0.0173	0.205	0.2911
Panel E: Independent Macroeconomic Variables						
EPU/100	264	1.1014	1.0232	0.3513	0.5720	2.4513
News-based EPU/100	264	1.1289	1.0372	0.4257	0.4478	2.8367
Stock market return	264	0.0085	0.0132	0.0427	-0.1846	0.114
Income per capita ($)	1,100	22,419	21,959	4,142	13,288	37,886
Unemployment rate (%)	13,200	5.85	5.50	1.96	1.60	15.40

Table 2: Summary Statistics (continued)

Variable	N	Mean	Median	Std. dev.	Min.	Max.
Panel F: Independent Demographic Variables for Individual-Level Regressions – Drinkers and Nondrinkers						
Female	6,143,729	0.61	1	0.49	0	1
Employed	6,143,729	0.54	1	0.5	0	1
Age group 18-24	6,143,729	0.05	0	0.23	0	1
Age group 25-34	6,143,729	0.12	0	0.33	0	1
Age group 35-44	6,143,729	0.16	0	0.36	0	1
Age group 45-54	6,143,729	0.19	0	0.39	0	1
Age group 55-64	6,143,729	0.2	0	0.4	0	1
Age group > 65	6,143,729	0.28	0	0.45	0	1
Married cohab	6,143,729	0.57	1	0.49	0	1
Divorced or separated	6,143,729	0.16	0	0.37	0	1
Widowed	6,143,729	0.13	0	0.33	0	1
Never married	6,143,729	0.14	0	0.34	0	1
Marriage not reported	6,143,729	0	0	0.06	0	1
Race white	6,143,729	0.8	1	0.4	0	1
Race black	6,143,729	0.07	0	0.26	0	1
Race Hispanic	6,143,729	0.05	0	0.23	0	1
Race other	6,143,729	0.06	0	0.24	0	1
Race not reported	6,143,729	0.01	0	0.1	0	1
Education dropout	6,143,729	0.1	0	0.3	0	1
Education high school	6,143,729	0.3	0	0.46	0	1
Education some college	6,143,729	0.27	0	0.44	0	1
Education college graduate	6,143,729	0.33	0	0.47	0	1
Education not reported	6,143,729	0	0	0.04	0	1

Table 3: Panel OLS Regressions of Individuals' Alcohol Use on EPU

This table reports the panel OLS regression results of individuals' decisions regarding alcohol use on economic uncertainty (as captured by *EPU*). The three dependent variables are an indicator for whether an individual had a drink in the past month (*Drinker*), the number of drinks in the past month *(ln(1+no. drinks)*), and an indicator for binge drinking in the past month (*Binge*). All models include state-specific time trends, calendar month fixed effects, and state fixed effects. See Appendix A for detailed definitions, sources, and construction of all variables. Columns (1)-(3) use the sample of both drinkers and nondrinkers. Columns (4)-(5) are limited to drinkers only. Standard errors are heteroscedasticity-consistent, double clustered by state and year-month, and reported in parentheses. ***, **, and * indicate p<0.01, p<0.05, and p<0.1, respectively.

	(1)	(2)	(3)	(4)	(5)
	Drinkers + Nondrinkers			Drinkers Only	
	Drinker	ln(1+no. drinks)	Binge	ln(1+no. drinks)	Binge
EPU	0.003	0.042***	0.004**	0.069***	0.007***
	(0.004)	(0.011)	(0.002)	(0.007)	(0.003)
Macroeconomic variables	no	no	no	no	no
Demographic variables	no	no	no	no	no
Month FE	yes	yes	yes	yes	yes
State FE	yes	yes	yes	yes	yes
State-specific time trend	yes	yes	yes	yes	yes
Cluster by year-month	yes	yes	yes	yes	yes
Cluster by state	yes	yes	yes	yes	yes
Observations	6,143,729	6,143,729	6,143,729	3,019,395	3,019,395
R^2	0.039	0.030	0.007	0.006	0.005

