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ABSTRACT

We use two quasi-natural experiments, the rapid expansion of many markets after the collapse of the Soviet Union and the Anti-Alcohol Campaign in 1986, and a migrants research design to identify highly persistent habits in food and alcohol consumption. Large shocks to product availability and persistent habits produce large cohort differences in consumption. Placebo tests and descriptive statistics show that habits are formed when individuals start consuming a good regularly and remain largely unaffected afterward. We estimate that Russian male mortality will decrease by 23% within twenty years even without further interventions due to changes in alcohol consumption preferences.

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1 Introduction

Consumption habits are notoriously difficult to measure in the data and are challenging to identify separately from other behavior. Nevertheless, they play an important role in many economic models ranging from applied microeconomics to macroeconomics and finance. These models usually have very different properties depending on the dynamics of the habit formation process as well as the mechanism that leads to habit formation. Using three independent sources of identification, we provide strong evidence that state dependence can indeed be very persistent, and we develop a theoretical framework to interpret such behavior. Our analysis shows that the initial choice of consuming a habit-forming good affects individual choices even decades later. Two quasi-natural experiments—the rapid expansion of many markets after the collapse of the Soviet Union in 1992 and Mikhail Gorbachev's anti-alcohol campaign in 1986—as well as a research design based on migrants together with long panel data show that individuals who start consuming one type of good early in life form strong habits toward this type of good. Habits last over the entire lifetime, leading to very persistent consumption behavior, especially once the habit stock has fully accumulated.

For instance, for the case of alcoholic beverages, we non-parametrically estimate that consumers reach their steady-state habit stock around age 22. Important for the case of alcoholic beverages is the fact that these results apply to *all* levels of alcohol consumption and are not limited to heavy alcohol consumption or alcoholism. We control for the level of total alcohol intake in all our specifications and we follow the recent literature by using consumption shares instead of levels in order to make the results robust to outliers. Moreover, all our findings are robust to dropping the top quartile of the distribution of alcohol consumers, measured in terms of total alcohol intake. As a matter of fact we find that individuals form habits at least as easily toward light alcohol as toward harder drinks.

We then extend our results to other, non-alcoholic goods which experienced similar rapid market expansions during Russia's transition to an open market economy, including subtropical fruits, yogurt and chocolate. This analysis highlights that long-run consumption habits are important for a broad set of consumer goods and are not limitted to potentially addictive substances. While the persistent habits we document are certainly evidence in support of models with habit formation, the microeconomic behavior we uncover is very different than the standard habit formation model. In particular, we find that summarizing habits in terms of short lags of consumption, as is typically done in this literature—especially when modeling aggregate data—, is not appropriate for modeling individual behavior. Instead of lagged consumption, we find that *initial* consumption largely determines habits, and once those habits are formed, they are very persistent, at least for the set of goods we study.

This has important implications for policy, since aggregate behavior changes only slowly as older cohorts who formed their habits in the distant past exit and younger cohorts enter and form different habits if the environment changes. Using the two quasi-natural experiments, we relate our results to the previous literature on habit formation by estimating the short-run persistence of the habit process typically studied in this literature. We show that the autoregressive coefficients for consumption are severely *downward* biased when estimated by ordinary least squares (OLS), contrary to the upward bias implied by unobserved taste heterogeneity. This downward bias could result from the attenuation induced by the substantial measurement error typically found in expenditure surveys. For instance, when we instrument the lagged consumption share of alcoholic beverages with the exogenous variation provided by the two quasi-natural experiments, the first-order autoregressive coefficient increases threefold, from 0.28 to 0.82 for beer and from 0.33 to 0.87 for vodka, and we cannot reject the hypothesis that both coefficients are one.

Finally, we focus on the subsample of male consumers in order to analyze the long-run consequences of persistent habits for one of the most important health issues in Russia: the extremely low male life-expectancy—currently only 60 years compared to 75 years in the U.S. Using our estimates we predict that male mortality in Russia will decrease by one quarter within twenty years even under the current set of policies and current levels of relative prices of alcoholic beverages. This will happen simply because new generations will be more accustomed to light alcohol and will replace older generations with strong preferences for hard liquor. Since much of the gap between male and female life expectancy is due to occasional binge drinking, which is more likely to occur for males who prefer liquor, this shift in consumption habits toward light alcohol in turn implies strong effects on mortality. Hence, this reduction in male mortality will be the result of changes that occurred several decades ago.

We focus on habits over alcoholic beverages for four reasons beyond their importance for health outcomes, before turning to consumption habits over food. First, while alcohol consumption has several drawbacks when studying habit formation, one major advantage is that most individuals start consuming alcohol regularly around the legal drinking age, which is 18 in Russia. Individuals at this age make their own consumption decisions, which is an important difference to say the consumption of food. Under our hypothesis of persistent habits that form when consuming a certain good regularly for the first time, individuals form habits over food during early childhood when they are not making their own consumption decisions. Instead, they are mostly exposed to their parents' food choices and thus their parents' habits. Hence, even when we observe large, exogenous discontinuities in the supply of certain types of food, we would not expect to see similarly sharp changes in consumption patterns across cohorts. Parents purchase food for their children, and the

parents' preferences are largely determined before those supply shocks occurred and only change gradually. Moreover, the children's exposure to those new goods also depends on the age of their parents. All these reasons make the identification of persistent habits over non-alcoholic goods much more challenging. Second, by restricting the analysis to alcohol we take advantage of the detailed consumption data for different types of alcoholic beverages obtained for each adult household member using a separate health module, which is attached to the household-level expenditure survey. In contrast to the previous literature, which is often restricted to household-level data or credit card accounts, our data has the individual consumer as the unit of analysis. Furthermore, the health module asks individuals about *quantities consumed* instead of expenditure outlays. Our consumption measure therefore directly captures actual consumption and is not subject to timing issues that may lead to a wedge between expenditures and consumption. For instance, we do not have to assume that an individual consumed all the alcohol it purchased in the reference period.[1] Third, having access to a long time series of aggregate alcohol sales by type of alcohol—including several decades before the collapse of the Soviet Union—, allows us to document the dramatic changes in this market and relate it to persistent cohort effects in consumption. Finally, our second quasi-natural policy experiment was specifically designed to curbe alcohol production and lasted only for a short period. This allows us to test habit formation against some common alternative explanations which typically involve processes that adjust more slowly, such as culture or social norms. The two quasi-natural experiments also show that unobserved taste heterogeneity does not explain a significant part of the observed consumption patterns.

To illustrate the persistence of consumption habits, the top and middle panel of Figure 1 show strong cohort differences in alcohol consumption patterns among male alcohol consumers in each year from 1994 to 2011.[2] Indeed, preferences regarding beer and vodka have not changed significantly during the entire sample period despite dramatic changes to the availability of different types of alcoholic beverages over the past two decades. Males born in the 1960s or earlier who spent their early adulthood in the Soviet Union still prefer vodka today, whereas younger generations overwhelmingly prefer beer. These differences are also quantitatively large: vodka constitutes on average 60% of total alcohol intake for males born in the 1960s or earlier, but only 48% for those born in the 1970s who spent their adulthood in the transition period after the collapse of the Soviet Union, and 32% and 19% for those born in the 1980s and 1990s, respectively, who spent their early adulthood in the post-Soviet era. In contrast, the share of beer in total alcohol intake for these

[1] As we document in the Online Appendix, reported household-level expenditures on alcohol are of much poorer quality than similar individual-level data obtained from the health module.

[2] Females show similar cohort effects but consume a larger variety of alcoholic beverages leading to more complex substitution patters; see the discussion of Table 1 in Section 3 and Table A.1 in the Online Appendix.

cohorts constitutes 20%, 36%, 56%, and 68%, respectively. The same pattern emerges for women as well as for other, non-alcoholic goods that saw similar rapid changes in market access over the same period. These stark changes in various markets induced by the collapse of the Soviet Union form our first quasi-natural experiment for the study of habit formation in the consumption of both alcoholic and non-alcoholic goods.

To understand these cohort differences as a result of habit formation it is useful to note that many goods that were not readily available during the Soviet Union became accessible to the broader public only after Russia opened its borders to trade and foreign investment. For instance, the vodka industry dominated the alcohol market measured in terms of pure alcohol during the Soviet Union. Since 1992, however, the beer industry has expanded rapidly, as shown in the bottom pannel of Figure 1, for reasons that are largely exogenous to these preference changes, such as the liberalization of the alcohol market after the collapse of the Soviet Union, a lower regulatory burden for the beer industry—in particular compared to all other alcohol producers—and the entry of foreign competition into this new market. In 1991 for example, shortly before the collapse of the USSR, there were no foreign-owned beer breweries in Russia and no foreign brand was sold. However, already by 2009, less than 20 years later, the five leading foreign-owned companies combined—Carlsberg, Anheuser-Busch, SABMiller, Heineken, and Efes—produced more than 85% of the total beer sold in Russia.

Opening the beer market to foreign competition also lead to the introduction of new technologies. For example, beer sold in cans or in plastic bottles started to be produced only after the collapse of the Soviet Union. Brewing technologies also changed significantly, and the assortment of beer has increased dramatically from only 20 varieties offered in 1991 to over 1,000 in 2009.[3] As a result, from 1991 to 2011, the last year included in our analysis, beer sales have increased by a factor of four from 2.8 to 10.8 billion liters. In contrast, vodka sales have not followed the same trend. Total annual sales of vodka were 1.59 billion liters in 2011, which is roughly the same level as during the Soviet era. In the final 20 years of the USSR, from 1970 to 1991, average annual sales of vodka totaled 1.66 billion liters, and annual sales of beer 3.09 billion liters. In terms of pure alcohol, these numbers correspond to 0.66 billion liters for vodka and only 0.15 billion for beer. We measure consumption in terms of pure alcohol instead of values for these figures because there were no formal market prices in the Soviet Union. Instead, the alcohol industry was monopolized by the state, and quantities produced were heavily regulated. As a result, it was difficult or even impossible to find many goods in stores, and prices were usually not the most significant factor as there was severe

[3]See, for example, http://moepivo.narod.ru/about_beer/brewing-in-the-ussr.html and http://www.beerunion.ru/soc_otchet/2.html. The set of varieties available in 1991 was even more limited than this number suggests, since one brand—Zhigulevskoe—dominated the entire industry.

rationing.

Exploiting the long panel dimension of our data, we show that the pattern shown in Figure 1 is driven almost entirely by variation in consumption between individuals (cohort effects) rather than within individuals, i.e., variation over time following the same individual (age effects). In particular, we find little evidence for the hypothesis commonly formed based on cross-sectional data that differences in the consumption of light and hard alcohol at different ages are driven by a so-called "stepping-stone" or "gateway" effect of light alcohol, where individuals consume light alcoholic beverages when young before switching to harder alcohol later in life. We show that after controlling for individual fixed effects, the consumption-age profile is almost completely flat for consumers starting in the their mid 20s, while there is some modest stepping-stone effect at younger ages. However, these small age effects are dominated by the cohort effects. The age effects can at best explain about one-fifth to a quarter of the unconditional age profile, while the rest is due to long-run effects of shocks to the alcohol market. These shocks that occurred in the distant past mostly affected the habits of consumers who were young at that time, and they manifest themselves as cohort effects in the survey data that were collected long after those shocks occurred.

In all our analyses we also control for household income to account for the possibility that post-Soviet cohorts might be richer than older cohorts and that this in turn might account for the pattern shown in Figure 1 if the newely available goods, such as beer or subtropical fruits, have a higher income elasticity than the more traditional goods, such as vodka or local fruits. Moreover, Russia's gross domestic product (GDP) displayed a strong J-curve pattern after the collapse of the Soviet Union, which is typical for post-Soviet transition economies; see the International Monetary Fund (2014). This pattern as well as the recession caused by the Russian financial crisis of 1998 do not show up in Figure 1, providing further indirect evidence against strong income effects. We also control for contemporaneous relative prices as a potential alternative explanation using both local prices as well as time and region fixed effects. However, in the absence of habit formation, contemporaneous relative prices cannot explain cohort differences since all cohorts face the same prices in a given period and location. With habit formation, relative prices affect the initial choice of *young* individuals over which habit-forming good to consume.

In addition to using the rapid expansion of various markets after the collapse of the Soviet Union, we also use the sharp drop in the production of both beer and especially vodka during Mikhail Gorbachev's anti-alcohol campaign as our second quasi-natural experiment, which significantly disrupted the alcohol markets during the short period from 1986 to 1991, also clearly visible in the bottom panel of Figure 1. While this policy sharply reduced the *official* production of alcohol, it simultaneously also lead to a dramatic increase in the *illegal* production of homemade

vodka called samogon. Crucial for our identification is the fact that the increase in home-produced samogon was much more prevalent in rural areas than in the densely populated urban areas for reasons we discuss in Section 3.4. We exploit this differential impact of Gorbachev's policy on young rural consumers (both men and women) relative to young urban consumers to identify the long-run impact of this policy on habit formation using a difference-in-difference design. Specifically, we analyze the persistent effects of this shock on the habit formation of urban consumers who spent their habit-forming years during the campaign relative to consumers reaching the same age before or after the anti-alcohol campaign. Placebo tests for both experiments reveal non-parametrically that habits in the consumption of alcoholic beverages are indeed formed during early adulthood in a small window, which is roughly centered at age 18.