Table 4: Panel OLS Regressions of Individuals' Alcohol Use on EPU and Controls

This table reports the panel OLS regression results of individuals' decisions regarding alcohol use on economic uncertainty (as captured by *EPU*) and control variables. The three dependent variables are an indicator for whether an individual had a drink in the past month (*Drinker*), the number of drinks in the past month (*ln(1+no. drinks)*), and an indicator for binge drinking in the past month (*Binge*). Independent variables also include the contemporaneous stock market return, unemployment rate, per capita state income, individual-level demographic characteristics, state-specific time trends, calendar month fixed effects, and state fixed effects. See Appendix A for detailed definitions, sources, and construction of all variables. Columns (1)-(3) use the sample of both drinkers and nondrinkers. Columns (4)-(5) are limited to drinkers only. Standard errors are heteroscedasticity-consistent, two-way clustered by state and year-month, and reported in parentheses. ***, **, and * indicate p<0.01, p<0.05, and p<0.1, respectively.

	(1)	(2)	(3)	(4)	(5)
	Drinkers + Nondrinkers			Drinkers Only	
	Drinker	ln(1+no. drinks)	Binge	ln(1+no. drinks)	Binge
EPU	0.016***	0.064***	0.009***	0.052***	0.009***
	(0.003)	(0.010)	(0.001)	(0.007)	(0.002)
Stock market return	0.017	0.040	0.007	-0.004	0.005
	(0.026)	(0.079)	(0.009)	(0.051)	(0.013)
Unemployment rate (dec.)	-0.232**	-0.152	0.046	0.868***	0.207***
	(0.098)	(0.256)	(0.034)	(0.144)	(0.052)
Income per capita/10,000	-0.015	0.012	0.012	0.095***	0.030**
	(0.020)	(0.050)	(0.007)	(0.034)	(0.013)
Female	-0.116***	-0.581***	-0.101***	-0.594***	-0.142***
	(0.003)	(0.010)	(0.003)	(0.009)	(0.003)
Married cohab	0.089***	0.212***	0.014***	0.036***	0.003
	(0.006)	(0.016)	(0.002)	(0.014)	(0.004)
Divorced or separated	0.091***	0.289***	0.051***	0.179***	0.070***
	(0.004)	(0.010)	(0.002)	(0.012)	(0.004)
Widowed	0.044***	0.149***	0.036***	0.056***	0.030***
	(0.004)	(0.012)	(0.002)	(0.012)	(0.004)
Never married	0.068***	0.241***	0.057***	0.193***	0.088***
	(0.004)	(0.010)	(0.002)	(0.012)	(0.004)

Table 4: Panel OLS Regressions of Individuals' Alcohol Use on EPU, with Controls (continued)

	(1)	(2)	(3)	(4)	(5)
	Drinkers + Nondrinkers			Drinkers Only	
	Drinker	ln(1+no. drinks)	Binge	ln(1+no. drinks)	Binge
Age group 18-24	0.139***	0.400***	0.199***	0.160***	0.357***
	(0.007)	(0.025)	(0.008)	(0.023)	(0.007)
Age group 25-34	0.124***	0.315***	0.172***	0.046**	0.288***
	(0.007)	(0.021)	(0.006)	(0.019)	(0.006)
Age group 35-44	0.094***	0.213***	0.120***	0.006	0.218***
	(0.006)	(0.018)	(0.004)	(0.017)	(0.005)
Age group 45-54	0.064***	0.154***	0.079***	0.024*	0.160***
	(0.005)	(0.015)	(0.003)	(0.013)	(0.004)
Age group 55-64	0.032***	0.074***	0.037***	0.006	0.089***
	(0.003)	(0.009)	(0.001)	(0.008)	(0.002)
Employed	0.105***	0.249***	0.034***	0.011***	0.009***
	(0.003)	(0.007)	(0.001)	(0.004)	(0.001)
Race white	0.090***	0.262***	0.033***	0.119***	0.036***
	(0.006)	(0.017)	(0.002)	(0.009)	(0.002)
Race black	-0.017**	-0.094***	-0.018***	-0.167***	-0.035***
	(0.008)	(0.022)	(0.003)	(0.011)	(0.003)
Race Hispanic	-0.009	-0.058**	0.004	-0.105***	0.030***
	(0.009)	(0.025)	(0.004)	(0.017)	(0.006)
Race other	-0.050***	-0.144***	-0.001	-0.054**	0.029**
	(0.008)	(0.024)	(0.005)	(0.021)	(0.012)
Education dropout	-0.008	0.028*	0.030***	0.156***	0.114***
	(0.006)	(0.014)	(0.002)	(0.021)	(0.006)
Education high school	0.087***	0.228***	0.036***	0.108***	0.069***
	(0.005)	(0.015)	(0.003)	(0.022)	(0.006)
Education some college	0.165***	0.397***	0.036***	0.094***	0.032***
	(0.006)	(0.015)	(0.002)	(0.022)	(0.006)
Education college graduate	0.255***	0.622***	0.021***	0.118***	-0.018***
	(0.007)	(0.020)	(0.002)	(0.023)	(0.007)
Month FE	yes	yes	yes	yes	yes
State FE	yes	yes	yes	yes	yes
State-specific time trend	yes	yes	yes	yes	yes
Cluster by year-month	yes	yes	yes	yes	yes
Cluster by state	yes	yes	yes	yes	yes
Observations	6,143,729	6,143,729	6,143,729	3,019,395	3,019,395
R^2	0.138	0.134	0.087	0.081	0.118