In the Online Appendix we show that an extension of the standard habit formation model allowing for two habit-forming goods provides a simple explanation for the observed consumption patterns. Persistent habits are formed when individuals start to consume a certain good regularly for the first time in their life, which we assume to be during early childhood for non-alcoholic goods and which we estimate to be during early adulthood for alcoholic beverages. Individuals in our model are born with the same preferences but exposed to different initial market conditions and will therefore form habits toward very different goods. Importantly, with two habit-forming goods we can observe multiple long-run equilibria even without any unobserved individual heterogeneity.

Related Literature The persistence of the consumption habits as well as the underlying mechanism we document in this paper have important implications for various fields in economics such as health economics and consumer demand. Examples in this literature include Becker and Murphy (1988), Chaloupka (1991), Becker et al. (1994), Cook and Moore (2000), and Williams (2005). Most of this literature lacks convincing identification of habits in general and of the persistence of such habits in particular. This paper follows the "deep habits" literature, which analyzes habit formation across goods rather than over a consumption aggregate; see, e.g., Ravn et al. (2006).[4] The studies that are closest to ours are Atkin (2013b,a) and particularly Bronnenberg et al. (2012), all of which use movers or migrants to elicit preferences. Bronnenberg et al. (2012) also estimate the long-run persistence of preference and find quantitavely similar effect to ours, in their case for preferences over different brands within narrowly defined consumer packaged goods. Our paper contributes to this literature by using two large quasi-natural experiments as sources of identification in addition

[4]Interpreted more broadly, habit formation has also been successfully applied in asset pricing and macroeconomics to explain several empirical puzzles; see e.g., Eichenbaum et al. (1988), Sundaresan (1989), Heien and Durham (1991), and Campbell and Cochrane (1999). However, those papers and the few studies that test these models using micro-level data use short-run habits in the level of total consumption instead of consumption shares of disaggregated goods; see e.g., Dynan (2000) and Ravina (2007).

to exploiting variation from migrants.

Our results also echo the literature on cohort differences in beliefs and preferences, such as beliefs about inflation and macroeconomic risk or preferences for redistribution and state intervention in former communist countries; see e.g., Guiso et al. (2004, 2008), Alesina and Fuchs-Schündeln (2007), and Malmendier and Nagel (2011a,b) for examples of the former and Denisova et al. (2010) for a discussion of the latter. This research suggests that the cultural and political environment in which an individual grows up affects his behavior over his entire lifetime.

Finally, our paper is also related to an active literature in health economics. Our analysis of the effect of habits in the consumption of different types of alcohol on male mortality complements recent research on the causes of the "male mortality crisis" in Russia. Yakovlev (2012) uses a dynamic discrete choice model with peer effects and habits to estimate the demand for heavy drinking and to simulate the effect of an increase in the price of alcohol on heavy drinking and mortality. Bhattacharya et al. (2013) study the effect of changes in alcohol supply on *contemporaneous* mortality before and after the anti-alcohol campaign. Brainerd and Cutler (2005) analyze the factors that lead to the surge in mortality in Russia during the 1990s and argue that excessive alcohol consumption accounts for one third of the increase. In this paper we show that looking on average alcohol consumption as these studies do may mask crucial heterogeneity that is important for understanding the dynamics of the effect of alcohol on mortality, which in turn is also important for policy makers. Our results highlight the long-run consequences of policies, in particular the anti-alcohol campaign in the late 1980s and the expansion of the beer market in the 1990s, and also help to explain the recent decrease in male mortality in the 2000s as a long-run consequence of those shocks. Hence, our analysis has clear predictions for the evolution of male mortality over the next several decades, even without any additional intervention as discussed in more detail in section 5.

The paper is organized as follows. Section 2 describes the data and section 3 identifies habit formation in the consumption of alcoholic beverages. Section 4 extends our analysis to consumption habits over non-alcoholic goods and estimates short-run dynamics of habit formation using an instrumental variable approach. In section 5 we analyze the consequences of our results for the life-expectancy of Russian males. Section 6 concludes.

2 Data

We use data from the Russian Longitudinal Monitoring Survey (RLMS), which is a nationally representative annual survey panel starting in 1992 that covers more than 4,000 households per year corresponding to about 9,000 individual respondents, and is conducted by the Carolina Population

Center at the University of Carolina at Chapel Hill and the High School of Economics in Moscow. Our initial sample consists of rounds 5 through 20 of the RLMS spanning the period from 1994 to 2011, but not including 1997 and 1999 when the survey was not conducted. We do not use data from rounds 1 to 4 because they were conducted by another institution, have a different methodology, and are generally considered to be of much lower quality. We provide a more detailed description of the data in the Online Appendix.

Table A.1 in the Online Appendix summarizes the socioeconomic and demographic characteristics as well as various measures of consumption for the samples used in the paper. For our analysis of alcohol consumption patters, we restrict the gender-based samples to individuals age 18 and older, with 18 being the minimum legal drinking age in Russia.[5] Since there is severe underreporting of underage drinking in the RLMS, we cannot reliably measure the drinking pattern of males below age 18. Our primary measures of alcohol consumption are the shares of beer and vodka consumption in total alcohol intake, calculated in milliliters of pure alcohol. Specifically, we use the individual's reported quantity consumed in a typical day during the last 30 days, and we then transform the volume to grams of pure alcohol, e.g., grams of ethanol in beer.[6] We use the term "vodka" to include vodka and other hard liquor, but we exclude homemade liquor, i.e., samogon. The production of homemade liquor for personal consumption became legal only in 1997, and selling it remains illegal today. This variable is measured very imprecisely, and we therefore exclude it. However, all of our results are robust to including samogon, although the standard errors tend to increase. The term "beer" includes home-brewed beer in addition to purchased beer. However, the fraction of home-brewed beer is negligible for the vast majority of households, and thus it was not asked separately in most rounds of the survey.

In all specifications we also include the level of total alcohol consumption. To construct these variables we use the amount of all alcoholic beverages consumed during the previous month. We assume that beer contains 5% pure alcohol and vodka contains 40% pure alcohol, based on recommendations from the National Institutes of Health (NIH); see, e.g., Dawson (2003). Some researchers take into account the possibility that the percentage of alcohol contained in beer has increased from around 2.85% in the Soviet Union to around 5% in 2000; see, e.g., Nemtsov (2002) and Bhattacharya et al. (2013). We instead assume a constant share both for simplicity and to be conservative with respect to the growth rate of beer sales relative to vodka sales measured in pure alcohol as shown

[5]Restricting the sample to consumers age 18 and above does not affect our estimated age at which consumers form their habits over alcoholic beverages, which is around age 16 to 18. This estimate is instead identified by individuals that spend their adolenscence before, during and shortly after the collapse of the Soviet Union, which occured largely before the start of our main sample in 2001.

[6]Consumption during a typical day is the right measure to study habit formation. For our analysis of the effect of habits on mortality below we do not measure binge drinking, which constitutes an a-typical day.

in the bottom panel of Figure 1. This assumption does not affect our results.

Vodka and beer are the most popular alcoholic beverages among Russian males, with an average share across all years of 62% for vodka (including samogon) and 29% for beer, respectively. Therefore, conditional on not becoming an abstainer, any behavioral response to a shock in one of those two types of alcohol causes a subsitution to the other one. The substitution pattern is more complex for women, since they also have a significant preference for wine. Female alcohol consumers consume on average 36% wine, but only 49% vodka and 23% beer. Hence, a shock to say the beer or vodka market leads to ambiguous cross-product substitution effects for women. Looking at the changes over time in the shares of beer and vodka consumed by men, shown in the top and middle panel of Figure 1, we see that the share of beer for the average person increases and the share of vodka decreases during the time span of the survey. In 1994, the average share of vodka was 73%, while beer had only a share of 10%. By 2011 these shares were already 49% and 38%, respectively. This general trend is also apparent in the aggregate sales shown in the bottom panel of Figure 1 and is caused by the ongoing expansion of the beer market in the early years of our sample.

Table A.1 also provides summary statistics for the main control variables we use in our analysis, both for our main samples of alcohol consumers age 18 and above, by gender, as well as for the sample of all individuals above age 18, including those who report not having consumed any alcohol during the previous month. We will use the latter sample for males when we analyze the effect of the changed alcohol patterns on male mortality. The large gap between male and female life expectancy is reflected in the much larger sample of women than men, 97,431 vs. 68,350, and the higher unconditional average age for females, 47 vs. 42.5 years. Once we restrict the samples to alcohol consumers only, both sample sizes become similar, which is mostly driven by the fact that there is a much larger fraction of abstainers among women than men, 54% vs. 30%.

Finally, looking at total alcohol intake we see that the average male alcohol consumer consumes almost four times as much pure alcohol as the average female consumer, which is only partially due to the larger share of vodka consumed by men. This fact is crucial for understanding the large effects we find of the share of vodka consumed on male mortality, even conditional on the total level of alcohol consumed. The reason is that most alcohol-related deaths of individuals below the age of 65 are caused by occational binge drinking. The measure of alcohol consumption we use in this paper, however, is not based on binge drinking, but on the amount of alcohol consumed during a *typical* day. Nevertheless, having a preference for vodka consumption, i.e., consuming a higher share of vodka, makes binge drinking much more likely, and hence increases mortality risk, even when comparing two individuals with the same average alcohol intake per month. We discuss the household-level expenditure data of non-alcoholic goods in more detail in section 4.2.

3 Identifying Persistent Consumption Habits

In this section we first verify that the patterns shown in Figure 1 are robust to including various controls. Using two quasi-natural experiments and a research design based on migrants, we then formally test our conjecture that changes in alcohol consumption are mainly driven by cohort differences against various alternative hypotheses, and that those cohort differences in turn are caused by shocks to the initial conditions of young consumers when they start to form their habits.

3.1 Accounting for Income and Relative Price Effects

To analyze the robustness of the cohort effects shown in Figure 1, we estimate the following reduced-form regression of the share of alcohol S_{it}^g consumed by individual i in year t of alcohol of type $g \in \{\text{b: beer}, \text{v: vodka}\}$ by OLS,

$$S_{it}^g = \text{10-year-cohort}_i + \gamma' x_{it} + \epsilon_{it}, \quad g \in \{b, v\}. \tag{1}$$

10-year-cohort$_i$ are the same ten-year cohort fixed effects shown unconditionally in Figure 1. The vector of controls x_{it} includes local relative prices, household log-income, the level of total alcohol intake, a standard set of demographics such as personal health status, weight, education, and marital status, as well as age, period and region fixed effects, which flexibly control for life-cycle patterns and local and macroeconomic shocks.

In columns 1 and 10 of Table 1, we estimate the cohort effects for males shown in Figure 1 for beer and vodka consumption shares, respectively, using cohorts born before 1930 as the reference group. Consistent with the pattern shown in Figure 1, we find that cohorts turning 18 during the Soviet Union consume similar shares of beer (vodka), which in turn are significantly lower (higher) than those of younger cohorts. Moreover, there is a clear difference in consumption behavior between individuals born in the 1970s—who spent their early adulthood during the economic transition and experienced the opening of Russian markets to foreign competition—and both older and younger cohorts. In turn, the consumption patterns of younger cohorts who turned 18 in the 21th century is again fairly similar and significantly different from all previous cohorts. These patterns are slightly stronger for vodka consumption because the beer market still expanded rapidly during the first half of our sample, as seen in the bottom panel of Figure 1, and hence the beer consumption pattern of many consumers we observe has not stabilized yet. To facilitate the interpretation of the results, we therefore use the cohorts who turned 18 during the Soviet Union as the reference group in all other columns, with the baseline cohort effects shown in columns 2 and 11.

Columns 6 and 7 show that female consumers exhibit the same cohort effects as males, although

slightly attenuated because in contrast to men they also consume a significant fraction of wine. Columns 3, 8 and 12 control for various socioeconomic demographics, household income, local relative prices and total alcohol intake. A higher level of total alcohol intake is achieved by consuming relatively more vodka, while having a higher share of beer is associated with a higher level of self-reported health.[7] Body weight does not affect the share of beer but is a significant predictor of the share of vodka. Both beer and vodka shares have a positive income effect due to the fact that home-made vodka (i.e., samogon) is a low-quality substitute for purchased vodka and hence is an inferior good. The evidence in the literature on the relationship between alcohol consumption patterns and education and marital status is mixed and typically uses levels of total alcohol consumed instead of shares by types of alcohol; hence, these coefficients are difficult to interpret. A increase in the relative price of beer decreases females' share of beer consumed and increases the males' share of vodka, while having no statistically significant effect on their share of beer.

Due to the restrictions we impose on the cohort effects, i.e., the fact that we define 10-year cohorts, the model of age, period, and cohort effects is identified. Column 4 shows that imposing a quadratic function of age instead does not affect the results. We prefer to non-parametrically control for age effects throughout of the paper, noting that all our results are robust to imposing a quadratic function in age instead. The significant negative effect of age might suggest a stepping-stone effect of light alcohol, but section 3.2 shows that this is not the case. Finally, columns 5 and 9 show that the cohort effects are robust to dropping the top quartile of the distribution of total alcohol consumers.

Overall, Table 1 clearly shows that younger generations—both male and female—tend to consume more beer and less vodka even after controlling for all those factors, and that the results are not driven by heavy drinkers. For instance, even after controlling for all those factors, the average share of beer in total alcohol intake is about 20 percentage points (pp) higher for both males and females born in the 1990s than for those born before 1970. Even those born in the 1980s have on average a 15 pp higher share of beer consumption than those born before 1970. Those born in the 1970s in turn have a 5 pp higher share of beer consumption than those born earlier.