Table 5: Channel Analysis—Investment Channel and Job Channel

This table reports the panel OLS regression results of the impact of money and job on the documented positive relation between individuals' decisions regarding alcohol use and economic uncertainty (as captured by *EPU*). The independent variable of interest is the interaction of *EPU* and a measure captures people's involvement in stock market and job status. Specifically, *EPU*Market participation* interacts *EPU* with state-level stock market participation rate (Panel A); and *EPU*Workage* interacts *EPU* with a dummy variable that indicates whether the individual is between 25 and 64 years old (Panel B). The three dependent variables are an indicator for whether an individual had a drink in the past month (*Drinker*), the number of drinks in the past month (*ln(1+no. drinks)*), and an indicator for binge drinking in the past month (*Binge*). Independent variables also include each component of the interaction term, the contemporaneous stock market return, unemployment rate, per capita state income, individual-level demographic characteristics, state-specific time trends, calendar month fixed effects, and state fixed effects. See Appendix A for detailed definitions, sources, and construction of all variables. Columns (1)-(3) use the sample of both drinkers and nondrinkers. Columns (4)-(5) are limited to drinkers only. Standard errors are heteroscedasticity-consistent, two-way clustered by state and year-month, and reported in parentheses. ***, **, and * indicate p<0.01, p<0.05, and p<0.1, respectively.

	(1)	(2)	(3)	(4)	(5)
	Drinkers + Nondrinkers			Drinkers Only	
	Drinker	ln(1+no. drinks)	Binge	ln(1+no. drinks)	Binge
Panel A					
EPU*Market participation	0.044**	0.192***	0.037***	0.101**	0.050***
	(0.021)	(0.058)	(0.011)	(0.039)	(0.016)
EPU	-0.001	-0.003	-0.002	0.019	-0.005
	(0.008)	(0.020)	(0.003)	(0.014)	(0.005)
Market participation	0.415***	0.595*	0.127*	-0.538***	0.070
	(0.139)	(0.350)	(0.064)	(0.173)	(0.082)
Observations	4,851,920	4,851,920	4,851,920	2,400,951	2,400,951
R^2	0.137	0.134	0.087	0.079	0.116
Panel B					
EPU*Workage	0.013***	0.054***	0.020***	0.028***	0.031***
	(0.002)	(0.007)	(0.002)	(0.008)	(0.004)
EPU	0.008**	0.029***	-0.004**	0.032***	-0.013***
	(0.004)	(0.010)	(0.002)	(0.008)	(0.003)
Workage	0.020***	0.006	0.017***	-0.059***	0.035***
	(0.004)	(0.011)	(0.003)	(0.011)	(0.006)
Observations	6,143,729	6,143,729	6,143,729	3,019,395	3,019,395
R^2	0.134	0.130	0.065	0.080	0.083
Macroeconomic variables	yes	yes	yes	yes	yes
Demographic variables	yes	yes	yes	yes	yes
Month FE	yes	yes	yes	yes	yes
State FE	yes	yes	yes	yes	yes
State-specific time trend	yes	yes	yes	yes	yes
Cluster by year-month	yes	yes	yes	yes	yes
Cluster by state	yes	yes	yes	yes	yes