Our hypothesis is that while people have similar tastes regarding alcoholic beverages, they differ in their initial choice of which habit-forming good to consume. This initial choice combined with the strong persistence of such habits can explain the patterns observed in Figure 1. There are two main alternative hypotheses to consider that might also explain these patterns. First, individuals born in different time periods might have different preferences for certain types of alcohol because of slowly evolving unobserved factors such as culture or social norms and not because of different initial choices

[7]Recall that the subjective health-status variable equals 1 if the individual feels very healthy and 5 if he is in poor health.

and subsequent habit formation. Second, these observed cohort differences may be the result of a stepping-stone effect. The young might start consuming beer or other light drinks before eventually switching to harder drinks later in life. In section 3.2 we use the panel dimension of the data to assess steping stone effects. In sections 3.3 and 3.4 we use two quasi-natural experiments to test our hypothesis against slow-moving unobservables, and section 3.5 complements these experiments by using independent identifying variation based on migrants. Furthermore, these quasi-natural experiments allow us to non-parametrically estimate the age window in which most individuals form habits over alcoholic beverages.

3.2 Quantifying Stepping-Stone Effects

The first main alternative explanation for cohort differences in alcohol consumption put forward in the literature—which is often based on cross-sectional data—is a "stepping-stone" or "gateway" effect of light drugs for the consumption of harder drugs later on. In the case of alcohol, this means that beer might serve as a stepping stone earlier in life for the consumption of harder alcoholic substances later in life, such as vodka. According to this theory, people would start out with beer but eventually switch to harder drinks, in which case the observed cohort differences in Figure 1 would just be the effect of aging. The stepping-stone hypothesis is widely studied in health economics. Several papers have analyzed it in the context of various types of drugs and tested it against alternative explanations, in particular against unobserved individual heterogeneity in preferences.[8] However, to the best of our knowledge our study is the first to analyze the stepping-stone effect of light alcohol towards harder alcoholic beverages.

The aggregate sales in the bottom panel of Figure 1 mask substantial heterogeneity in the drinking behavior across the age distribution as shown in the top-left panel of Figure 2. The share of beer consumption drops from 68% at age 18 to only 17% at age 65, while the share of vodka increases from 19% at age 18 to 54% at age 65. This remarkable age profile can potentially be driven by within- or between-consumer variation. A stepping-stone effect of beer would generate within-consumer variation where younger consumers start out with beer before gradually substituting to harder alcohol as they become older. In the case of between-consumer variation, different cohorts would have relatively flat alcohol life-cycle profiles, implying very persistent drinking habits. The initial share of beer relative to vodka would increase from one cohort to the next, so that the

[8] For instance, Mills and Noyes (1984) and Deza (2012) find evidence for a modest stepping-stone effect of marijuana and alcohol in general for the consumption of harder drugs later on. Similarly, Beenstock and Rahav (2002) find a stepping-stone effect in cigarette consumption leading to an increase in the probability of smoking marijuana later on. Van Ours (2003) finds that unobserved individual heterogeneity and stepping-stone effects can explain many patterns of drug consumption.

intercept of the age profile of younger cohorts would be higher than that of older cohorts for beer consumption, and vice versa for the share of vodka.

The top-right panel of Figure 2 assesses the relative contribution of those two forces by showing the average drinking patterns after taking out individual means. Specifically, for each individual we subtract his average share, and we normalize the average of the first observed share across all individuals to zero. Hence, this figure shows the average slope of the age profile over all individuals in the sample after controlling for individual fixed effects. Explaining the aggregate age profile in Figure 2 with substantial within-consumer heterogeneity would imply that this demeaned consumption profile should retain a significant slope, positive for vodka consumption and negative for beer. On the other hand, if the aggregate trend is driven by changes in persistent habits across cohorts, then these profiles should be relatively flat. The pattern shown in this figure strongly supports the hypothesis that these aggregate trends are mainly driven by changes in persistent habits between cohorts, and there is little evidence for much change within cohorts over time.

The average individual's slope shown in the top-right panel of Figure 2 could mask a stepping-stone effect if habits are formed very quickly during early adulthood and then remain fairly constant. This could generate an age profile that is steep at the beginning and then flattens out quickly. In this case the average slope across all individuals would be small, since most individuals in our sample would be in the flat part of their life-cycle profile, even though the age profile is steep at the beginning. In the bottom-left panel we assess this hypothesis by plotting the demeaned age profile of individuals starting from age 18 and following them up to at most age 24. That is, we perform the same analysis as in the top-right panel of Figure 2 on this subsample, again controlling for individual fixed effects and normalizing the initial share to zero, which is now the share at age 18. The bottom-left panel of Figure 2 shows that there indeed is a steeper age profile from age 18 to about age 22.

The bottom-right panel of Figure 2 repeats this exercise, now following individuals starting at age 25 through at most age 29. We observe that the age profile already becomes flat when consumers are in their late 20s. In fact, the profiles are so flat that we cannot reject the hypothesis that the slope of the two age profiles for beer and vodka are the same. Figure A.1 in the Online Appendix performs the same analysis over the entire life-cycle, showing that the age profiles remain flat at all ages above age 22, such that the two slopes of the age profiles of beer and vodka shares are not statistically different from each other.

Hence, we find that within-consumer variation such as the stepping-stone effect cannot explain most of the average age profile shown in the top-left panel of Figure 2. Instead, most of the profile is driven by between-consumer variation such as cohort effects which is consistent with the

flat cohort profiles shown in Figure 1. Moreover, this non-parametric analysis also reveals that consumer preferences form early in the life and are fully accumulated already by the age of about 22, presumably at the beginning of an individual's consumption life-cycle. That is, habits form mostly in the first couple of years after the individual starts consuming alcohol regularly for the first time. In all our subsequent analyses, we therefore control for age flexibly with fixed effects to account for potential life-cycle effects such as stepping-stone effects. We now turn to two quasi-natural experiments to formally test the hypothesis that habits form early in life and then remain relatively stable throughout the remaining part of the life-cycle. Most of these shocks occurred well before the beginning of our sample period, and our results are not affected if we exclude individuals below age 22 from our sample, which is consistent with this hypothesis.

3.3 The Collapse of the Soviet Union as a Quasi-Natural Experiment

An alternative explanation for the observed heterogeneity is that individuals born at different times grow up in different cultural environments and might therefore have different preferences for hard and light drinks. To test our hypothesis against this explanation, we exploit the large change in the Russian alcohol market that occurred in the wake of the collapse of the Soviet Union as our first quasi-natural experiment.[9] Focusing on the relatively short period of time when the beer industry experienced rapid growth, we study the long-run consumption behavior of individuals who turn 18 years old during this period, which is the minimum legal drinking age in Russia.[10] Since culture and institutions change only slowly (e.g., Roland (2004)), males who turn 18 during the beer-market expansion and hence according to our hypothesis form their habits in this period face a very similar cultural environment and similar social norms but very different access to beer compared with males who are only slightly older. We estimate the same regression equation as in (1) except that we replace the ten-year cohort effects with a linear effect in the year in which the individual turns 18 in order to analyze the effect of the rapid changes in the beer market for males of only slightly different ages,

$$S_{it}^{g} = \beta \cdot \text{year-turned-18}_i + \gamma' x_{it} + \epsilon_{it}. \tag{2}$$

In the following we restrict our sample to years 2001–2011, since starting with year 2001 all

[9] In section 4 we extend this analysis to non-alcoholic goods that saw a similar market expansion after the collapse of the Soviet Union.

[10] Since there is no discontinuity implied by the legal drinking age—both because of limited enforceability of the minimum legal drinking age and because one cannot be forced to start consuming alcohol at 18—and also because habits do not necessarily form within a single year, we cannot use a regression discontinuity design. However, our identification approach closely mimics such a framework. Our results suggest that the average consumers forms his habits between ages 16 and 18. The literature surveyed in Koposov et al. (2002) suggests that the mean age at which minors started to binge drink was between 14 and 18 years in the Soviet Union and probably has not change much since then, consistent with our findings.

cohort groups reach a new steady state as documented in Figure 1. The cohort profiles between 1994 and 2000 are compressed by the fact that individuals have only limited access to the beer market. As the beer market expands, all cohorts increase their average beer consumption and decrease their vodka consumption across the board, although the relative ranking of the shares is preserved even in those earlier years. Therefore, when analyzing the long-run effects of the quasi-natural experiments, we need to restrict our analysis to the stable period after 2000. Otherwise, our analysis would be contaminated by the *current* evolution of the alcohol market instead of capturing only the long-run effects of these changes that occurred prior to our sample period. For instance, comparing the 1990s cohorts with the 1930s cohorts over the entire sample period from 1994 to 2011 would clearly overstate the pure cohort effect since it would attribute the fact that the 1930s cohorts did not have access to the same beer market during the 1990s as during the 2000s to cohort rather than time effects.[11]

The top left panel of Figure 3 illustrates the design of the analysis. We start estimating equation (2) on the sample of all males who turn 18 during the expansion of the beer market, which we determine lasted from about 1994 to 2008 based on the bottom panel of Figure 1. Since it is possible that other factors also changed during this period that may have affected males differentially depending on the year of their 18th birthday, we let the sample window, which is centered at year 2001, shrink until it only includes the three years from 2000 to 2002. Hence, as we shrink the sample window, we identify the effect of the expansion of the beer market on alcohol shares using males who grow up in a more and more similar environment, except that they face a different beer market when they turn 18.

The bottom left panel of Figure 3 plots the estimates of β for both types of goods together with 95% confidence intervals. The effect of the expansion of the beer market on the shares consumed is remarkably stable, and it remains statistically significant despite the substantial gradual reduction in the sample size. Moreover, consistent with our hypothesis, the magnitude of the coefficients increases (in absolute value) with shrinking sample periods since we are selecting males who are more and more likely to have formed their consumption habits during the rapid expansion of the beer market. For instance, males who turn 18 in 2002 exhibit on average a 12% higher long-run share of beer consumption compared with males who are only two years older.[12]

To analyze the validity of this quasi-natural experiment, we run placebo tests as illustrated in the top right panel of Figure 3. Specifically, we estimate equation (2) using a 10-year rolling window

[11] We absorb part of this contamination effect non-parametrically with period fixed effects.

[12] The term "long-run share" refers to the fact that we are estimating the individuals' consumption shares using data from 2001 to 2011. Hence, most of the individuals in our sample are (much) older than 18 when we measure their consumption shares.

starting with males who turned 18 between 1970 and 1979 and ending with the sample of males who turned 18 between 2002 and 2011, with 1970 being the first year for which we have official aggregate sales data by type of alcohol. Once we reach the sample ranging from 2002 to 2011, we continue shrinking the window from the left until it only includes the five years from 2007 to 2011.

Under our hypothesis we should not see any significant effect of the year in which an individual turned 18 on the share of beer consumed for samples that do not include the expansion of the beer market. As the 10-year sample window reaches the time at which the beer market expands rapidly, the estimate of β in equation (2) should gradually increase, because men turning 18 at the end of the 10-year sample window have much easier access to beer than men who turned 18 at the beginning of the sample window. Finally, the beer market stabilizes around 2007 at a new long-run equilibrium shown in Figure 2. As the sample window starts to cover more and more of the new steady state, the coefficient should gradually decrease. For the shortest sample which includes only males who turn 18 in 2007 or later, the estimate should be zero, as all individuals in this subsample have again access to a similarly developed beer market when they turn 18. To summarize, the response should first be zero and then exhibit a hump-shaped pattern with a peak response when the sample window fully covers the beer-market expansion period.

The bottom right panel of Figure 3 plots the estimates of β together with 95% confidence intervals from these placebo regressions. We indeed see this hump-shaped pattern emerge from the data for beer consumption precisely as we would expect under our hypothesis. The coefficients are close to zero and not statistically significant for samples that only include males who turn 18 before the expansion of the beer market. The effect gradually increases when more and more individuals from the 10-year rolling sample are affected by this shock. The peak response is reached for the sample that ranges from 1998 to 2007, which corresponds to the 10-year period that indeed saw the most-dramatic increase in the beer market over the entire 42-year period shown in the top panel. Finally, as we let the sample shrink to include only males who turn 18 after the market stabilizes, we see the coefficient converges to zero, although the precision naturally decreases with the smaller sample sizes. Figure A.2 in the Online Appendix adds the responses of vodka shares to this figure and shows that the beer-market expansion has the opposite effect on the share of vodka for males. The response of the share of vodka is also not significantly different from zero for the samples that do not cover the beer-market expansion. Similarly, the vodka share's response peaks in absolute value for the sample that ranges from 1998 to 2007 before gradually converging back to zero. These results suggest that for males, the substitution toward beer mainly comes at the expense of vodka.[13] This in turn has important health consequences to which we return in Section 5.

[13]We obtain qualitatively and quantitatively similar results for females, which are available from the authors upon request.

3.4 Gorbachev's Anti-Alcohol Campaign as a Quasi-Natural Experiment

Next we use the so-called Gorbachev anti-alcohol campaign as a second quasi-natural experiment to identify consumption habits and to estimate the persistence of this shock to individual preferences. In 1985 Mikhail Gorbachev introduced an anti-alcohol campaign that was designed to fight widespread alcoholism in the Soviet Union. Prices of vodka, beer, and wine were raised, their sales were heavily restricted, and many additional regulations were put in place aimed at further curbing alcohol consumption.[14] The campaign officially ended in 1988, although research shows that high alcohol prices and sales restrictions continued until the collapse of Soviet Union at the end of 1991.[15]

Since the communist government directly controlled the production of any official alcohol in the Soviet Union, the effect of Gorbachev's anti-alcohol campaign on official sales of alcohol was dramatic as is evident from the bottom panel of Figure 1. Sales of beer dropped by 29%, from 177 million liters of ethanol in 1984 to 125 million liters in 1987.[16] Official sales of vodka dropped by 60%, from 784 million liters in 1984 to 317 million liters in 1987, and wine sales experienced the most dramatic drop, from 292 million liters in 1985 down to only 108 million liters in 1990, a decrease of 63%. During the short period from 1984 to 1988 the ratio of official vodka sales to beer sales dropped by 43%, which in the absence of relative prices is our best approximation of the trade-off that individual consumers faced.[17]

However, as shown in the top panel of Figure 4, the drop in official sales of vodka was partially offset by the increased production of samogon, a then-illegal low-quality home-produced vodka. As a result, the effect of the Gorbachev anti-alcohol campaign on total vodka consumption including samogon was small on average; see, e.g., Treml (1997), Nemtsov (2002), Bhattacharya et al. (2013) and the Online Appendix for a discussion of the underlying data and methodology. Indeed, after accounting for samogon production, the estimated volume of total alcohol consumed during the Gorbachev anti-alcohol campaign decreased by only 33%.

More important for our identification approach is the fact that the production of samogon was heavily concentrated in rural areas for reasons related to the technology used to produce samogon. First, the production of samogon requires space, which is limited in urban areas, especially in Russian cities, which are very densely populated by international comparison, with most people living in large apartment buildings. Second, producing samogon causes smoke and a strong smell,

[14] The measures included, among other things, limiting the kinds of shops that were permitted to sell alcohol, closing vodka distilleries and destroying vineyards in the wine-producing republics, and banning the sale of alcohol in restaurants before 2p.m. White (1996) provides a detailed account of this policy.

[15] See, for example, White (1996), Nemtsov (2002), Bhattacharya et al. (2013), and Figure 4.

[16] The volume of alcohol sales is again measured in terms of pure alcohol.

[17] Similarly, the difference in log-changes between official vodka and beer sales is -57%, that is, vodka sales dropped by 57% more than beer sales from 1984 to 1988.

which is at the same time very unpleasant and also easy to detect by neighbors and law-enforcement agents, particularly in cities. Third, the illegal production of samogon was more strictly enforced and punished in urban areas. As a result, it was much safer to produce samogon in single-unit homes, which are highly concentrated in rural areas, than in apartment buildings, which are prevalent in cities.

To estimate the differential access of urban consumers to samogon during the campaign we regress the estimated annual share of samogon in each oblast, obtained from Bhattacharya et al. (2013), on the oblast's share of urban population in 1991, the first year we have reliable disaggregated population data. Table A.2 in the Online Appendix shows that moving to a region with a 10 percentage point higher urban population reduces the share of samogon consumed by 3 percentage points. This geographical pattern of samogon production (and consumption) continues to the present even though total samogon production has decreased dramatically since 1992. For instance, males in rural areas still drink 5.5 times more samogon and the share of samogon in total alcohol intake is five times higher than in rural areas—13% for rural areas compared with only 2.4% in urban areas according to the RLMS. The bottom panel of Figure 4 shows that accounting for samogon production dramatically changes the ratio of hard alcohol to beer available to consumers. Since rural consumers have much more access to samogon during the campaign, they see this ratio increase, while urban consumers face a relative decline in the availability of hard alcohol. One can therefore expect significant differences in the way the campaign affects the initial conditions of rural relative to urban consumers who turn 18 during the campaign and hence how it affects their habit formation in the long run.

This policy experiment naturally leads to a difference-in-difference design, since rural consumers are affected differently by the campaign than urban consumers. The treatment group are rural consumers who turn 18 during the campaign. The peak impact of the campaign lasted from 1987 to 1991 as shown in the bottom panel of Figure 4. Based on the assumption that the elasticity of substitution between vodka and samogon is much higher than the elasticity of substitution between beer and either vodka or samogon, we conjecture that some rural males who would have formed habits toward beer in the absence of the campaign substitute to samogon consumption, which is relatively abundant in rural areas during the campaign, and thus form a habit for hard alcohol. For urban males, samogon was much harder to obtain, and hence there were fewer who substituted beer with samogon during the campaign. Therefore, our model has two main predictions. First, it predicts that rural consumers who turned 18 during the campaign have a higher share of vodka consumption in our baseline sample from 2001 to 2011 relative to rural consumers who turned 18

both before or after the campaign.[18] Second, the difference between the vodka shares consumed by rural and urban males should be largest for those cohorts who turned 18 during the anti-alcohol campaign.

In this difference-in-difference approach, we implicitly exploit the fact that labor mobility is very low in Russia compared to most other countries; see e.g., Andrienko and Guriev (2004). Hence, the chance that the birth place of a survey respondent in our sample also identifies his location when he turned 18—something we do not observe directly in the data—is very high.[19] To test the predictions of our theory for the long-run effect of the anti-alcohol campaign on the consumption shares, we estimate the following regression:

$$S_{it}^g = \beta_{DD} \cdot I(\text{urban})_i \times I(\text{turned 18 in 1987-91})_i + \beta_D \cdot I(\text{turned 18 in 1987-91})_i + \lambda \cdot I(\text{urban})_i + \gamma' x_{it} + \epsilon_{it}. \quad (3)$$

In our baseline specification we restrict the sample to individuals who turned 18 in 1970 or later because official data on aggregate sales by type of alcohol is available only starting from 1970. Ideally, we would also like to observe a sufficiently long period after the end of the Gorbachev anti-alcohol campaign in which there are no further disruptions to the alcohol market. The bottom panel of Figure 1 however shows that there was only a brief period between the end of the campaign's impact on the alcohol market and the beginning of the rapid expansions of the beer market after the collapse of the Soviet Union. In all our specifications we therefore restrict our sample to individuals who turned 18 before 1999 to avoid a contamination of this experiment with the shock to the beer market analyzed in the previous section. One might be worried that individuals turning 18 after the end of the campaign's impact face different initial conditions than individuals who turn 18 before the campaign, and that our approach does not fully address that issue. To mitigate this concern we extend the difference-in-difference design of equation (3) to include two different sets of "control groups," one containing individuals who turn 18 between 1970 and 1986, and hence before the campaign, and another with individuals turning 18 between 1992 and 1998, after the campaign,

$$\begin{aligned} S_{it}^g = \quad & \beta_{DD,1} \cdot I(\text{urban})_i I(\text{turned 18 before 1987})_i + \beta_{DD,2} \cdot I(\text{urban})_i I(\text{turned 18 after 1991})_i + \\ & \beta_{D,1} \cdot I(\text{turned 18 before 1987})_i + \beta_{D,2} \cdot I(\text{turned 18 after 1991})_i + \lambda \cdot I(\text{urban})_i + \gamma' x_{it} + \epsilon_{it}. \end{aligned} \quad (4)$$

Column 1 of Table 2, which estimates (3) for the share of vodka of the male sample, shows that the "treatment" indicator—i.e., whether an individual turned 18 during the campaign—predicts a 5 pp higher share of vodka consumption relative to rural males who turned 18 before or after the campaign, consistent with our hypothesis. Moreover, the difference in the vodka shares of

[18] According to different expert estimates, samogon production increased rapidly in the second half of the 1980s; e.g., Treml (1997), Nemtsov (2002), Bhattacharya et al. (2013), and our own estimates based on the RLMS. Since the collapse of the Soviet Union, samogon production has decreased rapidly because of the liberalization of the alcohol markets and the sharp decrease in the price and increased availability of vodka.

[19] Our proxy for whether an individual lived in a urban area when turning 18 combines the variables "birth place" and whether the individual currently lives in a major city. Specifically, we set the proxy equal to 1 if the birth place is a city instead of a town or village. We then use our measure of whether an individual currently lives in a big city to impute the remaining missing values. With the exception of Sochi and Tolyatti, all big cities in Russia correspond to the regional capital cities, and neither of these two exceptions is part of the RLMS sample frame.

individuals turning 18 in rural relative to those in urban areas is 7 pp larger in absolute values for individuals turning 18 during the campaign than for individuals turning 18 outside of this period. This reflects the differential impact the campaign had on rural and urban males, again consistent with the hypothesis of highly persistent habit formation combined with the differential impact of the campaign on the alcohol market shown in Figure 4. Column 2 estimates (4) to assess whether using two comparison groups yields different results. While we cannot reject the hypothesis that the response is the same using the two control groups (again in absolute values), the larger point estimate for the group of males turning 18 before the campaign suggest that this group might be a more appropriate comparison group than the sample of males turning 18 after the campaign.

The coefficients on the control variables in all specifications are similar in sign and magnitude to those reported in Table 1. The positive coefficient of the urban fixed effect in specification (3) reflects the fact that rural males consume a much larger share of samogon than their urban counterparts. This difference is large enough to turn the effect positive despite the fact that the share of total vodka consumption including samogon is on average 7 pp higher for rural than for urban males. The fact that the sign of this coefficient changes between columns 1 and 2 is driven by the large size of the difference-in-difference coefficient.[20] Columns 3 and 4, which drop the top quartile of total alcohol consumers, show that these results are not driven by heavy drinkers or alcoholism. Columns 5 and 6 extend the sample to include individuals who turned 18 before 1970 and hence before we have data on aggregate sales by type of alcohol. The results are again similar to the baseline specification. Columns 7 and 8 extend the baseline sample to include all years from 1994 to 2011. While the coefficients are again not statistically different from the baseline results, the lower point estimates suggest that using the earlier part of the sample leads to a downward bias of the coefficient, since the individuals' consumption shares have not reached a stable equilibrium yet due to the ongoing expansion of the beer market, as seen in Figure 1. Finally, columns 9 and 10 show very similar effects for females, and columns 11 and 12 show that the campaign has the opposite effect on the share of beer consumed, again suggesting that for male consumers, the main substitution occurs between vodka and beer, which is important for interpreting our results for male life expectancy in section 5 below.

Overall, the results in Table 2 show that the campaign significantly changed long-run consumption behavior given that most subjects in our sample are observed two decades after the end of the campaign. Moreover, the results highlight the differential impact the campaign had on individuals who turned 18 in rural areas relative to their urban peers. Consistent with our hypothesis, these individuals formed persistent habits toward very different types of alcohol, and these differences in

[20] To see this, note that λ of (4) minus λ of (3) should approximately equal β_{DD} of (3).

preferences are still highly visible in their consumption behavior today.

Next we again analyze the validity of our quasi-natural experiment by running placebo tests similar to the approach taken in Figure 3 and which is illustrated in the top panel of Figure 5. Specifically, we estimate equation (3) with a 15-year rolling window starting with males who turned 18 between 1960 and 1974 and ending with the sample of males turning 18 between 1985 and 1999.[21] The "treatment group" is the five-year window centered in this 15-year rolling sample, covering years 1975 to 1979 in the first sample window. Once we reach the sample ranging from 1985 to 1999 we again shrink the window from the left until it only includes the years from 1990 to 1999, implying that the control group turned 18 between 1990 and 1994 and the treatment group turned 18 between 1995 and 1999. Under our hypothesis we should not see any significant effects before the sample enters the anti-alcohol campaign. As the sample enters the campaign period, we should first see β_{DD} *increase* as the true treatment group gets mistakenly assigned to the control group. The coefficient should then gradually decrease as the assigned treatment group more and more overlaps with the actual treatment group, reaching its maximum (in absolute value) with the group turning 18 between 1987 and 1991. The coefficient should then increase back to zero, before becoming positive again as we falsely assign the actual treatment group to the control group. Finally, the coefficient should gradually decrease back to zero although it will not converge to zero completely under our hypothesis since we have to restrict our sample to individuals turning 18 before 1999. Hence, the pattern for β_{DD} should be W-shaped. β_D on the other hand should exhibit the opposite pattern, i.e., M-shaped.

Figure 7 plots the evolution of β_D and β_{DD} together with 95% confidence intervals for these placebo regressions. Consistent with the hypothesis of persistent habit formation around age 18, we indeed see these two patterns emerge, W-shaped for β_{DD} and M-shaped for β_D, although the shape of the latter is weaker. The peak response of both coefficients (in absolute value) occurs when the treatment window reaches the actual treatment period from 1987 to 1991.

3.5 Identifying Consumption Habits from Migrants

In this section we use a different research design based on migrants, similar to the one used by Bronnenberg et al. (2012) and Atkin (2013b,a), and three sets of movers to provide additional independent evidence for persistent habit formation. First, we use migrants that moved from rural to urban areas to complement our difference-in-difference research design based on the Gorbachev anti-alcohol campaign. Consistent with persistent habits and the fact that vodka consumption is more prevalent in rural areas, columns 1 and 2 of Table 3 show that individuals who moved from a

[21] We again obtain very similar results for females.

rural area to a city and thus had easier access to liquor during their habit-forming years consume a significantly larger share of vodka than both (i) consumers that moved between cities, the reference group, and (ii) consumers that always lived in the same urban location, shown by the differential response in the bottom two rows. The average share of vodka among all urban consumers is 52 pp and is more than 11 pp higher for individuals that moved from a rural area to a city (column 1). At least 2 pp of this difference (respectively 3pp relative to non-movers) cannot be attributed to either age, year, income, or relative price effects, or any other observable characteristics (column 2).