Table 6: Robustness Test—Model Specification—Panel Logistic Regression

This table reports results of a logit regression of individuals' decisions regarding alcohol use on *EPU* and control variables. The two dependent variables are indicators for whether an individual had a drink in the past month (*Drinker*) and engaged in binge drinking in the past month (*Binge*). Independent variables also include the contemporaneous stock market return, unemployment rate, per capita state income, individual-level demographic characteristics, state-specific time trends, calendar month fixed effects, and state fixed effects. See Appendix A for detailed definitions, sources, and construction of all variables. Columns (1) and (2) use the sample of both drinkers and nondrinkers. Column (3) is limited to drinkers only. Standard errors are reported parenthetically, two-way clustered by state and year-month, and reported in parentheses and marginal effects are reported in brackets. ***, **, and * indicate $p<0.01$, $p<0.05$, and $p<0.1$, respectively.

	(1)	(2)	(3)
	Drinkers + Nondrinkers		Drinkers Only
	Drinker	Binge	Binge
EPU	0.074***	0.089***	0.055***
	(0.005)	(0.006)	(0.006)
Macroeconomic variables	yes	yes	yes
Demographic variables	yes	yes	yes
Month FE	yes	yes	yes
State FE	yes	yes	yes
State-specific time trend	yes	yes	yes
Cluster by year-month	yes	yes	yes
Cluster by state	yes	yes	yes
Observations	6,143,729	6,143,729	3,019,395
Cox and Snell (1989) R^2	0.184	0.167	0.173

Table 7: Robustness Test—Data Aggregation—State-Month Average Alcohol Use on EPU and Controls

This table reports the panel OLS regression results of state-month average alcohol use on economic uncertainty (as captured by *EPU*) and control variables. The three dependent variables are the proportion of survey participants that had a drink in the past month (*%Drinker*), the average number of drinks in the past month (*Avg. ln(1+ no. drinks)*), and fraction of survey participants who engaged in binge drinking in the past month (*%Binge*). Independent variables also include the contemporaneous stock market return, unemployment rate, per capita state income, state-month level demographic characteristics, state-specific time trends, calendar month fixed effects, and state fixed effects. See Appendix A for detailed definitions, sources, and construction of all variables. Columns (1)-(3) use the sample of both drinkers and nondrinkers. Columns (4)-(5) are limited to drinkers only. Standard errors are heteroscedasticity-consistent, two-way clustered by state and year-month, and reported in parentheses. ***, **, and * indicate p<0.01, p<0.05, and p<0.1, respectively.

	(1)	(2)	(3)	(4)	(5)
	Drinkers + Nondrinkers			Drinkers Only	
	%Drinker	Avg. ln(1+ no. drinks)	%Binge	Avg. ln(1+ no. drinks)	%Binge
EPU	0.013***	0.067***	0.007***	0.074***	0.007***
	(0.002)	(0.008)	(0.001)	(0.010)	(0.002)
Macroeconomic variables	yes	yes	yes	yes	yes
Demographic variables	yes	yes	yes	yes	yes
Month FE	yes	yes	yes	yes	yes
State FE	yes	yes	yes	yes	yes
State-specific time trend	yes	yes	yes	yes	yes
Cluster by year-month	yes	yes	yes	yes	yes
Cluster by state	yes	yes	yes	yes	yes
Observations	12,700	12,700	12,700	12,700	12,700
R^2	0.895	0.872	0.705	0.446	0.481