Second, we use information about the birth country for individuals that moved to Russia from another republic of the former Soviet Union.[22] Although vodka and beer production was relatively uniform across countries of the former Soviet Union (although not within), production of wine was heavily concentrated in only two republics, Moldova and Georgia.[23] Columns 3 and 4 show that migrants from those wine-producing Soviet republics consume a significantly larger share of wine compared to all other consumers. This effect is not only statistically but also economically significant. Immigrants from wine-producing republics consume a share of wine that is twice as large, 8 pp, relative to a baseline wine consumption share of only 4 pp for all other consumers (column 3). Of this 4 pp difference, more than 3 pp cannot be explained by other covariates, at the bottom two rows show that this difference is robust to comparing it relative to consumers that never moved (column 4).

Finally, we use the leave-out mean share of wine consumption by country of origin to construct a continuous measure of market exposure during the habit-forming years. The leave-out mean is the average consumption share among all immigrants from a given republic, *excluding* other individuals living in the same location ("settlement"), such as a town or city (the survey's so-called secondary sampling units, SSU or *site*). Column 5 shows that this leave-out mean is a good predictor of individual consumption shares. However, it might potentially be affected by local unobservables, a point recently emphasized by Angrist (2014). To address this issue we use a second, more noisy measure of the individual's initial market conditions: aggregate domestic consumption data from the World Health Organization for years between 1991 and 2010 for each of the fifteen countries of origin in the RLMS. These average shares range from 65% in Georgia to 5% in Kazakhstan, while Russia's share is just 9%.[24] We use the more noisy but arguably more exogenous country-of-origin shares to instrument for the potentially endogenous leave-out means. The fact that the IV estimate

[22]Unfortunately, we have neither information on the country of origin for immigrants from non-Soviet countries, nor about sub-regions within the fifteen former Soviet republics.

[23]A part of Russia, Krasnodarskiy Kray, and a part of Ukraine , Crimea, also produced wine, but these two regions are small compared to size of the corresponding republic.

[24]These aggregate statistics are fairly noisy. For example, the aggregate share of wine out of total alcohol consumption drops from 100% to 3% within one year for Azerbaijan and from 90% to 50% for Georgia and Turkmenistan.

in column 6 is larger than the OLS suggests that measurement error might play a role, too. Finally, column 7 shows that the results are robust to controlling for age, year, income, relative prices, and any other observable characteristic, most importantly SSU fixed effects. Column 8 reports the corresponding first stage regression.

Overall, the results in Table 3 paint a picture of persistent habits that is very consistent with the results from the two quasi-natural experiments, even though they are based on a completely different research design.

4 Extensions

In this section we extend our analysis to relate to previous work on habit formation. In particualr, we first estimate a short-run autoregressive process as typically done in the literature, and we then show that our results extend to other non-alcoholic goods for which identification of persistent habits is conceptually more challenging.

4.1 Short-Run Dynamics of Habit Formation

We use the quasi-experimental variation from sections 3.3 and 3.4 to relate our results to the previous literature that studies habit formation in the short run using micro-level data. For this purpose we estimate the following first-order autoregressive process for male consumers—which is the most common specification used in the literature—first by OLS and then by IV:

$$S_{it}^{g} = \rho \cdot S_{i,t-1}^{g} + \lambda \cdot I(\text{urban})_i + \gamma' x_{it} + \epsilon_{it}. \tag{5}$$

To deal with the potential upward bias due to autocorrelated unobserved taste shocks, which might simultaneously drive current and lagged shares, and to address attenuation bias due to measurement error in the lagged consumption shares, we instrument the lagged share with the condition of the alcohol market that individuals faced when they first started to consume alcohol around age 18. For urban males, we use the ratio of aggregate sales of official vodka to beer when they turn 18 as a proxy of the market conditions they faced. For rural males, we instead use the ratio of all aggregate vodka to beer when they turn 18, including samogon. In the set of instruments we also include both aggregate ratios not interacted with the individual's geographical information when turning 18. This specification estimates the effect of habits under the assumption that individuals born in different periods have similar preferences and differ only in the initial level of consumption, holding fixed income, relative prices and demographic characteristics. Moreover, we assume that aggregate

sales are uncorrelated with any unobserved individual taste heterogeneity.

Panel A of Table 3 shows a severe downward bias of the OLS estimate of the autoregressive coefficient ρ relative to its IV estimate for both beer and vodka. The IV estimate for beer is three times larger than its OLS estimate, and the IV estimate for vodka is more than two and a half times larger than its OLS estimate. In the Online Appendix we use these results to provide a lower bound for the attenuation bias. The lower bound equals one minus the ratio of the OLS to the IV estimator and equals one if there is complete attenuation and 0 if there is no attenuation bias. We estimate this lower bound to be about two-thirds for both beer and vodka. Therefore, significant measurement error in expenditure surveys might explain why previous research has found little evidence of habit formation at the micro level when estimating specifications similar to (5).

4.2 Consumption Habits over Other Goods

In this section we use the opening of many other markets after the collapse of the Soviet Union to study habit formation over other non-alcoholic goods. Identifying such habits is much more challenging as mentioned in the introduction. Conceptually, the hypothesis that habits are formed when consuming a new good regularly for the first time implies that food consumption habits are formed during childhood when the individual does not make her own consumption decisions. Hence, the effect of the sharp exogenous changes in market conditions on consumption habits at the end of the Soviet Union will be dampened by the accumulated habits of the parents who are making the consumption decisions on behalf of their children.

In addition to this conceptual problem, there are several measurement issues that further complicate the clean identification of consumption habits over non-alcoholic goods. First, the parents' own consumption habits obviously depend on their age. Unfortunately, we do not know the parents' age of the survey respondents in the RLMS. Second, when analyzing non-alcoholic goods, we have to rely on household-level expenditure data instead of the individual-level consumption data from the RLMS' health module. These expenditure data are measured with substantially more error. Moreover, several individuals can decide on the consumption bundle in a multi-person household. Unfortunately, there are only few single households in the data which would mitigate this problem. Similarly, there are only few households where both spouses were born in the same or a similar cohort, say within a 5-year window. Therefore, it is important to realize that household-level expenditures reflect complex, aggregated preferences which make a direct mapping from changes in market conditions to cohort differences in consumption patterns difficult.

With the exception of certain types of meat, the RLMS' expenditure questionnaire does not provide sufficient details about those new, more "exotic" goods that became available only after

the collapse of the Soviet Union, such as pineapples and bananas for example.[25] We therefore turn to a second source of micro-level expenditure data that has more detailed, disaggregated expenditures allowing us to differentiate between those new goods and more traditional goods in the same category (i.e., close substitutes) that were also available during the Soviet Union. The National Survey of Household Welfare and Program Participation (NOBUS), which was collected in 2003 by Goskomstat in collaboration with the World Bank and includes about 45,000 households across 80 regions in Russia, contains detailed household-level expenditure data. We identify seven expenditure groups for which we can classify the goods as either new or traditional. Listing the new goods first, these are subtropical fruits such as pineapples and bananas vs. apples, pears and plums; chocolate vs. jam and honey for desserts; yoghurt vs. cottage cheese for breakfast; long-lasting vs. short-lived milk; frozen and canned fruits vs. dried fruits; and chicken vs. pork and beef for meat. The availability of the new goods is mostly caused by two factors, (i) the import of previously unavailable goods, such as subtropical fruits, and (ii) the inflow of new technologies, such as new ways to preserve milk or new technologies to produce chicken at much lower cost. Table A.4 in the Online Appendix provides more detail about our classification of each good.

We restrict our sample to households for which both head and spouse were born in the same 10-year cohort window. To have a sufficient sample size, especially when estimating habits good-by-good, we group the households into those born in the 1970s, the 1980s, and those born in the 1960s or earlier, which is the reference group. Because the survey was done in 2003 we do not have households born in the 1990s. Hence, these estimates are likely lower bounds for the degree of habit formation since younger cohorts that are most responsive to the new market conditions have not formed their own households yet.

Panel B of Table 4 shows that consistent with persistent long-run habits, younger generations consume a significantly larger share of new relative to traditional food consumption goods. This is true conditional on real income, family size as well as region respectively region-by-good fixed effects that capture relative price differences across regions. Column 1 uses all information in a pooled household-by-goods panel estimator, while columns 2 to 8 show that the same pattern emerges good-by-good, although less precisely estimated.

Since NOBUS has only a single cross-section, we cannot separate cohort from age effects. We therefore turn again to the RLMS which contains sufficiently detailed data only for one of the categories, chicken vs. beef and pork consumption. While the RLMS allows us to control for household age, measured as the average age of the head of household and spouse, focusing on meat consumption has the additional advantage that we also have a long time-series of aggregate meat

[25]For instance, in the RLMS we only have data on fresh fruits; dried fruits and berries; fresh berries; fruit and berry preserves; and melons and watermelons, including pickled and dried.

sales going back to 1970 to document these large changes. Figure A.3 in the Online Appendix documents similar rapid changes in the meat markets after the collapse of the Soviet Union as in the alcohol markets shown in the bottom panel of Figure 1. Columns 9 and 10 in Panel B of Table 4 provide similar estimates of the effects of the collapse of the Soviet Union on the share of chicken consumed by younger cohorts in the RLMS as in the NOBUS data, even controlling for age and relative prices, although the estimates are less precise in the much smaller RLMS sample.

5 Effect of Persistent Habits on Male Life Expectancy

Finally, in this section we apply our results to study the consequences of persistent habits for one of the most pressing public policy concerns in Russia: the large gap between male and female life expectancy. Male life expectancy at birth was on average only 60 years between 2000 and 2009, which is 15 years lower than in the US, 7 years lower than in Bangladesh and even 4 years lower than in North Korea. Moreover, the gender gap in life expectancy over the same period was 13 years in Russia, but only 5 years in the US, one year in Bangladesh, and 7 years in North Korea.[26] One key difference between these countries and Russia is the prevalence of heavy drinking among men. The high level of alcohol consumption among Russian men is therefore widely believed to be a main contributing factor to the low male life expectancy and the large gender gap; see, e.g., Brainerd and Cutler (2005), Leon et al. (2007) and Yakovlev (2012). Approximately 40% of all annual deaths are estimated to be related to alcohol consumption, and most of them are not due to long-run consequences of heavy drinking such as cirrhosis but instead are due to so-called "dose-related excess," a hazardous event occurring when the amount of pure alcohol consumed is very high. Indeed, the literature finds that about 7% of deaths are due to alcohol poisoning, while over 30% are due to "external causes" related to alcohol intoxication, including vehicular and other accidents and homicides, and hence are unrelated to long-run consequences of alcohol consumption. Moreover, alcohol poisoning is typically not caused by the poor quality of the alcohol consumed but is rather caused by binge drinking.[27] Hence, while a high average level of alcohol intake can certainly be hazardous—in particular for older individuals—it is mostly the occasional binge drinking by men that leads to high mortality rates across all age groups. Furthermore, since binge drinking is much

[26] Sources: The Human Mortality Database, http://www.mortality.org/, and The World Bank, http://data.worldbank.org/.

[27] Estimates of the effect of alcohol on mortality vary somewhat and are difficult to compare across studies due to differences in methodology and in the underlying data. However, most studies find similar magnitudes and broadly agree with official statistics, which attribute 4% of all deaths of Russian males to alcohol poisoning and an additional 36% to external causes related to alcohol intoxication; see Goskomstat, Demograficheskiy yezhegodnik RF, 2006. Similarly, in their sample of 48,557 residents of three typical Russian cities, Zaridze et al. (2009) find that 8% of deaths are directly due to alcohol poisoning, while another 37% are due to accidents and violent acts that are related to alcohol intoxication.

less likely to occur when consuming beer rather than vodka, we conjecture that individuals who prefer beer over vodka have a lower alcohol-related probability of dying, even holding fixed the average level of alcohol intake.

To test this conjecture and to quantify the effect of alcohol consumption habits toward different types of alcohol on the probability of dying, we estimate a semi-parametric Cox proportional hazard model as is standard in the literature.[28] We use a similar specification as in our previous analysis with two modifications. First, we add three additional explanatory variables to the vector x that improve the fit of the model. The first indicates whether an individual reports not drinking in a typical day during the previous month, the second is an indicator of whether the individual smokes, and the third is an indicator for being a binge-drinker. Second, we collapse the data to one observation per individual, and we replace time-varying covariates with their mean. For individuals who report not consuming alcohol in a given interview, we set their shares of beer and vodka to zero before collapsing the data. We impose two additional sample restrictions relative to our previous analysis. First, our preferred specification focuses on working-age males. This excludes males older than 65 years due to selection bias arising from the fact that older individuals tend to consume a lower share of vodka (see the top-left panel of Figure 2), both because of endogenous attrition of heavy drinkers from the sample and because they might not be able to consume hard alcohol anymore due to medical conditions such as liver failure. Second, we exclude individuals below age 22 since our estimate of the long-run consequences of the changed consumption habits on male mortality crucially depend on them as they approximate the consumption behavior of the population in the new long-run steady state. The analysis in section 3.1 reveals that the habits of males below age 22 have not yet converged to their long-run equilibrium; hence, their observed consumption shares are not a good predictor of their future shares.

Panel A of Table 5 shows that consuming a higher share of beer strongly decreases the hazard of death, while a higher share of vodka increases it, even conditional on the total level of alcohol consumed.[29] Hence, these results are consistent with the findings in the previous literature that a majority of alcohol-related deaths are due to alcohol poisoning or external causes in connection with binge drinking. The estimates are also economically significant: decreasing the share of vodka by

[28] The model estimates $\lambda(a|x) = \exp(\gamma' x)\lambda_0(a)$, the conditional hazard of death, which approximates the instantaneous probability of dying at age a conditional on the covariates x. $\lambda_0(a)$ is the baseline hazard rate that is common across all individuals and can be estimated non-parametrically and independently of the parameter β.

[29] The effect of both shares can be identified simultaneously as shown in columns 3 and 6 of Table 5, because the two shares are not perfectly collinear—the sample correlation is -0.42—due to the presence of nondrinkers and due to the fact that there is a small share of other types of alcohol consumed such as wine, which we exclude from the regressions. We obtain similar coefficients for the shares consumed when estimating the model separately for beer (columns 1 and 5) and vodka (columns 2 and 6) compared with the coefficients when using both shares jointly (columns 3 and 7), which we will use in the simulations below.

30 pp while simultaneously increasing the share of beer by 30 pp, which corresponds to a standard deviation for both shares in the sample, while holding fixed the level of total alcohol intake, decreases the hazard of death for males age 22 to 65 by 48%. The level of total alcohol intake on its own also increases the hazard of death. The fact that these estimates are larger and statistically more significant for the sample including older males points to the negative long-run consequences of alcohol consumption. The remaining controls have the expected sign with the exception of the indicator of whether an individual reported not drinking in all interviews. However, this effect is not stable across specifications and samples, is statistically not significant, and is likely affected by the aforementioned selection bias, particularly at older ages. Finally, columns 5 to 8 show that the main results are similar if we include these older individuals.

Our results seem to be in sharp contrast to the common belief that increased alcohol consumption after the end of the anti-alcohol campaign and after the liberalization of the alcohol market caused the surge in male mortality since 1991—the so-called Russian mortality crisis. Our results however apply to the shares of alcohol consumed, not the level of total alcohol intake. Our hypothesis is that because it is easier to binge drink with vodka than beer, forming a habit toward vodka increases an individuals' mortality risk, even holding fixed his level of total alcohol intake. Indeed, consistent with our individual-level results, we find that when we regress male mortality for ages 22 to 65 on aggregate sales per capita of beer and vodka—both expressed in pure alcohol—, vodka is highly predictive, while beer has no explanatory power; see Table A.3 and Figure A.4 in the Online Appendix.

As a final step we study the implications of the changes in consumption patterns for the evolution of male mortality. To do so we simulate a counterfactual scenario that maintains the sample distribution of individual characteristics except for the shares of vodka and beer consumed. Specifically, we predict consumption shares of vodka and beer for each individual in our sample by running regressions similar to equation (1), except that we include a full set of cohort effects and we drop period fixed effects to identify the model. Using these cohort effects, we predict each individual's shares at different points in the future and in turn use the predicted shares together with the individual characteristics to estimate his hazard of death. For example, to predict the hazard of death in 10 years of an individual born in 1970, we maintain his current characteristics but we assign him the conditional cohort effect of individuals born in 1960. Integrating across the entire sample then provides us with an estimate of the evolution of male mortality as a consequence of the changes in consumption habits only.[30]

Panel B of Table 5 provides the predicted population consumption shares and the annual rate of

[30]The Online Appendix provides more detail for this algorithm.

death for the current population of males age 22 to 65 as well as for the corresponding counterfactual populations in 10, 20, and 55 years, with 55 years being the time at which the population reaches its new steady state. Figure A.5 in the Online Appendix graphs the entire path of both shares and the mortality rate. Our results suggest that the mortality of males age 22 to 65 will decrease by 12% from 1.42% to 1.25% over the next 10 years, by 23% over 20 years, and will be cut roughly in half in the new long run equilibrium. The predicted current rate of death of 1.42% is only slightly lower than its official estimated average from 1994 to 2010, which is 1.57%. For comparison, the annual rate of death is 0.5% in the US and 0.4% in the UK and Germany. Hence, the counterfactual simulation predicts that the increase in the share of beer consumption at the expense of vodka, as suggested by the persistent habits we find in the data, combined with the large changes to the alcohol market that occurred in the past, might further cut the gap between the Russian and US male mortality in half over the next 55 years.

6 Conclusion

This paper identifies persistent habit formation in consumption using both individual consumption and household-level expenditure data. It is one of the first studies to directly identify such habits at the micro-level and to estimate the age range over which those habits accumulate. Since these habits manifest themselves mostly as cohort effects, the policy implications are very different from the standard theory which models habit formation with short consumption lags. Instead, the habits we identify change only slowly, generation by generation. Therefore, shocks such as the ones used in our quasi-natural experiments can have significant long-term effects on outcomes of interests, such as the large gap between male and female mortality in Russia, in addition to their immediate impact.

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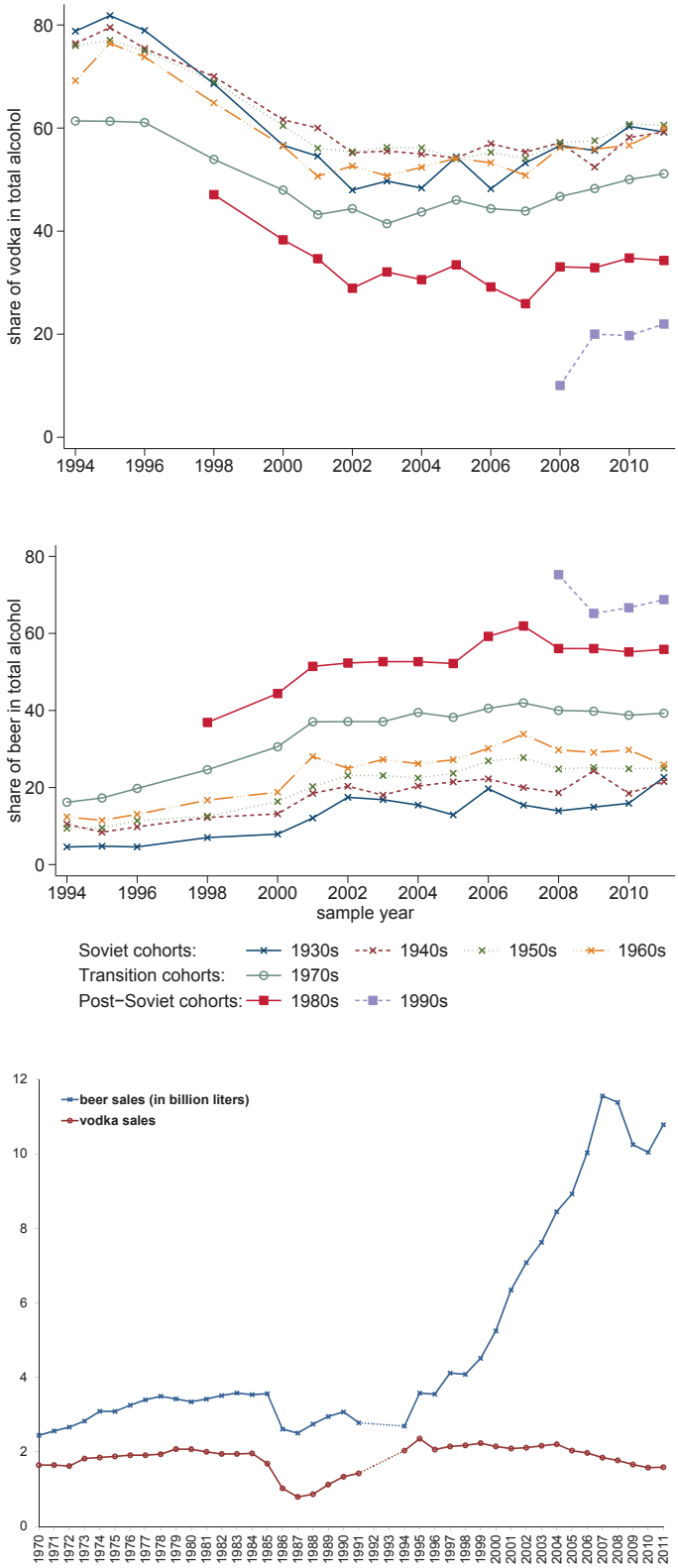
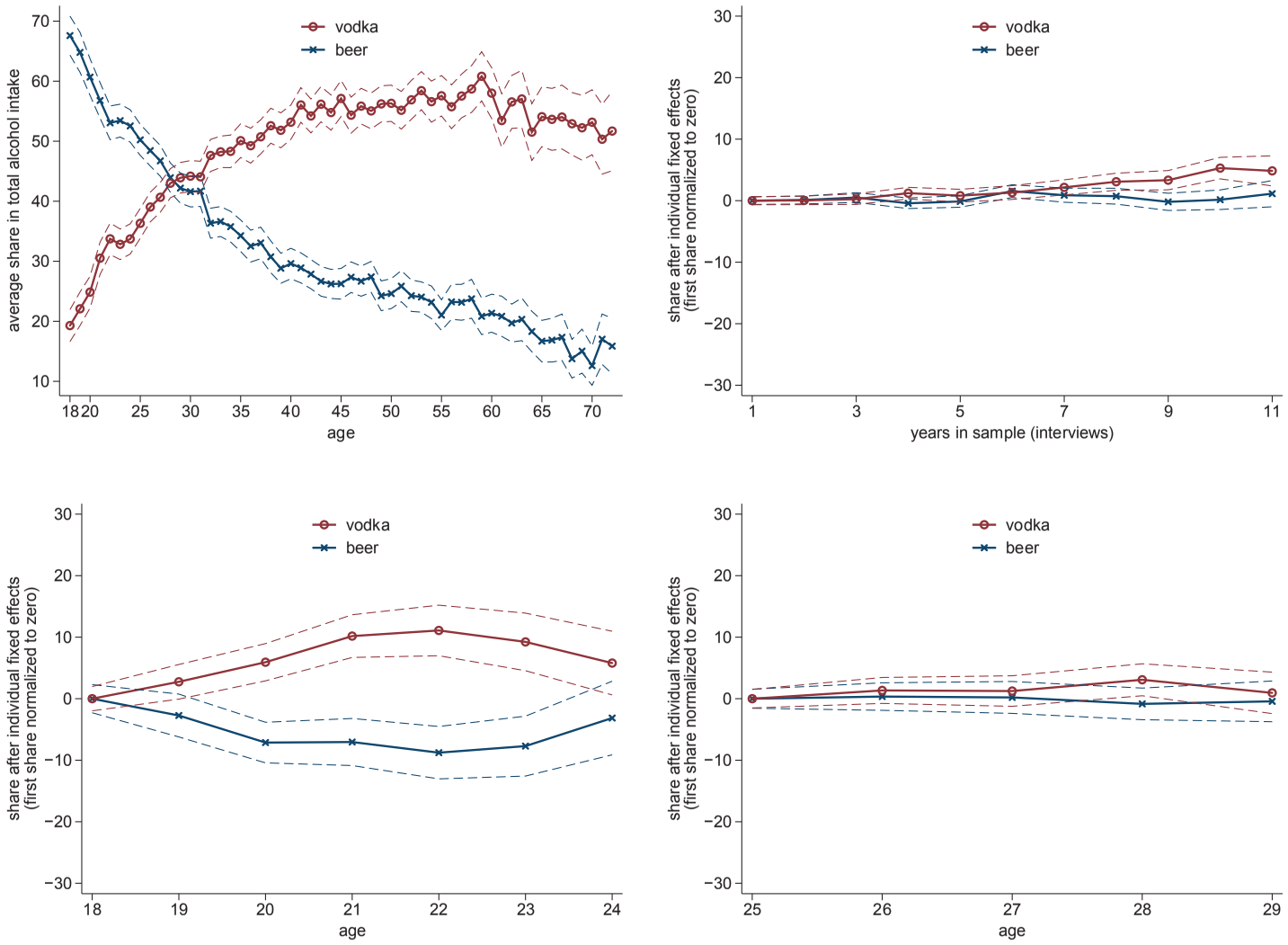
Figure 1: Share of vodka and beer in total alcohol intake by birth cohorts