Table 8: Robustness Check—Alternative Measures of Uncertainty—News-based EPU

This table reports the panel OLS regression results of individuals' decisions regarding alcohol use on economic uncertainty (as captured by *News-based EPU*) and control variables. The three dependent variables are an indicator for whether an individual had a drink in the past month (*Drinker*), the number of drinks in the past month (*ln(1+no. drinks)*), and an indicator for binge drinking in the past month (*Binge*). Independent variables also include the contemporaneous stock market return, unemployment rate, per capita state income, individual-level demographic characteristics, state-specific time trends, calendar month fixed effects, and state fixed effects. See Appendix A for detailed definitions, sources, and construction of all variables. Columns (1)-(3) use the sample of both drinkers and nondrinkers. Columns (4)-(5) are limited to drinkers only. Standard errors are heteroscedasticity-consistent, two-way clustered by state and year-month, and reported in parentheses. ***, **, and * indicate p<0.01, p<0.05, and p<0.1, respectively.

	(1)	(3)	(5)	(7)	(9)
	Drinkers + Nondrinkers			Drinkers Only	
	Drinker	ln(1+no. drinks)	Binge	ln(1+no. drinks)	Binge
News-based EPU	0.012***	0.042***	0.004***	0.028***	0.002
	(0.002)	(0.007)	(0.001)	(0.005)	(0.002)
Macroeconomic variables	yes	yes	yes	yes	yes
Demographic variables	yes	yes	yes	yes	yes
Month FE	yes	yes	yes	yes	yes
State FE	yes	yes	yes	yes	yes
State-specific time trend	yes	yes	yes	yes	yes
Cluster by year-month	yes	yes	yes	yes	yes
Cluster by state	yes	yes	yes	yes	yes
Observations	6,143,729	6,143,729	6,143,729	3,019,395	3,019,395
R^2	0.138	0.134	0.087	0.081	0.118

Table 9: Robustness Check—Alternative Measure of Behavior—Smoking

This table reports the panel OLS regression results of individuals' decisions regarding tobacco use on economic uncertainty (as captured by *EPU* or News-based *EPU*) and control variables. The dependent variable *Smoker* is an indicator for whether an individual is a current smoker. Independent variables also include the contemporaneous stock market return, unemployment rate, per capita state income, individual-level demographic characteristics, state-specific time trends, calendar month fixed effects, and state fixed effects. See Appendix A for detailed definitions, sources, and construction of all variables. Standard errors are heteroscedasticity-consistent, two-way clustered by state and year-month, and reported in parentheses. ***, **, and * indicate p<0.01, p<0.05, and p<0.1, respectively.

	(1)	(2)
	Smoker	
EPU	0.003**	
	(0.001)	
News-based EPU		0.003***
		(0.001)
Macroeconomic variables	yes	yes
Demographic variables	yes	yes
Month FE	yes	yes
State FE	yes	yes
State-specific time trend	yes	yes
Cluster by year-month	yes	yes
Cluster by state	yes	yes
Observations	6,810,614	6,810,614
R^2	0.086	0.086

Table 10: Panel OLS Regressions of Individuals' Unhealthy Choice on Stock Market Return and Controls

This table reports the panel OLS regression results of individuals' decisions regarding alcohol and tobacco use on stock market return and control variables. The four dependent variables are an indicator for whether an individual had a drink in the past month (*Drinker*), the number of drinks in the past month (*ln(1+no. drinks)*), an indicator for binge drinking in the past month (*Binge*), and an indicator for whether an individual is a current smoker (*Smoker*). Independent variables also include unemployment rate, per capita state income, individual-level demographic characteristics, state-specific time trends, calendar month fixed effects, and state fixed effects. See Appendix A for detailed definitions, sources, and construction of all variables. Columns (1)-(3) use the sample of both drinkers and nondrinkers. Columns (4)-(5) are limited to drinkers only. Column (6) uses the smoking sample. Standard errors are heteroscedasticity-consistent, two-way clustered by state and year-month, and reported in parentheses. ***, **, and * indicate p<0.01, p<0.05, and p<0.1, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Drinkers + Nondrinkers			Drinkers Only		Smoking Sample
	Drinker	ln(1+no. drinks)	Binge	ln(1+no. drinks)	Binge	Smoker
Stock market return	-0.008	-0.062	-0.007	-0.086*	-0.009	0.005
	(0.025)	(0.075)	(0.009)	(0.046)	(0.013)	(0.007)
Macroeconomic variables	yes	yes	yes	yes	yes	yes
Demographic variables	yes	yes	yes	yes	yes	yes
Month FE	yes	yes	yes	yes	yes	yes
State FE	yes	yes	yes	yes	yes	yes
State-specific time trend	yes	yes	yes	yes	yes	yes
Cluster by year-month	yes	yes	yes	yes	yes	yes
Cluster by state	yes	yes	yes	yes	yes	yes
Observations	6,143,729	6,143,729	6,143,729	3,019,395	3,019,395	6,810,614
R^2	0.138	0.134	0.087	0.081	0.118	0.086

Appendix A. Variables and Data Sources

Variable Name	Source	Definition (subscription is dropped for brevity)
EPU_t	Economic policy uncertainty (EPU) website: http://www.policyuncertainty.com/	EPU is a constructed index that measures overall policy-related economic uncertainty.
News-based EPU_t	News-Based economic policy uncertainty (EPU) website: http://www.policyuncertainty.com/	News-based EPU is a constructed index that measures news-based policy-related economic uncertainty.
Stock market $return_t$	Center for Research in Security Prices (CRSP)	The value-weighted stock market return in month *t*.
Income per $capita_{s,y}$	The Federal Reserve Bank of St. Louis: https://www.stlouisfed.org/	The per capita income adjusted by 1990 dollars for state *s* in year *y*. We apply state-annual *Income per capita* in year *y* to all months in that year for state *s*. We use *Income per capita* divided by 10,000 in all regression models.
Unemployment $rate_{s,t}$	The Federal Reserve Bank of St. Louis: https://www.stlouisfed.org/	The unemployment rate for state *s* in month *t*.
Market $Participation_s$	Hong, Kubik, and Stein (2004, Table 5)	Stock market participation rate in state *s*.
$Workage_{i,s,t}$	BRFSS	An indicator variable for whether an individual *i* in state *s* in month *t* is between 25 and 64 years old.
$Drinker_{i,s,t}$	BRFSS. The survey question of whether the participant had at least one drink of alcohol in the past 30 days. A drink of alcohol is one can or bottle of beer, one glass of wine, one can or bottle of wine cooler, one cocktail, or one shot of liquor.	An indicator variable for whether an individual *i* in state *s* in month *t* had at least one alcoholic drink over the past 30 days.

Appendix A. Variables and Data Sources (Continued)

$ln(1+no.\ drinks)_{i,s,t}$	BRFSS. The survey calculates and reports the total number of drinks per month for 1990-2014 and per week in 2015 based on the computed number of drinks of alcohol beverages per day. The survey calculates the number of drinks of alcohol beverages per day using two survey questions. One question asks the survey participant how many days per week or per month she had at least one drink of any alcoholic beverage during the past 30 days. The other question asks how many drinks the participant had on average during the past 30 days when she drank.	The natural logarithm of one plus the total number of alcoholic beverages consumed over the past 30 days by individual *i* in state *s* in month *t*. We cap the number of drinks per month at 450 following Ruhm and Black (2002).
$Binge_{s,t}$	BRFSS. 1990-2005: The survey asks whether a participant (male or female) had five or more alcoholic beverages in the past month on one or more occasions. 2006-2016: The survey asks how many times in the past month a male participant had five or more drinks (a female participant had four or more drinks) on an occasion.	An indicator for binge drinking conducted by a survey participant *i* in state *s* in month *t*.
$Smoker_{i,s,t}$	BRFSS. The survey asks whether a participant has smoked at least 100 cigarettes in her entire life. Participants who answer "yes" are further asked whether they currently smoke cigarettes (1990-1995) or whether they smoke cigarettes every day, some days or not at all (1996-2015).	An indicator variable for whether an individual *i* in state *s* in month *t* is currently a smoker.

Appendix A. Variables and Data Sources (Continued)

Female $_{i,s,t}$	BRFSS	An indicator variable that takes a value of one if an individual *i* in state *s* in month *t* is female and zero for male.
Employed $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* is employed and zero otherwise.
Age group 18-24 $_{i,s,t}$	BRFSS	An indicator variable that equals one if the age of an individual *i* in state *s* in month *t* is between18 and 24.
Age group 25-34 $_{i,s,t}$	BRFSS	An indicator variable that equals one if the age of an individual *i* in state *s* in month *t* is between 25 and 34.
Age group 35-44 $_{i,s,t}$	BRFSS	An indicator variable that equals one if the age of an individual *i* in state *s* in month *t* is between 35 and 44.
Age group 45-54 $_{i,s,t}$	BRFSS	An indicator variable that equals one if the age of an individual *i* in state *s* in month *t* is between 45 and 54.
Age group 55-64 $_{i,s,t}$	BRFSS	An indicator variable that equals one if the age of an individual *i* in state *s* in month *t* is between 55 and 65.
Age group > 65 $_{i,s,t}$	BRFSS	An indicator variable that equals one if the age of an individual *i* in state *s* in month *t* is 65 and above.
Married cohab $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* is either married or a member of an unmarried couple.
Divorced or seperated $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* is either divorced or separated.
Widowed $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* is widowed.
Never married $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* has never married.
Marriage not reported $_{i,s,t}$	BRFSS	An indicator variable that takes a value of one if an individual *i* in state *s* in month *t* refuses to answer the marital status questions.
Race white $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* is white.
Race black $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* is black.

Appendix A. Variables and Data Sources (Continued)

Race Hispanic $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* is Hispanic.
Race other $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* is neither white, or black, or Hispanic.
Race not reported $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* refuses to answer the race demographics question.
Education dropout $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* does not finish high school.
Educationhigh school $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* is a high school graduate but with no college or technical school education.
Education some college $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* has some college or technical school education but not graduate.
Education college graduate$_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* graduated from a college.
Education not reported $_{i,s,t}$	BRFSS	An indicator variable that equals one if an individual *i* in state *s* in month *t* refuses to answer the education background survey question.

Appendix B: Summary Statistics of Demographic Variables

Appendix B reports summary statistics of demographic variables for individual-level regressions that use the sample of drinkers only. See Appendix A for detailed definitions, sources, and construction of all variables.

Variable	N	Mean	Median	Std. Dev.	Min.	Max.
Female	3,015,962	0.53	1	0.5	0	1
Employed	3,015,962	0.64	1	0.48	0	1
Age group 18-24	3,015,962	0.06	0	0.23	0	1
Age group 25-34	3,015,962	0.14	0	0.35	0	1
Age group 35-44	3,015,962	0.18	0	0.39	0	1
Age group 45-54	3,015,962	0.21	0	0.41	0	1
Age group 55-64	3,015,962	0.19	0	0.4	0	1
Age group > 65	3,015,962	0.21	0	0.41	0	1
Married cohab	3,015,962	0.61	1	0.49	0	1
Divorced or separated	3,015,962	0.16	0	0.36	0	1
Widowed	3,015,962	0.08	0	0.27	0	1
Never married	3,015,962	0.15	0	0.36	0	1
Marriage not reported	3,015,962	0	0	0.05	0	1
Race white	3,015,962	0.84	1	0.36	0	1
Race black	3,015,962	0.05	0	0.22	0	1
Race Hispanic	3,015,962	0.05	0	0.21	0	1
Race other	3,015,962	0.05	0	0.22	0	1
Race not reported	3,015,962	0.01	0	0.09	0	1
Education dropout	3,015,962	0.05	0	0.22	0	1
Education high school	3,015,962	0.25	0	0.43	0	1
Education some college	3,015,962	0.28	0	0.45	0	1
Education college graduate	3,015,962	0.42	0	0.49	0	1
Education not reported	3,015,962	0	0	0.03	0	1