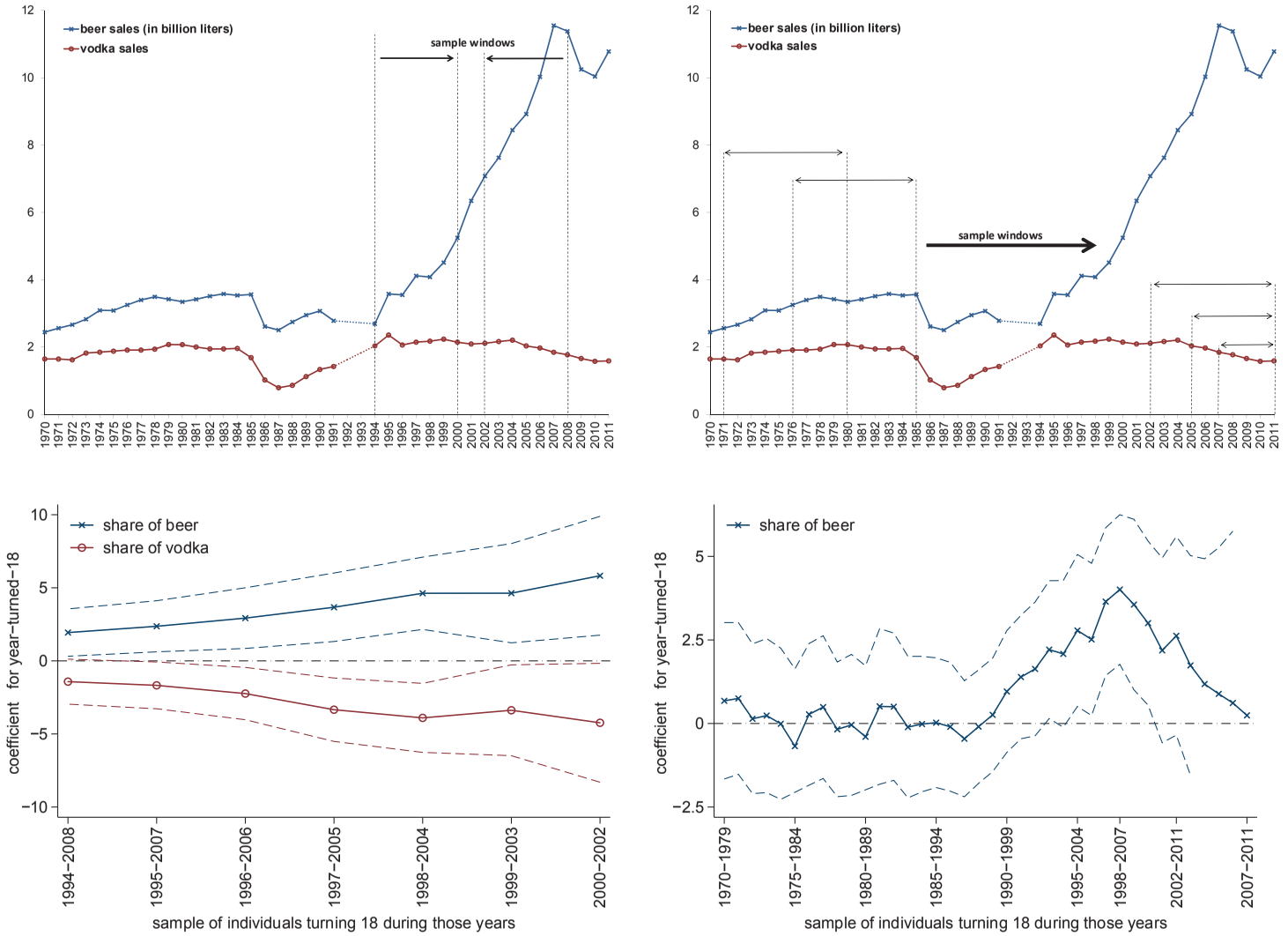
Notes: These figures show the share of vodka (top panel) and beer (middle panel) as a function of the RLMS sample year for 10-year birth cohorts. Cohorts are classified based on the average time in which their members turned 18, which is our estimate of when people on average start to regularly consume alcohol and to form habits under our hypothesis. The bottom panel shows the aggregate sales of beer and vodka in liters (not in ethanol). Data in 1992 and 1993 are not reliable and are excluded due to significant data-collection and reporting problems in the wake of the collapse of the Soviet Union, leading to severely underreported levels for all types of alcohol.

Figure 2: Shares by age and demeaned shares by age and years in sample



Notes: These figures show the life-cycle profiles of the shares of beer and vodka consumed. The dashed lines represent two standard error confidence intervals using data from 1994 to 2011. The top-left panel shows the sample age profile. The top-right panel shows the consumption shares against the number of years an individual is observed in the sample, after controlling for individual fixed effects. The two bottom panels show the age profile for the two subgroups of individuals age 18 to 24 and 25 to 29 as a function of age, again after controlling for individual fixed effects. Figure A.1 in the Online Appendix provides similar results for five-year age-sample intervals from age 30 to 74.

Figure 3: Effect of the beer-market expansion on consumption habits

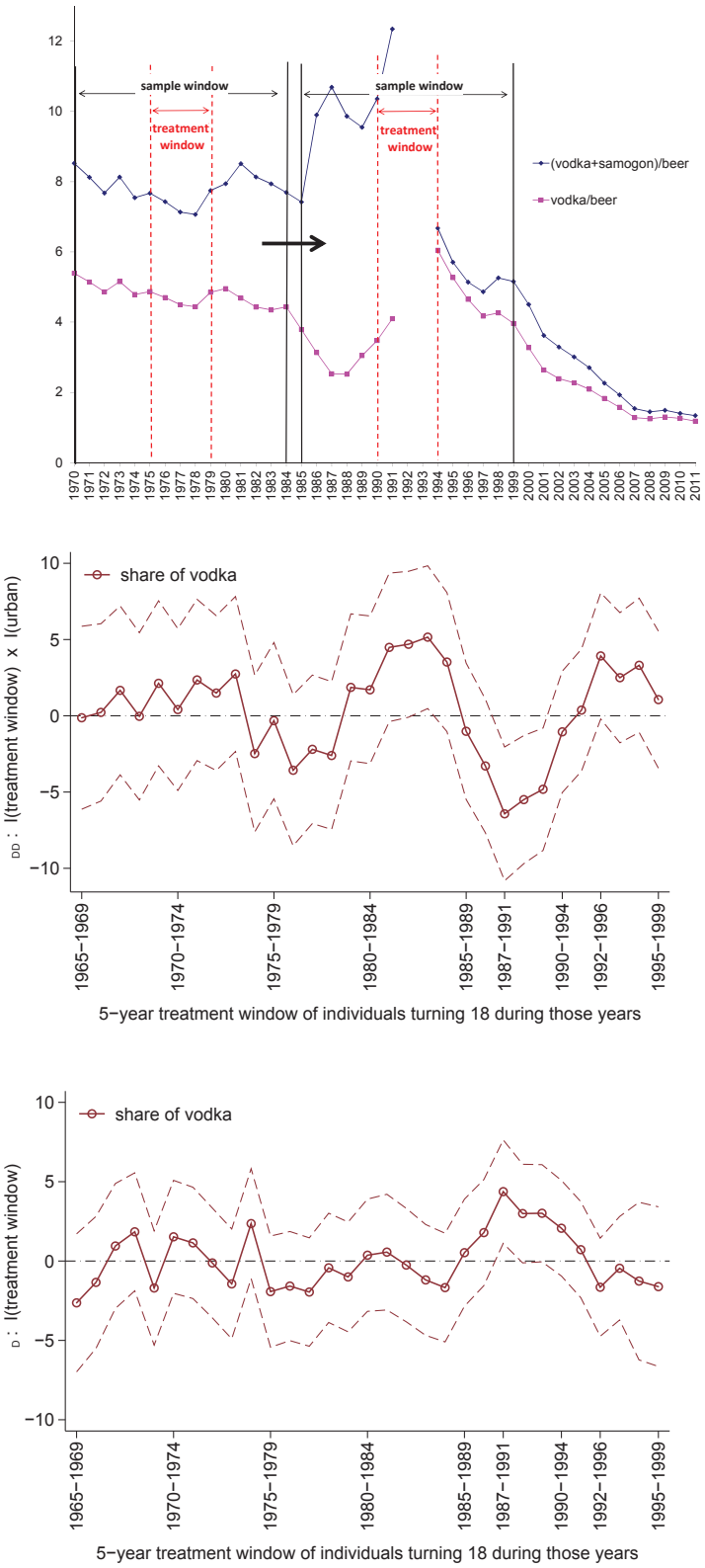


Notes: These figures show the regression design (top left) and placebo regression design (top right) together with the corresponding results for the beer-market expansion analysis (bottom left) and the placebo regression results, respectively (bottom right). The regressions control for the level of total alcohol intake, log of real income, subjective health status, body weight, education, marital status, and a full set of year, age, and region fixed effects. Dashed lines show two standard error confidence bands using robust standard errors clustered by individual.

Figure 4: Relative alcohol production in Russia

Notes: The top panel shows estimates of the ratio of illegally produced vodka (i.e., samogon) to officially produced vodka using four different data sources. The bottom panel displays the ratio of official vodka production to beer production and the ratio of total vodka to official beer production, all measured in grams of ethanol. Data in 1992 and 1993 are not reliable and are excluded due to significant data-collection and reporting problems in the wake of the collapse of the Soviet Union, leading to severely underreported levels for all types of alcohol.

Figure 5: Placebo regressions for anti-alcohol campaign experiment



Notes: These figures show the placebo regression design (top) together with the estimated difference-in-difference (middle) and before-after estimates (bottom) for the anti-alcohol campaign experiment. Dashed lines are two standard error confidence bands using robust standard errors clustered by individual.

Table 1: 10-year cohort effects on the shares of vodka and beer consumption

Dependent variable:	*share of beer*									*share of vodka*		
	males					females				males		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Post-Soviet cohorts:												
I(born in 1990s)	57.876***	48.408***	20.720***	22.750***	19.302***	45.296***	36.338***	21.040***	23.660***	-46.242***	-41.030***	-11.707***
	[2.026]	[1.778]	[2.266]	[2.150]	[2.660]	[2.340]	[2.257]	[3.003]	[4.266]	[2.386]	[1.470]	[2.343]
Transition cohorts:												
I(born in 1980s)	45.508***	36.041***	15.175***	14.776***	17.173***	39.668***	30.710***	16.189***	20.802***	-33.561***	-28.350***	-7.601***
	[1.192]	[0.693]	[1.302]	[1.217]	[1.743]	[1.023]	[0.815]	[1.614]	[2.370]	[2.008]	[0.705]	[1.532]
I(born in 1970s)	25.760***	16.292***	4.458***	3.910***	6.693***	22.262***	13.304***	4.654***	7.993***	-17.746***	-12.534***	-1.697
	[1.148]	[0.614]	[0.872]	[0.839]	[1.232]	[1.145]	[0.964]	[1.121]	[1.618]	[2.002]	[0.688]	[1.068]
Soviet cohorts:												
I(born in 1960s)	14.496***					13.560***				-7.819***		
	[1.118]					[1.077]				[2.022]		
I(born in 1950s)	10.571***					9.695***				-4.551**		
	[1.125]					[0.916]				[2.048]		
I(born in 1940s)	6.833***					4.871***				-3.536		
	[1.198]					[1.069]				[2.151]		
I(born in 1930s)	1.606					3.980***				-4.408*		
	[1.191]					[0.994]				[2.254]		
Alcohol intake (in grams of ethanol)			-0.068***	-0.068***	-0.403***			-0.091***	-0.681***			0.039***
			[0.002]	[0.002]	[0.007]			[0.005]	[0.028]			[0.002]
Price of beer relative to vodka			0.388	0.411	0.017			-0.124**	-0.188**			1.808
			[1.157]	[1.156]	[1.752]			[0.057]	[0.093]			[1.440]
Log(real income)			0.615***	0.555***	0.474***			0.269	1.218**			0.371***
			[0.102]	[0.101]	[0.142]			[0.484]	[0.572]			[0.126]
Health status			-0.893***	-0.881***	-1.475***			-0.080***	-0.010			0.080
			[0.286]	[0.286]	[0.389]			[0.022]	[0.028]			[0.366]
Body weight (in kg)			-0.017	-0.017	-0.009			-5.954***	-9.916***			0.130***
			[0.016]	[0.016]	[0.022]			[0.534]	[0.784]			[0.020]
I(college degree)			-2.757***	-2.796***	-5.842***			-0.224	-0.616			0.671
			[0.588]	[0.588]	[0.732]			[0.588]	[0.761]			[0.672]
I(married)			-1.931***	-2.137***	-2.891***			-2.434	-2.069			3.522***
			[0.515]	[0.508]	[0.688]			[2.072]	[2.999]			[0.622]
Age				-0.383***								
				[0.114]								
Age squared				-0.001								
				[0.001]								
Observations	46,985	46,985	44,029	44,029	27,353	44,962	44,962	41,956	20,498	46,985	46,985	44,029
R-squared	0.163	0.152	0.270	0.269	0.375	0.111	0.103	0.181	0.202	0.077	0.075	0.175
Region FE			YES	YES	YES			YES	YES			YES
Year FE			YES	YES	YES			YES	YES			YES
Age FE			YES		YES			YES	YES			YES
Top alcohol quartile dropped					YES				YES			

Notes: Robust standard errors, clustered by individual, are provided in parentheses. ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 2: Effect of Gorbachev's anti-alcohol campaign on consumption habits

Dependent variable: Share of vodka (columns 1-10) or beer (11-12)	Baseline		Top quartile dropped		All turned 18 before 1991		Full sample 1994-2011		Females		Share of Beer	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
I(urban)*I(turned 18 in 1987-1991)	-6.540***		-6.095***		-7.108***		-5.144***		-6.043***		3.859**	
	[2.065]		[2.094]		[2.031]		[1.742]		[2.152]		[1.787]	
I(turned 18 in 1987-1991)	4.774***		5.563***		5.069***		3.437***		4.229**		-3.477***	
	[1.531]		[1.621]		[1.518]		[1.297]		[1.807]		[1.266]	
I(urban)*I(turned 18 before 1987)		7.354***		6.944***		7.847***		5.674***		4.511*		-4.397**
		[2.201]		[2.255]		[2.098]		[1.781]		[2.313]		[1.871]
I(urban)*I(turned 18 after 1991)		5.225**		4.586**		5.407**		3.581*		8.778***		-3.044
		[2.271]		[2.289]		[2.292]		[2.030]		[2.783]		[2.028]
I(turned 18 before 1987)		-4.947**		-6.886***		-4.367**		-2.408		-4.588**		3.225*
		[2.039]		[2.241]		[1.932]		[1.543]		[2.255]		[1.646]
I(turned 18 after 1991)		-4.366**		-4.181**		-5.127***		-3.696**		-4.699**		3.526**
		[1.900]		[1.992]		[1.861]		[1.543]		[2.194]		[1.658]
I(urban)	2.620**	-3.937**	2.544**	-3.529*	1.791*	-5.382***	0.536	-4.661***	-0.987	-6.925***	0.101	3.991**
	[1.043]	[1.981]	[1.115]	[2.009]	[0.930]	[1.978]	[0.770]	[1.695]	[1.076]	[2.047]	[0.842]	[1.712]
Alcohol intake (in grams of ethanol)	0.054***	0.054***	0.306***	0.306***	0.050***	0.050***	0.029***	0.029***	0.236***	0.236***	-0.093***	-0.093***
	[0.004]	[0.004]	[0.007]	[0.007]	[0.003]	[0.003]	[0.002]	[0.002]	[0.012]	[0.012]	[0.004]	[0.004]
Relative price of beer to vodka	1.788	1.783	0.949	0.913	1.380	1.394	2.197	2.208	2.144	1.979	-1.219	-1.220
	[2.025]	[2.022]	[1.948]	[1.937]	[1.861]	[1.860]	[1.627]	[1.628]	[4.014]	[3.999]	[1.635]	[1.635]
Log(real income)	0.557***	0.552***	0.543**	0.538**	0.774***	0.770***	0.324**	0.319**	0.092	0.095	0.807***	0.811***
	[0.194]	[0.194]	[0.222]	[0.221]	[0.189]	[0.189]	[0.152]	[0.151]	[0.115]	[0.115]	[0.155]	[0.155]
Health status	-0.238	-0.238	-0.400	-0.397	-0.155	-0.153	0.206	0.211	3.712**	3.610**	-0.707	-0.706
	[0.562]	[0.562]	[0.614]	[0.613]	[0.503]	[0.503]	[0.414]	[0.414]	[1.522]	[1.438]	[0.469]	[0.468]
Body weight (in kg)	0.145***	0.145***	0.107***	0.106***	0.146***	0.146***	0.124***	0.124***	0.302***	0.299***	-0.021	-0.021
	[0.028]	[0.028]	[0.031]	[0.031]	[0.025]	[0.025]	[0.022]	[0.022]	[0.041]	[0.039]	[0.024]	[0.024]
I(college degree)	0.019	-0.002	0.627	0.585	0.586	0.549	0.828	0.837	-2.716***	-2.706***	-2.634***	-2.623***
	[0.924]	[0.924]	[0.969]	[0.968]	[0.836]	[0.835]	[0.833]	[0.832]	[0.940]	[0.939]	[0.807]	[0.807]
I(married)	5.021***	5.014***	5.072***	5.086***	3.913***	3.888***	3.473***	3.417***	-1.446	-1.392	-2.740***	-2.727***
	[0.893]	[0.892]	[0.975]	[0.975]	[0.829]	[0.829]	[0.724]	[0.724]	[1.341]	[1.297]	[0.755]	[0.756]
Observations	19,373	19,373	15,250	15,250	25,528	25,528	35,351	35,351	19,178	19,178	19,373	19,373
R-squared	0.100	0.101	0.235	0.235	0.099	0.099	0.128	0.128	0.194	0.195	0.179	0.179
Region FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Age FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Robust standard errors, clustered by individual, are provided in parentheses. ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 3: Consumption habits identified from migrants

Dependent variable: Share of vodka (columns 1-2) or wine (3-8)	Migrants to cities		Immigrants from other Soviet republics					
			OLS			IV with 1st stage		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I(born in a rural now living in an urban area)[i)]	11.451***	2.086**						
	[0.975]	[1.060]						
I(immigrated from Georgia or Moldova)			4.083***	3.152**				
			[1.521]	[1.523]				
Share of wine by country of origin (leave-out mean)					0.460***	0.947**	0.672*	
					[0.124]	[0.470]	[0.373]	
Share of wine in aggregate alcohol sales of country of origin								0.064***
								[0.007]
I(always lived in the same location)[ii)]		-0.695		0.416*			-0.087	0.839***
		[0.902]		[0.221]			[0.376]	[0.013]
Alcohol intake (in grams of ethanol)		0.046***		-0.012***			-0.012***	-0.000
		[0.004]		[0.001]			[0.001]	[0.000]
Relative price of beer to vodka		-2.351		-0.828*			-0.878*	0.009
		[2.682]		[0.473]			[0.495]	[0.015]
Log(real income)		0.169		0.256***			0.221***	-0.001
		[0.189]		[0.047]			[0.048]	[0.003]
Health status		-0.984*		0.127			0.081	-0.001
		[0.521]		[0.141]			[0.142]	[0.009]
Body weight (in kg)		0.108***		0.002			-0.002	0.001
		[0.028]		[0.007]			[0.007]	[0.001]
I(college degree)		-0.898		3.051***			2.859***	-0.018
		[0.929]		[0.297]			[0.296]	[0.014]
I(married)		1.993**		0.428*			0.468*	-0.001
		[0.874]		[0.239]			[0.240]	[0.012]
Observations	19,883	19,111	46,985	44,029	46,985	46,763	43,849	43,849
R-squared	0.017	0.181	0.000	0.051	0.001	0.000	0.015	0.413
Region FE		YES		YES			YES	YES
Year FE		YES		YES			YES	YES
Age FE		YES		YES			YES	YES
Difference between i) and ii)		2.781		2.735			.758	
p-value of difference		.005		.073			.286	
Weak-IV F-statistic (Kleibergen-Paap)						47.41	78.41	

Notes: Robust standard errors, clustered by individual, are provided in parentheses. ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 4: Extensions

	share of beer						*share of vodka*					
	OLS	IV rural	IV urban	IVs combined	1st stage	Full sample	OLS	IV rural	IV urban	IVs combined	1st stage	Full sample
Panel A: Short-run dynamics	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Lagged share of beer	0.280***	0.886***	0.807***	0.832***		0.816***						
	[0.008]	[0.143]	[0.189]	[0.122]		[0.067]						
Lagged share of vodka							0.328***	0.749***	0.872***	0.848***		0.950***
							[0.008]	[0.149]	[0.119]	[0.102]		[0.113]
I(urban) x (aggregate vodka/beer when 18)					0.243						2.216***	
					[0.611]						[0.691]	
Aggregate vodka/beer when 18					-1.266**						-0.042	
					[0.522]						[0.588]	
I(rural) x aggregate (vodka+samogon/beer) when 18					-0.500*						-0.165	
					[0.284]						[0.314]	
Aggregate (vodka+samogon)/beer when 18					-0.533**						0.723**	
					[0.265]						[0.294]	
I(urban)	0.590	-0.343	-0.226	-0.264	-3.276	-0.087	0.838	0.656	0.603	0.613	-10.520***	0.546
	[0.586]	[0.506]	[0.534]	[0.483]	[2.484]	[0.390]	[0.696]	[0.492]	[0.477]	[0.477]	[2.545]	[0.426]
Observations	23,801	23,801	23,801	23,801	23,801	29,357	23,792	23,792	23,792	23,792	23,792	29,347
R-squared	0.324	-0.008	0.064	0.042	0.193	0.030	0.230	0.034	-0.075	-0.051	0.126	-0.187
Socio-economic demographics, year, age and	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region, Year, and Age FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Weak-IV F-statistic (Kleibergen-Paap)		9.499	4.654	6.928		20.47		6.189	11.87	7.758		6.773
J-test, p-value				0.740		0.561				0.535		0.132

	share of new goods (NOBUS)								*share of chicken (RLMS)*	
	all new goods	subtropical fruits	chocolate	yogurt	long-lasting milk	frozen fruits	salted salmon	chicken		
Panel B: Habit formation in non-alcoholic goods	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
I(born in 1990s)									16.232***	9.408*
									[4.800]	[5.288]
I(born in 1980s)	11.930***	8.621***	9.157***	26.248***	2.909	30.807**	15.196***	10.737***	11.214***	7.005***
	[1.152]	[2.557]	[1.728]	[2.297]	[1.769]	[13.912]	[4.253]	[3.067]	[1.478]	[2.657]
I(born in 1970s)	7.173***	5.551***	6.814***	19.252***	1.764	27.584***	15.885***	-2.302	6.655***	4.952**
	[0.743]	[1.589]	[1.530]	[1.830]	[1.106]	[6.890]	[2.542]	[1.905]	[1.688]	[2.397]
Log(real income)	-0.032	0.211*	-0.165	-0.166	-0.002	-0.621*	-0.048	-0.000		-0.164
	[0.048]	[0.113]	[0.138]	[0.127]	[0.059]	[0.357]	[0.162]	[0.122]		[0.183]
Family size	-0.201	0.873	5.574***	2.869***	-0.357	2.672	1.813	-7.309***		-7.333***
	[0.350]	[0.813]	[0.995]	[0.912]	[0.432]	[2.678]	[1.190]	[0.890]		[0.824]
Average age of head of household and spouse										-0.103
										[0.075]
Relative price of chicken to pork										4.524
										[4.834]
Relative price of chicken to beef										-0.440
										[4.722]
Observations	44,186	6,576	4,584	7,504	10,075	845	5,110	9,492	6,513	6,513
R-squared	0.365	0.052	0.061	0.102	0.059	0.196	0.043	0.067	0.011	0.094
Region x good FE	YES									
Region FE		YES	YES	YES	YES	YES	YES	YES		YES
Year FE										YES

Notes: Panel A shows the results using RLMS sample years 2001 to 2011. Columns 1 and 7 provide OLS estimates. Columns 2 and 8 instrument the lagged consumption shares with the ratio of official aggregate vodka to beer sales when the individuals turned 18. Columns 3 and 8 use total vodka to beer including samogon as an instrument. Columns 4 and 10 use both instruments and report the p-value for the over-identification J-test statistic. Columns 5 and 11 provide the first-stage coefficients using both IVs. Columns 6 and 12 use all sample years from 1994 to 2011 and both IVs. Panel B estimates habit persistence for other non-alcoholic goods. Robust standard errors, clustered by household or individual, are reported in parentheses. ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 5: Effect of consumption habits on male life expectancy

	Males age 22-65				*Males age 22 and older*			
Panel A: Cox proportional hazard model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of beer (not in percentage)	-1.123***		-0.825*	-0.825*	-1.194***		-1.130***	-1.123***
	[0.418]		[0.440]	[0.440]	[0.348]		[0.355]	[0.355]
Share of vodka (not in percentage)		0.650***	0.488**	0.488**		0.266**	0.123	0.126
		[0.191]	[0.197]	[0.198]		[0.130]	[0.129]	[0.130]
I(urban)	-0.024	-0.088	-0.070	-0.070	0.112	0.065	0.098	0.100
	[0.126]	[0.127]	[0.127]	[0.128]	[0.100]	[0.102]	[0.102]	[0.103]
I(smokes)	0.398***	0.380**	0.388**	0.388**	0.519***	0.522***	0.520***	0.520***
	[0.153]	[0.152]	[0.152]	[0.152]	[0.109]	[0.110]	[0.109]	[0.109]
I(no alcohol consumed)	-0.159	0.130	0.020	0.019	-0.093	0.086	-0.042	-0.031
	[0.217]	[0.217]	[0.219]	[0.232]	[0.166]	[0.166]	[0.167]	[0.173]
Alcohol intake (in kg of ethanol)	0.750	1.108**	0.897	0.902	1.052**	1.354***	1.091**	0.906
	[0.559]	[0.525]	[0.546]	[0.652]	[0.475]	[0.461]	[0.474]	[0.638]
Log(real income)	-0.473***	-0.506***	-0.486***	-0.486***	-0.493***	-0.520***	-0.495***	-0.495***
	[0.039]	[0.038]	[0.039]	[0.039]	[0.036]	[0.036]	[0.036]	[0.036]
Health status	0.494***	0.532***	0.516***	0.516***	0.509***	0.534***	0.510***	0.512***
	[0.131]	[0.134]	[0.132]	[0.132]	[0.092]	[0.094]	[0.092]	[0.092]
Body weight (in g)	2.543	2.542	2.582	2.581	3.818	3.349	3.588	3.628
	[4.756]	[4.724]	[4.728]	[4.742]	[3.612]	[3.695]	[3.643]	[3.642]
I(college degree)	-1.380***	-1.369***	-1.331***	-1.331***	-1.291***	-1.318***	-1.280***	-1.279***
	[0.281]	[0.287]	[0.284]	[0.284]	[0.223]	[0.227]	[0.224]	[0.224]
I(married)	-0.362**	-0.429**	-0.414**	-0.414**	-0.151	-0.167	-0.157	-0.156
	[0.168]	[0.169]	[0.169]	[0.169]	[0.134]	[0.135]	[0.134]	[0.134]
				-0.003				0.101
				[0.300]				[0.261]
Observations	6,623	6,623	6,623	6,623	7,506	7,506	7,506	7,506

Panel B: Counterfactual simulations

	Poplulation shares of		*Mortality rate of males*
horizon:	*beer*	*vodka*	*age 22-65 (in %)*
current year	31.42	46.19	1.42
in 10 years	42.20	32.30	1.25
in 20 years	48.89	23.26	1.09
long run	54.89	15.88	0.81

Notes: Robust standard errors, clustered by individual, in parentheses. ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively.