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Long-Run Effects of Public Policies: Endogenous Alcohol Preferences and Life Expectancy in Russia

Lorenz Kueng
Evgeny Yakovlev

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Endogenous Alcohol Preferences and Life Expectancy in Russia*

Lorenz Kueng† Evgeny Yakovlev‡

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Abstract

We use two quasi-natural experiments in the 1980s and 1990s to identify how public policies affect important long-run outcomes by changing preferences. Large but short-lived shocks to product availability in Russia shifted young consumers' long-run preferences from hard to light alcohol. The resulting large cohort differences in current alcohol consumption shares decades after the interventions ended explain about 60% of the recent decrease in male mortality based on both micro-level and aggregate estimates. Mortality will continue to decrease by another 23% over the next twenty years based on our analysis. Program impact evaluations that focus only on contemporaneous effects can therefore severely underestimate the total effect of such public policies.

JEL Classification: D12, H31, I10.

Keywords: long-run policy effects, endogenous preferences, mortality.

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†Department of Finance, Northwestern University's Kellogg School of Management, 2001 Sheridan Road, Evanston, IL 60208, and National Bureau of Economic Research. E-mail: l-kueng@kellogg.northwestern.edu.

‡Department of Economics, New Economic School, 100A Novaya Street, Skolkovo, Moscow 143026, Russia. E-mail: eyakovlev@nes.ru.

Can restricting consumption during an individual's sensitive ages affect his preferences? In this paper we show that public policies can have powerful long-run effects on important economic outcomes by changing consumption preferences, even if these policies are only temporary. Using a brief prohibition period in Russia and the rapid expansion of several markets after the end of the Soviet Union, we document significant long-run effects of temporary policies on life expectancy, health, and a reduction in social costs associated with negative externalities. By changing preferences of young consumers, a public policy can have substantial effects that persist for decades after the intervention has ended. In cases such as this, impact evaluations of public policies that focus only on the contemporaneous effects severely underestimate the full effects, which include the often unintended long-run consequences of such policies.

We identify the sensitive ages at which policies affect individuals' preference formation the most. The two quasi-natural experiments significantly changed the availability of specific products, in particular hard and light alcohol and certain types of food. We then estimate the long-run contributions of these two events on life expectancy over the last 15 years and we use our estimates to predict further decreases in mortality over the next 50 years after which a new population steady state will be reached.

The brief prohibition period in the late 1980s, the so-called anti-alcohol campaign, restricted access to alcohol, especially liquor, in order to decrease the significant number of alcohol-related deaths among the working-age population. Importantly for our research design, the policy was more strictly enforced in urban areas allowing us to compare the long-run effect of the campaign on urban consumer that started to drink alcohol regularly before, during, and after the campaign relative to similar rural consumers in a difference-in-difference setting. Hence, our methodology allows us to simultaneously control for age and cohort effects because the identifying variation is the differential exposure of urban and rural consumers to the policy.

To identify the age at which consumers form preferences over different types of alcohol, we exploit the fact that the policy only lasted for a couple of years. Hence, our research design does not rely on the legal drinking age to identify endogenous preference formation.[1] Instead, we non-parametrically estimate that relative alcohol preferences for the typical consumer are formed during early adulthood in a small window that is roughly centered at ages 16 to 18. Most consumers reach their steady-state preference around age 22 and these preferences do not change much afterward even in response to fairly large shocks. This result has important implications for public policies, suggesting that interventions targeted at young consumers might be more effective than more traditional broad-based policies such as excise taxes. To the best of our knowledge this is one of the first papers that estimates the age at which endogenous

[1] Endogenous preferences include state-dependent preferences (internal and external habit formation), peer effects, social norms and culture. While our research design does not identify the precise mechanism through which the quasi-experiments affect long-run outcomes, the important point is that whatever the precise mechanism, we show that it can be manipulated by public policies and other events. Hence, we use the general term *endogenous preferences* for such mechanisms that operate through preferences.

consumption preferences are formed.

The second experiment is the collapse of the Soviet Union at the end of 1991 and the rapid expansion of many markets for products that were previously unavailable or severely rationed, including beer, exotic fruits, and chocolate. The market for beer expanded particularly rapidly both in terms of quantities and number of varieties available for reasons unrelated to preference changes, such as the entry of foreign competition and investments, the liberalization of the alcohol market, and a lower regulatory burden for the beer industry relative to other alcohol producers.[2]

Looking at current consumption behavior in the Russian Longitudinal Monitoring Survey (RLMS) we find that both experiments differentially affected preferences of young consumers permanently relative to both less affected young consumers and also relative to older individuals. Young urban consumers that had limited access to liquor in the 1980s due to the temporary prohibition still prefer light alcohol today relative to their rural peers who had easier access to hard alcohol. These consumption differences persist even though all individuals in our sample now have access to the same products, and they hold even after we control for relative prices, income, age, and total alcohol intake.

These long-run effects are also quantitatively large. We find that individuals who were adolescents in urban areas during the campaign use 6 percentage points (pp) less vodka today to consume the same amount of alcohol than their rural peers, i.e., have a 6 pp lower vodka share of total alcohol intake. This relative drop comes on top of a 5 pp long-run decrease in the vodka share of rural consumers who spent their adolescence during the campaign and were more affected by the campaign than other rural consumers who were not adolescents during the campaign. Given a baseline vodka share of 50 pp for males and 35 pp for females, the long-run effects of this short-lived policy are economically significant.

Similarly, consumers who had access to a more developed beer market during adolescence after the collapse of the Soviet Union still consume a significantly larger share of light alcohol today relative to older cohorts who experienced these changes later in their lives. We therefore conclude that consumers who have access to the same products today make very different choices, and this difference is largely a function of the past socio-economic environment when they were young.

The fact that these policies change long-run alcohol preferences also has important consequences for one of the most pressing public policy concerns in Russia: the high mortality of working-age adults and in particular the large gap between female and male life expectancy.[3]

[2] For instance, in 1991 there were no foreign-owned beer breweries in Russia and no foreign brand was sold. By 2009, the five leading foreign-owned companies produced more than 85% of the total beer sold. Similarly, the number of beer brands increased from only 20 in 1991 to over 1,000 in 2009. The set of varieties available in 1991 was even more limited than this number suggests, since one brand—Zhigulevskoe—dominated the entire market.

[3] Based on data from the WHO for years 2000 to 2009, Russia has an extraordinarily low average life

To identify the mechanism that relates changes in long-run alcohol preferences to improved health outcomes we show that the *type* of alcohol consumed (e.g., vodka vs. beer) has an important effect on mortality for working-age adults, even when we hold the individual's average amount of alcohol consumed fixed. This happens because most of the alcohol-related deaths of working-age adults in Russia—fatal accidents, homicides, suicides, and alcohol poisoning—are a consequence of binge drinking, which is more likely to occur when consuming a given amount of alcohol in the form of liquor than light alcohol.

Focusing on the sample of males—who have a disproportionately low life expectancy—we estimate that 60% of the recent decline in mortality is due to relative alcohol preference while the level of alcohol consumed explains another 15%. Going forward, our estimates imply that male mortality will further decrease by one quarter during the next twenty years as a long-run consequence of changes in relative alcohol preferences caused by the rapid expansion of the beer market after the collapse of the Soviet Union and the brief anti-alcohol campaign. These changes will occur even under the current set of policies, current levels of relative prices, and current socio-demographic characteristics of the population except for the individuals' relative alcohol preferences. The increase in life-expectancy will happen simply because new generations will be more accustomed to light alcohol and will replace older generations who had strong preferences for hard liquor.

Previous studies have documented significant *contemporaneous* effects of changes in alcohol supply on morality rates in Russia (e.g., Bhattacharya, Gathmann and Miller (2013)). Our study extends this literature in two important ways. First, we document that these changes also have additional long-run effects by affecting preferences of young consumers. Second, we show that the type of alcohol consumed has an important effect on mortality that has so far been overlooked by studies that focus on the level of alcohol consumed. As a consequence, policies and events that change *relative* preferences from hard to light alcohol (e.g., from vodka to beer) substantially reduce the mortality of working-age adults, even when we control for the individual's average amount of alcohol consumed.

The quasi-natural experiments we use in this paper do not identify the precise mechanism through which policies affect long-run preferences. For instance, in addition to the standard model of internal habits (e.g., models of addiction, rational or otherwise), external habit formation such as peer effects, or cohort-specific changes in social norms and culture that differentially affected rural and urban consumers by age during the campaign or that affected young consumers differently than old consumers before, during, and after the collapse of the Soviet Union are all consistent with our results. The important point is that whatever the precise mechanism,

expectancy, 60 years vs. 75 years in the U.S., and also a significant gap between female and male life expectancy, 13 years vs. 5 years in the U.S. Both facts are widely attributed to alcohol consumption; e.g., Brainerd and Cutler (2005).

we show that it can be manipulated by public policies and other events.[4]

While studying when alcohol preferences are formed and whether they can be manipulated by public policies is important for understanding Russian life expectancies, alcoholic beverages are special in many ways, including the fact that they are potentially addictive. We use the collapse of the Soviet Union to directly address the question whether and to what extent our results extend to other non-addictive goods because the collapse also affected many other markets in addition to the market for beer. Consistent with our results for alcohol preferences we find that individuals that were born before, during and after the collapse of the Soviet Union have significantly different tastes today for goods whose market expanded rapidly, such as exotic fruits and chocolate for example, while controlling for relative prices and income.

Our analysis takes advantage of the rich individual consumption data for different types of alcoholic beverages. This data comes from a separate health module of the expenditure survey and is completed separately by each adult member of the survey. Compared to previous research, which is often restricted to household-level data, 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 individual consumption and is not subject to timing issues that may lead to a wedge between expenditures and consumption.[5] Since the health questions are confidential and asked of each individual separately without having other family members present, the answers are also less likely to be influenced by stigma.[6]

The data also allows us to deal with other issues of addictive goods. For example, our results could be sensitive to the behavior of a few individuals since alcohol consumption is known to be highly skewed to the right; see e.g., Cook and Moore (2000). To address this concern, we control for the level of total alcohol intake in all specifications and we follow the recent literature on long-run preferences by using consumption shares instead of levels in order to make the results robust to outliers. We also estimate the effects separately for both genders since alcohol preferences are very different for men and women; see e.g., Baltagi and Geishecker (2006). Moreover, all our findings are robust to dropping the top quartile of alcohol

[4] In the Online Appendix we show that an extension of the Becker and Murphy (1988) model of habit formation allowing for two habit-forming goods (hard and light alcohol) 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 adolescence for alcoholic beverages. Individuals in our model are born with the same preferences but exposed to different initial market conditions and can therefore form long-run habits toward different goods. Importantly, with two habit-forming goods we can observe multiple long-run equilibria even without any exogenous unobserved heterogeneity in preferences.

[5] We document in the Online Appendix that reported household-level alcohol expenditures are of poorer quality than individual-level data based on the health module.

[6] We exclude under-age individuals from our sample. Since we study the long-run effects of policies that happened in the distant past, we do not depend on survey responses from minors even if policies affect minors disproportionately. This contrasts with studies that estimate the contemporaneous impact of such policies.

consumers in terms of their total ethanol intake. As a matter of fact we find that individuals form preferences at least as easily toward light alcohol as toward harder drinks.

We also take advantage of the panel dimension of our data to show the importance of separating age from cohort effects. While there is a steep unconditional age profile in the pooled cross-section, which is decreasing for light alcohol and increasing for liquor consistent with light alcohol being a "stepping stone" or "gateway" for harder alcohol later in life, this age profile is almost entirely driven by cohort effects. In particular, we show that after controlling for individual fixed effects, the consumption-age profile is completely flat for consumers starting in their mid-20s, while there is some modest stepping-stone effect at younger ages. However, these age effects are small relative to the cohort effects and can explain at best a quarter of the unconditional age profile, while the rest is due to long-run effects of shocks to the alcohol market that manifest themselves as cohort effects.

Related Literature: Economists have long thought about endogenous preferences.[7] Recent empirical studies of endogenous preferences mostly use a migrants research design to identify the causal effect of changes in the socio-economic environment on preference formation.[8] Since forced migration is not a typical public policy tool, an important contribution of this paper is to show that other more targeted public policies such as restricting access to certain goods can be effective in changing long-run behavior.

Nevertheless, in order to relate our quasi-natural experiments to the prior literature we also implement an additional research design based on migrants from other former Soviet Republics to identify long-run preferences for wine consumption. While consumers in other Soviet Republics had roughly similar goods available as Russians during the Soviet Union, wine was produced and easily available only in a few Republics. As a direct long-run consequence of this fact, today's wine share is still relatively low in Russia. However, consistent with the migrants research design we find that individuals living in Russia today who spent a significant part of their early adulthood in one of the few wine-producing former Soviet Republics have a significantly higher wine share.

The paper is organized as follows. Section 1 describes the data. Section 2 identifies changes in long-run preference and the age at which consumers typically form such preferences using

[7] Aaron (1994), Bowles (1998), Guiso, Sapienza and Zingales (2006) and Alesina and Giuliano (2013) survey the literature. Leibenstein (1950), Harsanyi (1953), Stone (1966), Marschak (1978) and Pollak (1978) are early theoretical contributions. The closest studies to ours relating to alcohol consumption and endogenous preferences are Moore and Cook (1995) and Williams (2005).

[8] See e.g., Bronnenberg, Dubé and Gentzkow (2012) and Atkin (2016). Our results show that these findings not only apply to preferences over brands (e.g., Budweiser vs. Miller Light) but also extend to preferences over categories or types of goods (e.g., beer vs. vodka) and that changes in long-run preferences have additional important effects on individual welfare by affecting long-run health and life expectancy. Hence, persistent endogenous preferences are also relevant for other fields in economics, in particular health and public economics, and are not limited to industrial organization, marketing, or international economics.

the two quasi-natural experiments. Section 3 estimates the effect of these preference changes on Russian life expectancy. Section 4 provides additional robustness checks and extensions. Section 5 concludes.

1 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 Higher 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 considered to be of much lower quality according to the survey's website. A more detailed description of the data is provided in the Online Appendix.

Table 1 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 patterns, we restrict the gender-based samples to individuals age 18 and older, with 18 being the minimum legal drinking age in Russia.[9] Since there might be severe underreporting of underage drinking in the survey, 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. 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 therefore measured very imprecisely, and we therefore exclude it. Note that we exclude this variable because it is noisy, not because we think it is not important. However, all of our results are robust to including samogon since samagon consumption today is much lower than in the Soviet era, although the standard errors tend to increase. The term "beer" includes home-brewed beer in addition to purchased beer. 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.

Vodka and beer are the most popular alcoholic beverages among Russian males, with an average share across all survey years of 62% for vodka (including samogon) and 29% for beer,

[9] Restricting the sample to consumers age 18 and above does not affect our estimated age at which consumers form preferences over alcoholic beverages, which we estimate to be roughly between age 16 and 18.

respectively. Therefore, conditional on not becoming an abstainer, any behavioral response to a shock in one of those two types of alcohol causes a substitution 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 39% vodka and 23% beer. Hence, a shock to say the beer or vodka market leads to ambiguous cross-product substitution effects for women.

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. This assumption does not affect our results.

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 occasional 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.

Table 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 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%. We discuss the household-level expenditure data of non-alcoholic goods in more detail in section 4.3.

2 Identifying Long-Run Effects on Alcohol Preferences

We use two quasi-natural experiments to causally identify the effect of changes in market access on the formation of long-run preferences of young adults.

2.1 Gorbachev's Anti-Alcohol Campaign as a Natural Experiment

Our first quasi-natural experiment identifies the long-run effect of a temporary public policy on individual long-run consumption preferences.

Institutional Background: 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.[10] 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.[11]

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. Sales of beer dropped by 29%, from 177 million liters of ethanol in 1984 to 125 million liters in 1987. 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.

However, as shown in the top panel of Figure 1, 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 smaller on average.[12] Indeed, after accounting for the illegal production of homemade vodka, the estimated volume of total alcohol consumed during the Gorbachev anti-alcohol campaign decreased by "only" 33% instead of 60%.

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,

[10] 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.

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

[12] See e.g., Treml (1997), Nemtsov (2002), Bhattacharya et al. (2013), and the Online Appendix for a discussion of the underlying data and methodology.

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, 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, which we take 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.1 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 day 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 1 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 preference formation of rural relative to urban consumers who are adolescents during the campaign.

Difference-in-Difference Estimator: 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 is rural adolescents during the campaign, which for now we define as being 18 years old, the minimum legal drinking age in Russia.[13] Below we show that this assumption is robust to assuming that consumers instead form preferences earlier.

The peak impact of the campaign lasted from 1987 to 1991 as shown in the bottom panel of Figure 1. 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

[13] 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 preferences 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 consumer forms his preferences between ages 16 and 18. The literature surveyed in Koposov, Ruchkin, Eisemann and Sidorov (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.

samogon, we conjecture that some rural males who would have formed preferences for beer in the absence of the campaign substitute to samogon consumption, which is relatively abundant in rural areas during the campaign, and thus form preferences for hard alcohol more generally. For urban males, samogon was much harder to obtain, and hence there were fewer who substituted beer with samogon during the campaign. Therefore, we have two main predictions. First, we predict that rural consumers who were adolescent in the late 1980s during the campaign have a higher share of vodka consumption today relative to rural consumers who were adolescent either before or after the campaign.[14] Second, the difference between the vodka shares consumed by rural and urban males should be largest for those cohorts who were adolescent during the anti-alcohol campaign.

In our baseline specification we restrict the sample to individuals who are adolescent in 1970 or later because official data on aggregate sales by type of alcohol is available only starting in 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 top panel of Figure 3 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 were adolescent before 1999 to avoid a contamination of this experiment with the shock to the beer market analyzed in the next section.

For similar reasons we restrict the baseline sample to survey years 2001 to 2011, since starting with year 2001 all cohort groups reach a new steady state as documented in section 4.1 below. 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 1970s cohorts with the 1950s cohorts over the entire sample period from 1994 to 2011 would overstate the pure cohort effect since it would attribute the fact that the 1950s cohorts did not have access to the same beer market during the 1990s as during the 2000s to cohort rather than time effects. In the robustness checks when we use the entire sample from 1994 on, we absorb part of this contamination effect non-parametrically with period fixed effects. We find qualitatively and

[14] 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.

quantitatively similar results using the full sample.

In this difference-in-difference approach, we implicitly exploit the fact that labor mobility is very low in Russia compared to most other countries (Andrienko and Guriev (2004)). Hence, the chance that the birth place of a survey respondent in our sample also identifies his location during adolescence—something we do not observe directly in the data—is very high.[15]

To test our predictions for the long-run effect of the anti-alcohol campaign on the consumption shares, we estimate the following difference-in-difference specification,

$$\begin{aligned} S_{it}^{g} &= \beta_{DD} \cdot I(\text{urban})_i \times I(\text{adolescent in 1987-91})_i + \beta_D \cdot I(\text{adolescent in 1987-91})_i \\ &+ \lambda \cdot I(\text{urban})_i + \gamma' x_{it} + \varepsilon_{it}, \end{aligned} \tag{1}$$

where S_{it}^{g} is individual i's share of alcohol consumed of type g in year t, either beer or vodka. The vector of controls x_{it} includes household log-income and local relative prices to control for *contemporaneous* substitution patterns and differences in income elasticities. Importantly, we include the level of total alcohol intake to control for heavy drinking. We also add 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. Since the policy affected rural and urban cohorts differentially, the full set of age and year effects is identified. Imposing a quadratic function on age as often done in the literature does not change any of our results. The coefficients on the control variables in all specifications have the expected sign and are therefore omitted from our discussion.

Column 1 of Table 2 shows that consistent with our hypothesis, the "treatment" indicator—i.e., whether an individual was adolescent during the campaign—predicts a 5 pp higher share of vodka consumption relative to rural males who spent their adolescence before or after the campaign. Moreover, the difference in the vodka shares of adolescents in rural relative to those in urban areas is 7 pp larger in absolute values for individuals who became adolescent during the campaign than for individuals that become adolescent outside of this period. This reflects the differential impact the campaign had on rural and urban males, consistent with the hypothesis that preferences for young consumers can be manipulated by public policies.

Robustness: One concern might be that adolescents after the end of the campaign did face different initial conditions than adolescents before the campaign and hence are not a proper control group. To address this concern we extend the difference-in-difference design of equation

[15] Our proxy for whether an individual lived in a urban area when adolescent 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 major cities in Russia correspond to the regional capital cities, and neither of these two exceptions is part of the RLMS sample frame.

(1) to include two different sets of control groups, one containing individuals who become adolescent between 1970 and 1986, and hence before the campaign, and another with individuals who become adolescent between 1992 and 1998, hence after the campaign:

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

While we cannot reject the hypothesis that the response is the same using the two control groups in column 2 (again in absolute values), the larger point estimate for the group of males that were adolescents before the campaign suggest that this group might be a more appropriate comparison group than the sample of males that were adolescent after the campaign.

One might be concerned that our results are driven by heavy drinkers or by alcoholism. In columns 3 we address this issue showing that the results are robust to dropping the top quartile of total alcohol consumers. In columns 4 we extend the sample to include individuals in the control group who were adolescent before 1970 and hence before we have data on aggregate sales by type of alcohol. The results are again similar to the baseline specification. In column 5 we extend the baseline RLMS sample to include all available 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 during the early rounds of the survey (see Figure A.1 in the Online Appendix).

In column 6 we show that our results are robust to using 16 instead of 18 as the age at which consumers form their alcohol preferences. Nevertheless, as we will see below, the age range in which preferences are formed is surprisingly narrow and can be reasonably precisely inferred to be between 16 and 18. In particular, we will see that the treatment effect quickly disappears when we assign the treatment to consumers that were younger than 16 or older than 18 during the campaign.

Finally, column 7 shows very similar effects of the campaign on female consumers, and column 8 shows that the campaign has the opposite effect on the share of beer consumed, suggesting that for male consumers, the main substitution occurs between vodka and beer, which is important for interpreting the long-run effects of the quasi-natural experiments on male life expectancy in the next section.

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 more than two decades after the end of the campaign. Moreover, the results highlight the differential impact the

campaign had on consumers that were adolescent in rural areas relative to their urban peers. Consistent with our hypothesis, these individuals formed different but persistent preferences for different types of alcohol, and these differences in preferences are still highly visible in their consumption behavior today.

Identifying the Preference-Forming Years: We exploit the temporary nature of the campaign to identify the age at which typical consumers form their long-run preferences.[16] For this purpose we estimate equation (1) with a 15-year rolling window starting with males who are adolescent between 1960 and 1974 and ending with the sample of males who are adolescent between 1985 and 1999 as illustrated in the top panel of Figure 2. For convenience and for consistency with the previous analysis, we define adolescence as being 18 years old in order to label the graphs below, but none of the results depends on this particular choice. Instead, we let the data speak and see whether this normalization aligns the responses of the endogenous preferences with the date of the campaign.

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 shrink the window from the left until it only includes the years from 1990 to 1999, implying that the control group became adolescent between 1990 and 1994 and the treatment group became adolescent between 1995 and 1999. Under our joint hypothesis that individuals form alcohol preferences around age 18 and that the policy had a differential impact on rural and urban consumers 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 that becomes adolescent 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 males that are adolescent 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 2 plots the evolution of β_D and β_{DD} together with 95% confidence intervals for this research design. Consistent with the hypothesis of long-run preferences that form during adolescence 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

[16] If we had strong priors about this age range instead, then this analysis would be akin to a placebo test.

period from 1987 to 1991. Note that this pattern, which is consistent with the prediction under the assumption that preferences form fairly quickly during adolescence, suggests that the typical consumer forms persistent alcohol preferences around ages 16 to 18; otherwise these results would not be as sharp and the timing would be off.

2.2 The Collapse of the Soviet Union as a Natural Experiment

The anti-alcohol campaign is a useful experiment as it lets us cleanly identify the causal effect of this public policy on long-run preferences, because it affected urban and rural consumers differentially, and because the policy was short-lived, which identifies the age at which consumers form preferences over different types of alcohol. Looking at the top panel of Figure 3 however, we see that the expansion of the beer market after the collapse of the Soviet Union in 1992 had potentially an even larger impact on consumer preferences. This second quasi-natural experiment is a change in the market for light alcohol and hence complements the anti-alcohol campaign experiment, which disproportionally affected the market for hard alcohol.

Institutional Background: 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 in 1992. 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 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 and investments into this new market.[17]

Foreign competition also brought 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 as mentioned before the assortment of beer has increased dramatically from only 20 varieties offered in 1991 to over 1,000 in 2009.[18] 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.

The top panel of Figure 3 measures sales in terms of quantities instead of values because there were no formal market prices in the Soviet Union. Instead, the alcohol industry was

[17] In section 4.3 we extend this analysis to non-alcoholic goods that saw a similar market expansion after the collapse of the Soviet Union.

[18] See http://moepivo.narod.ru/about_beer/brewing-in-the-ussr.html and www.beerunion.ru/soc_otchet/2.html.

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 rationing.

The Effect of the Beer Market Expansion on Long-run Preferences: Focusing on the relatively short period when the beer industry experienced rapid growth, we study the long-run effects of this expansion on relative alcohol preferences of individuals who turn 18 years old during this period. Below we again show that our results are robust to choosing a slightly lower age at which consumers form long-run preferences. Since culture and institutions change only slowly (Roland (2004)), males who turn 18 during the beer-market expansion 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 differential impact of the beer market expansion on long-run alcohol preferences by comparing individuals that turned 18 in different years during the expansion, and hence had different access to beer when they formed their relative preferences, by running the following regression,

$$S_{it}^{g} = \beta \cdot \text{year-turned-18}_i + \gamma' x_{it} + \varepsilon_{it}. \tag{3}$$

The top left panel of Figure 3 illustrates the design of the analysis. We start estimating equation (3) 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 top panel of Figure 3. 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 preferences 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.[19]

[19] 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

Identifying the Preference-Forming Years: To measure the age at which consumers form their alcohol preferences in this setting we again run a similar analysis as for the anti-alcohol campaign, illustrated in the top right panel of Figure 3. Specifically, we estimate equation (3) using a 10-year rolling window 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 joint 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 (3) 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 3. 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 turned 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 turned 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 research design. We indeed see this hump-shaped pattern emerge from the data 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 turned 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 turned 18 after the beer 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 the 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

measure their consumption shares.

absolute value for the sample that ranges from 1998 to 2007 before gradually converging back to zero. These results paint the same picture as the anti-alcohol campaign suggesting that for males, the substitution toward beer mainly comes at the expense of vodka. Finally, we note that we obtain qualitatively and quantitatively similar results for females.

3 Relative Alcohol Preferences and Male Life Expectancy

In this section we apply our results of the long-run effects of policies and other changes to the alcohol market on relative alcohol preferences to study the consequences for one of the most pressing public policy concerns in Russia: the high mortality of working-age adults and in particular 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.[20]

Alcohol consumption has well-known long-term adverse effects on health outcomes (e.g., cirrhosis) and life-expectancy. Probably less well-known is the fact that approximately 40% of all annual deaths in Russia are estimated to be related to alcohol consumption. Most of them are not due to long-run consequences of heavy drinking but due to the fact that alcohol is often consumed in large amounts over a short period of time, i.e., binge drinking. While Russia certainly has one of the highest levels of alcohol consumption per capita, other countries with high levels of alcohol consumption such as France and many other western European countries have a much lower number of alcohol-related deaths per capita. This is because consumers in those countries tend to spread their annual alcohol intake more evenly over the year; see e.g., Rehm and Shield (2013). 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.[21] Of the 40% alcohol-related annual deaths, about 7% 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 unrelated to long-run consequences of alcohol consumption.[22]

Hence, while a high average level of alcohol intake can certainly be hazardous—in particular

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

[21] See e.g., Brainerd and Cutler (2005), Leon, Saburova, Tomkins, Andreev, Kiryanov, McKee and Shkolnikov (2007) and Yakovlev (2012).

[22] 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; see Goskomstat, Demograficheskiy yezhegodnik RF, 2006. Similarly, in their sample of 48,557 residents of three typical Russian cities, Zaridze, Brennan, Boreham, Boroda, Karpov, Lazarev, Konobeevskaya, Igitov, Terechova, Boffetta 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.

for older individuals—it is mostly the occasional binge drinking that leads to high mortality rates across all age groups, and in particular among working-age adults. Furthermore, since binge drinking is much less likely to occur when consuming beer rather than vodka, a natural hypothesis is that individuals who prefer beer over vodka have a lower alcohol-related probability of dying, even holding fixed their average level of alcohol intake.

Estimating the Effect of Relative Alcohol Preferences on Mortality Hazards: To test this hypothesis and to quantify the effect of alcohol preferences over different types of alcohol on the probability of dying, we estimate a semi-parametric Cox proportional hazard model that is standard in the literature.[23] We discuss the quality of the data for estimating mortality hazard rates in the Online Appendix and compare the data to official mortality statistics.

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 heavy 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, 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 preferences 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 4.1 below shows that alcohol preferences 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 3 shows that consuming a lower share of vodka strongly decreases the hazard of death, while a lower share of beer increases it. Importantly, these effects hold conditional on the total level of alcohol consumed. The effect of both shares can be identified

[23] 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 γ. This function therefore controls for the (unconditional) effect of age on mortality.

simultaneously as shown in columns 3 and 7 because the two shares are not perfectly collinear. The sample correlation is only -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 omit from the regressions. We obtain similar coefficients for the shares consumed when estimating the model separately for vodka (columns 1 and 5) and beer (columns 2 and 6) compared to the coefficients when using both shares jointly (columns 3 and 7), which we will use for the counterfactual simulations below.

These results confirm the findings in the previous literature that alcohol-related deaths are a major cause of the low life expectancy among Russian men. The results also highlight the new insight we gain relative to this earlier literature. The significant effect of the alcohol shares while controlling for the level of total alcohol intake suggests 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 30 pp while simultaneously increasing the share of beer by 30 pp—which roughly 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 33%. The level of total alcohol intake on its own also increases the hazard of death as expected.

Columns 5 to 8 show that the main results are similar if we include these older individuals. The fact that these estimates are larger and statistically more significant for the sample that includes older males (columns 5 to 8) points to the additional negative long-run consequences of alcohol consumption. Finally, columns 4 and 8 show that these results are robust to controlling for heavy drinkers or alcoholics.

External Validity using Aggregate Data: 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 from 1991 to 1995—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 preferences for vodka instead of beer increases an individual's mortality risk, even holding fixed the level of total alcohol intake.

In order to compare our results in Panel A of Table 3 based on the individual-level survey data to official aggregate statistics, we perform the same analysis using time-series data from 1970 to 2013. We use historical data on aggregate sales by type of alcohol and calculate annual mortality rates for males age 22 to 65 using data from The Human Mortality Database (www.mortality.org). The top panel of Figure 4 shows the enormous changes in male mortality over the past four decades. We use standardized mortality rates (SMR) relative to the mid-year

population to avoid biases over time due to demographic changes.[24] For comparison we also graph the evolution of the corresponding male mortality rate for the U.S. population, which is much more gradual. For instance, the standard deviation of the Russian male mortality rate is more than double that of the U.S. The figure also shows that changes in mortality are closely associated with changes in alcohol sales per capita, and in particular with sales of vodka.

The middle panel of Figure 4 contrasts the male mortality rate with the aggregate shares of alcohol sales. While the shares evolve more smoothly, the share of vodka captures well the long-run trend in mortality as we would expect. The share of beer on the other hand seems much less related to male mortality. To quantify the relative importance of these channels and to assess the external validity of our micro-level estimates, we regress the male mortality rate on the level and the relative shares of aggregate alcohol, controlling for a linear time trend.

Panel B of Table 3 shows the relationship between aggregate alcohol sales by type of alcohol and mortality rates for working-age males using official death statistics. These macro-level estimates are qualitatively and quantitatively similar to the micro-level estimates in Panel A. Columns 1 and 2 show that both the share of aggregate vodka sales and the level of total alcohol sales per capita (in pure alcohol) substantially increase mortality. The share of beer on the other hand has no or even a negative effect on mortality (columns 2 and 3). Furthermore, Column 4 shows that this negative effect of the level of alcohol sales on mortality is driven by the level of vodka sales, consistent with our mechanism. Adding beer and vodka sales separately in addition to both alcohol shares lowers the precision of the individual coefficients relative to column 3. However, the share of vodka also remains statistically significant and economically large in this specification. Finally, performing the same counterfactual experiment of increasing the share of beer by 30 pp and lowering the share of vodka by the same amount would reduce male mortality by 30% from an average baseline of 1.34% over this period. This is almost identical to the effect based on the micro-level estimates, therefore providing strong evidence that the micro-based results are externally valid.

Contribution of Alcohol to the Recent Decline in Mortality: The top panels of Figure 4 document a substantial decline in male mortality since the mid-1990s. We use our micro-level estimates of the mortality hazard to decompose this decline into the contribution of the shares of alcohol consumption, the level of total alcohol intake, and all factors other than contemporaneous alcohol consumption. For each survey year we rescale the predictions to match the mortality rates based on official statistics.

The bottom panel of Figure 4 shows the evolution of the three counterfactual mortality rates. The green line with cross markers is the predicted mortality rate if all men abstained from consuming alcohol, i.e., setting both the level of alcohol intake and the share of vodka to

[24] We use the U.S. standard population from 2000 provided by the NIH; http://seer.cancer.gov/stdpopulations/stdpop.19ages.html.

zero. The red line with triangle markers is the predicted mortality if non-abstainers consumed all their alcohol in the form of light alcohol, i.e., setting the share of vodka to zero. The blue line with circle markers is the predicted share using the actual alcohol consumption data of survey respondents, i.e., using the actual alcohol shares. Based on this decomposition, the share of vodka—holding fixed the level of alcohol intake—explains 56% of the decline in male mortality from 1994 to 2011, while the level of alcohol intake explains 16% (if it were consumed in the form of light alcohol), and factors other than alcohol explain the remaining 28%.

The contribution of the relative share of hard alcohol to the decline in male mortality based on these micro-level estimates is very large. It is therefore useful to compare it to the predictions based on the macro-level estimates in column 4 of Panel B. From 1994 to 2011 male mortality declined by 0.7pp, the share of aggregate vodka sales declined by 30pp, and the share of aggregate beer sales increased by 25pp. The aggregate estimates therefore imply that changes in the shares of alcohol, holding fixed their levels of alcohol sales, decreased male mortality by 59%, consistent with the micro-level results.

Counterfactual Analysis of Future Male Mortality Rates: The top panel of Figure 4 shows a clear downward trend in male mortality that started in 2003. As a final step we use our regression estimates to study the likely evolution of this trend over the next few decades as the economy converges to a new population equilibrium. 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 regressing alcohol shares on a full set of cohort effects and the same set of controls as in the previous section. To identify the model we drop period fixed effects as these are not too important for our baseline sample as shown in section 4.1 below. Using the estimated cohort effects, we then 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 relative alcohol preferences only. The Online Appendix provides more detail for this algorithm.

Panel C of Table 3 provides the predicted population consumption shares and the annual rate of 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.[25] Our results suggest that the mortality of males age

[25] Figure A.3 in the Online Appendix graphs the entire path of both shares and the mortality rate.

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 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 2011, which is 1.55%. 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 alcohol preferences we find in the data, combined with the large changes to the alcohol market that occurred in the distant past, might further cut the gap between the Russian and US male mortality in half over the next 55 years.

4 Robustness and Extensions

In this section we perform additional robustness checks and extend our analysis to long-run preferences for non-alcoholic goods to provide external validity of our results for endogenous preference formation more generally.

4.1 Long-run Preferences vs. Age Effects

In this section we take advantage of the survey's panel dimension to provide additional non-experimental evidence for our mechanism. A common hypothesis in the health literature for heterogeneity in alcohol consumption are "stepping-stone" or "gateway" effects 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. According to this theory, people would start out with beer but eventually switch to vodka. Several studies have analyzed this hypothesis in the context of various types of non-alcoholic drugs.[26] To the best of our knowledge our study is the first to analyze the stepping-stone effect of light alcohol towards harder alcoholic beverages.

We decompose both alcohol shares into unconditional age and cohort effects.[27] 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. This would result in a downward sloping life-cycle profile of the beer share. If instead changes in alcohol shares are driven by persistent changes in preferences, then different cohorts would have relatively flat alcohol life-cycle profiles. The initial share of beer relative to vodka would increase from one cohort to the next, so that the intercept of the age profile of younger cohorts

[26] For instance, Mills and Noyes (1984) and Deza (2012) find evidence for a modest stepping-stone effect of marijuana and alcohol for the consumption of harder non-alcoholic 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.

[27] In the Online Appendix we show qualitatively similar results using the conditional decomposition proposed by Deaton (1997).

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

The top panel of Figure 5 shows the unconditional age and cohort profile of both alcohol shares. The pooled cross-sectional moments seem to support both mechanisms, stepping stone effects and changes in persistent preferences implied in the cohort effects. Survey year effects do not play a significant role as shown in the middle left panel.

Next, we exploit the panel dimension of the data to assess the relative contribution of those two forces in the middle right panel 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. Under the stepping-stone hypothesis, this demeaned consumption profile should retain a significant slope, positive for vodka consumption and negative for beer. On the other hand, if changes in consumption shares are driven by changes in persistent preferences across cohorts, then these profiles should be relatively flat. The pattern shown in this figure strongly supports the latter, and there is little evidence for much change within cohorts over time and hence for stepping stone effects.

The average individual's slope shown in the middle panel could mask a stepping-stone effect if preferences form 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 middle right panel 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 shows that there indeed is a steeper age profile from age 18 to about age 22.

The bottom-right panel 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.4 in the Online Appendix shows the same analysis over the entire life-cycle, documenting that the age profile remains flat at all ages above age 22, such that the slopes of the age profiles of beer and vodka shares are not statistically different from each other.

In addition to supporting the experimental results of section 2, this non-parametric analysis also reveals that consumer preferences form early in life and are fully accumulated already by

the age of about 22, presumably at the beginning of an individual's consumption life-cycle when the individual starts consuming alcohol regularly for the first time.

4.2 Identification using a Migrants Research Design

In this section we use a different research design based on migrants, similar to the one used previously in the literature, for example by Bronnenberg et al. (2012) and Atkin (2016). We use three sets of movers to provide additional independent evidence for the mechanism. First, we use migrants that moved from rural to urban areas in Russia to complement our difference-in-difference research design based on the anti-alcohol campaign. Consistent with persistent endogenous preferences and the fact that vodka consumption is more prevalent in rural areas, columns 1 and 2 of Table 4 show that individuals who moved from a rural area to a city and thus had easier access to liquor during their preference-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, as 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 3 pp 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 who moved to Russia from another republic of the former Soviet Union.[28] Although vodka and beer production was relatively uniform across countries of the former Soviet Union (but different for rural and urban areas), production of wine was heavily concentrated in only two republics, Moldova and Georgia.[29] 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. The wine share of immigrants from wine-producing republics 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, and 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 wine share by country of origin to construct a continuous measure of market exposure during the preference-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

[28] Unfortunately, we do not have information on the country of origin for immigrants from non-Soviet countries.

[29] 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.

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, noisier 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 survey. These average shares range from 65% in Georgia to 5% in Kazakhstan, while Russia's share is just 9%.[30] We use the more noisy but arguably more exogenous country-of-origin shares to instrument for the less noisy but potentially endogenous leave-out means. The IV estimates are qualitatively similar to the leave-out-mean OLS estimate. The fact that the IV estimate in column 6 is larger than the OLS estimate could indicate measurement error in the leave-out mean. Finally, column 7 shows that the results are robust to controlling for age, year, income, relative prices, and any other observable characteristic, most importantly city fixed effects. Column 8 reports the corresponding first stage regression.

Overall, Table 4 provides additional evidence of persistent alcohol preferences that are shaped by the socio-economic environment during adolescence. Hence, these results are very consistent with the findings from the two quasi-natural experiments, even though they are based on a completely different research design.

4.3 Long-run Preferences for Non-Alcoholic Goods

In this section we address the concern that our results might only apply to addictive substances and not have external validity. We use the opening of many other markets after the collapse of the Soviet Union to identify changes in long-run preferences for other non-alcoholic goods.

Identifying such preferences, however, is more challenging. Conceptually, the hypothesis that preferences are formed when consuming a new good regularly for the first time implies that food preferences 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 preferences at the end of the Soviet Union will be dampened by the accumulated preferences 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 endogenous preferences for non-alcoholic goods. First, the parents' own consumption preferences 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 survey's health module. These expenditure data

[30] 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 Turkmenistan.

might be 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. 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 expenditure questionnaire of the RLMS 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.[31] 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, the import of previously unavailable goods, such as subtropical fruits, and the inflow of new technologies, such as new ways to preserve milk or new technologies to produce chicken at much lower cost. Table A.2 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 mitigate the preference aggregation issue. To have a sufficient sample size, especially when estimating preferences 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 effect of the market changes on long-run preferences since younger cohorts that are most responsive to the new market conditions have not formed their own households yet.

Table 5 shows that consistent with preferences forming early in life, younger generations consume a significantly larger share of new relative to traditional goods. This is true conditional

[31] 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.

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 for one of the categories, chicken vs. beef and pork consumption. 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 sales going back to 1970 to document these large changes. Figure A.5 in the Online Appendix shows similar rapid changes in the meat markets after the collapse of the Soviet Union as in the alcohol markets.

Columns 9 and 10 of Table 5 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 after we control for age and relative prices. The estimates are somewhat less precise in the much smaller RLMS sample.

5 Conclusions

This paper makes two main contributions. First, it documents how public policies, even temporary ones, can have significant long-run effects by shaping preferences of consumer in their sensitive ages. Sensitive consumption ages vary across different types of goods depending on when an individual starts consuming them regularly. We show that among Russian consumers alcohol preferences from around ages 16 to 18 while preferences for basics foods form during early childhood. Shocks to product availability in the 1980s and 1990s significantly changed preferences of young consumers, and the resulting consumption differences are still large and hence easily detectable in survey data decades later.

Second, the paper shows that the *type* of alcohol consumed—i.e., hard vs. light alcohol—has a significant effect on mortality *in addition* to the effect of the level of alcohol consumed, which has been the main focus of previous research. For the case of Russia we find that changes in the share of alcohol consumed in the form of hard alcohol, holding fixed the level of alcohol intake, contribute about three times as much to the mortality of working-age men than the level of alcohol consumed. The reason for this large effect is the fact that a significant fraction of deaths among Russian working-age men are related to alcohol, and most of these in turn are associated with binge drinking, such as traffic accidents, alcohol poisoning, and homicides.

Combining these two contributions we conclude that public policies targeted at young consumers can have significant effects on both contemporaneous as well as long-run health outcomes by persistently changing consumption preferences.

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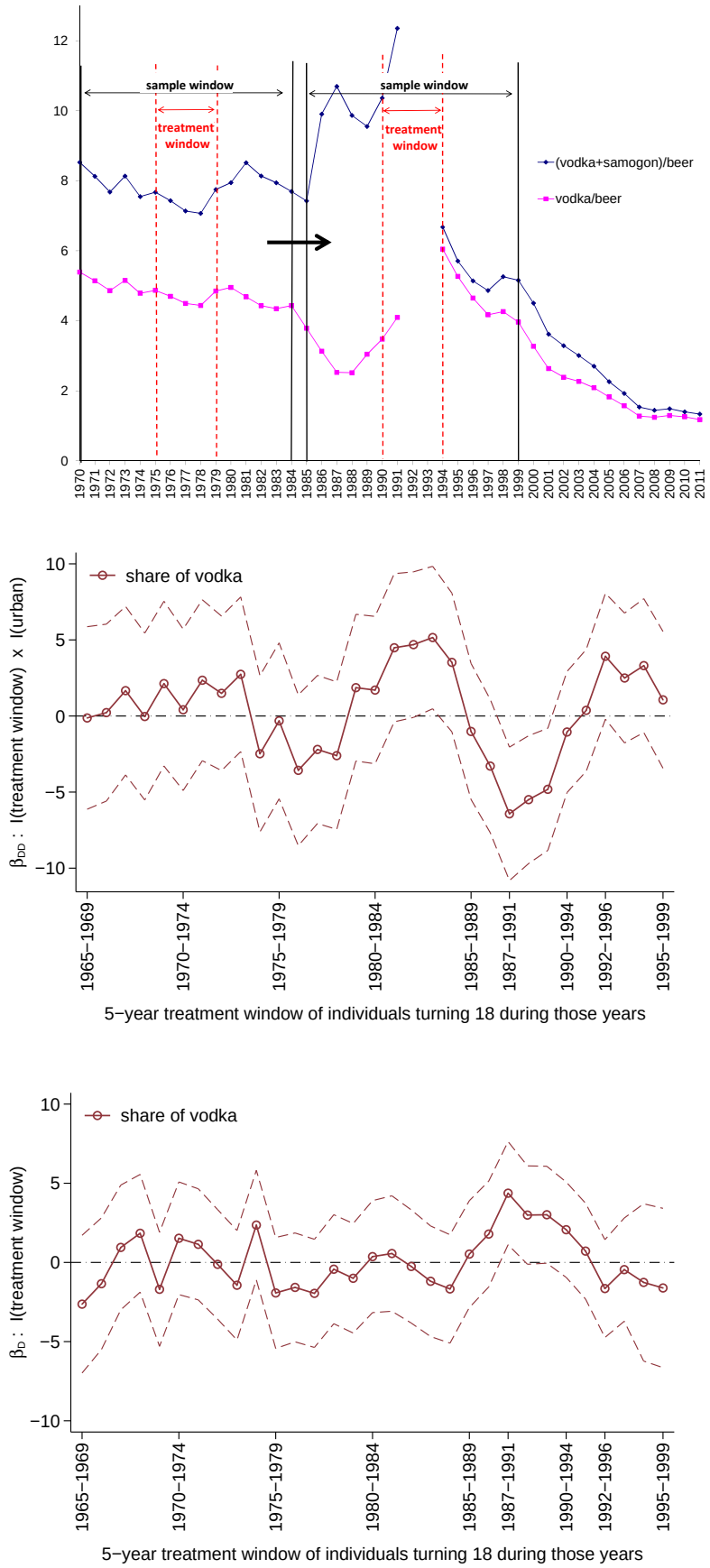
Figure 1 – Relative alcohol production around the anti-alcohol campaign

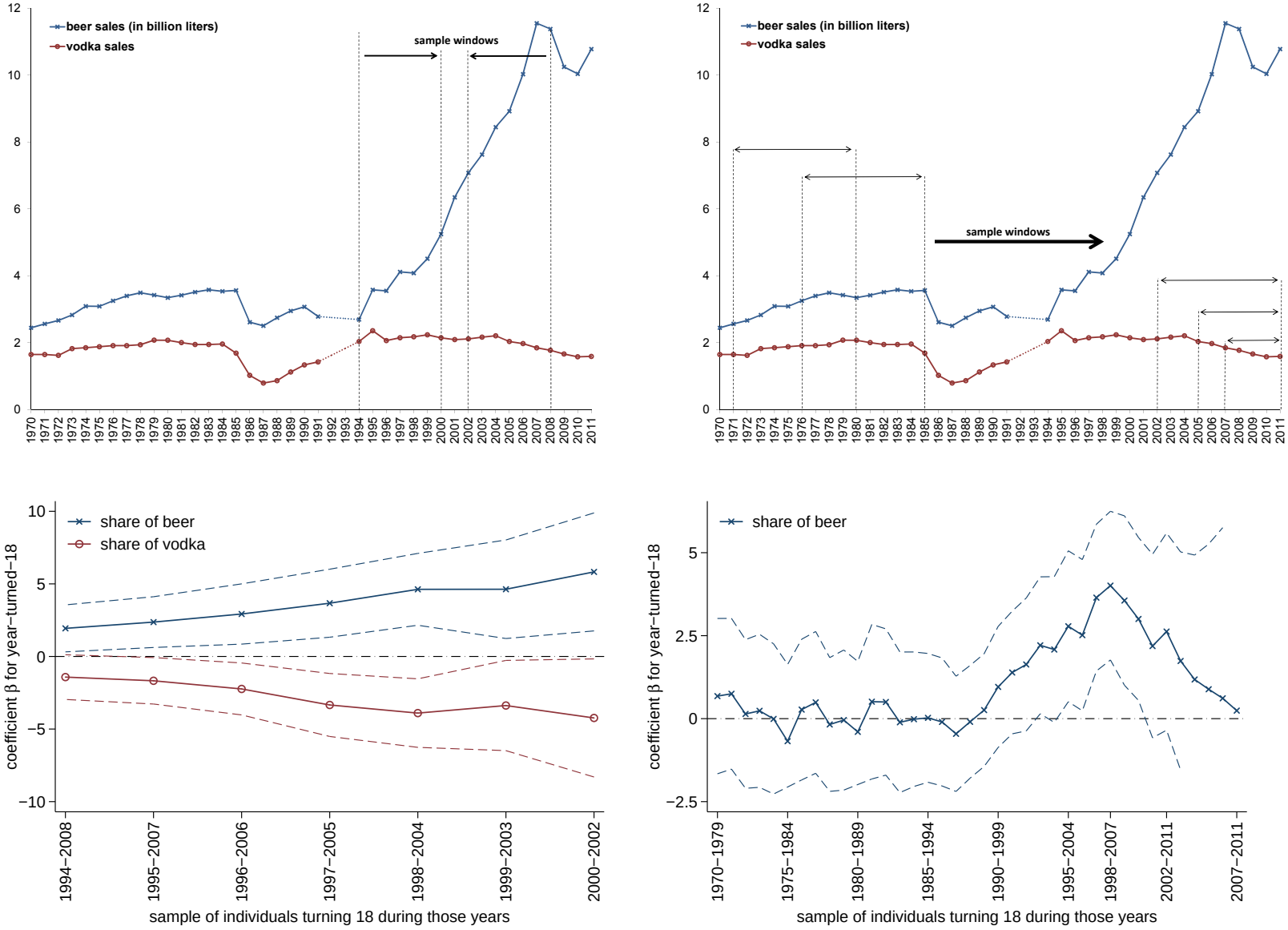
Notes: The top panel shows estimates of the ratio of illegally produced vodka (i.e., samogon) to officially produced vodka using four different data sources. The bottom panel displays the ratio of official vodka production to beer production and the ratio of total vodka to official beer production, all 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 2 – Identifying the preference-forming years using the anti-alcohol campaign experiment



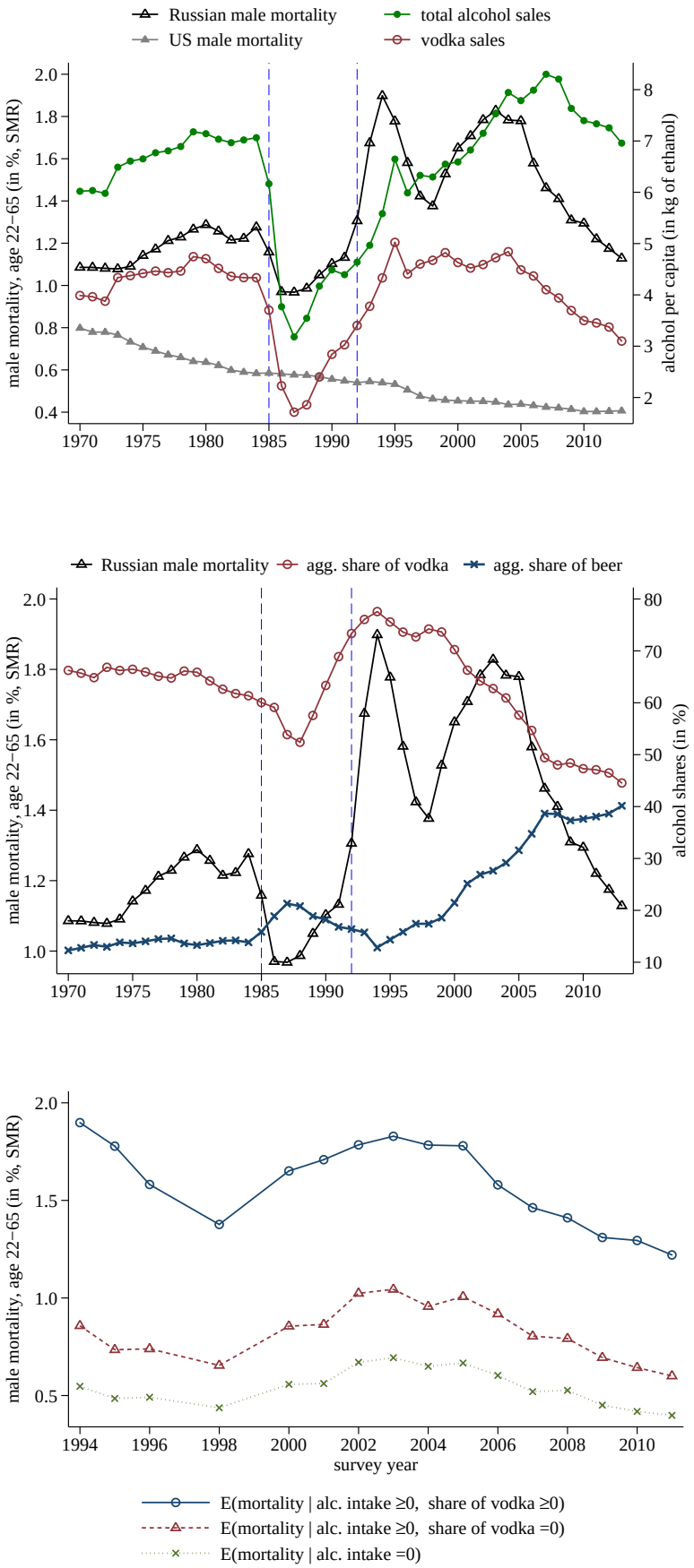
Notes: These figures show the design of the analysis (top) together with the estimated difference-in-difference (middle) and before-after estimates (bottom) for the anti-alcohol campaign experiment. Dashed lines are two standard error confidence bands using robust standard errors clustered by individual.

Figure 3 – Long-run effect of the beer-market expansion on relative alcohol preferences



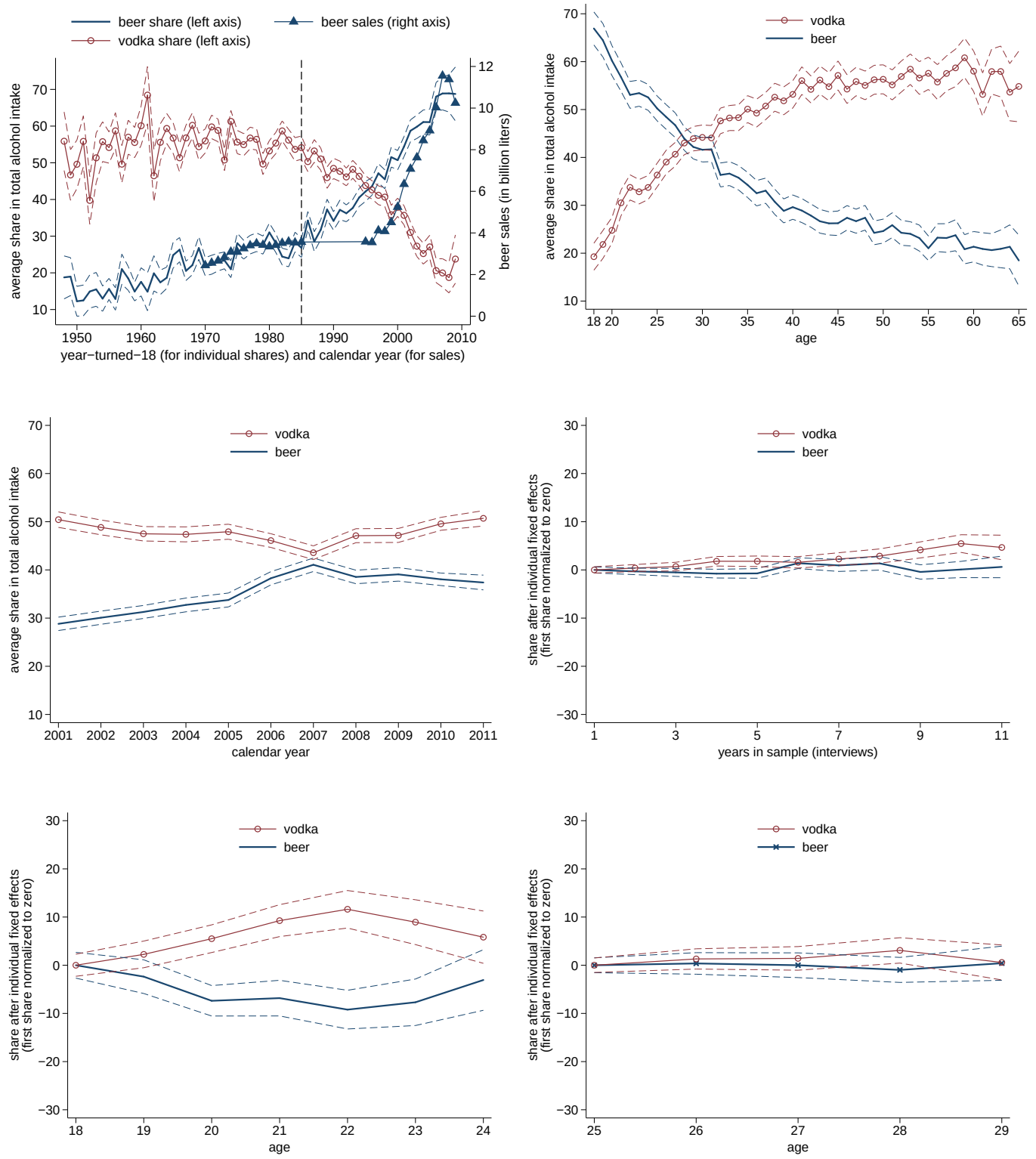
Notes: These figures show the regression design (top left) and the design for identifying the preference-forming years (top right) together with the corresponding results for the beer-market expansion analysis (bottom panels). The regressions control for the level of total alcohol intake, log of real 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 – The effect of different types of alcohol on mortality of working-age men



Notes: These figures show the effect of alcohol on mortality of working-age males age 22-65. Standardized mortality rates (SMR) use the U.S. standard population of 2000. Vertical blue dashed lines show the beginning of the Gorbachev anti-alcohol campaign in 1985 and the collapse of the Soviet Union at the end of 1991.

Figure 5 – Decomposition of male alcohol shares



Notes: These figures show the profiles of the shares of beer and vodka consumed for males. The dashed lines represent two standard error confidence intervals. The top-left panel shows the sample age profile. The top-left panel shows the shares by cohorts measured by when and individual turned 18. We also add the volume of beer sold in the year. The vertical dashed line marks the start of the anti-alcohol campaign. The top-right panel shows the age profile for working-age males. The middle left panel shows the average shares by survey year. The middle-right panel graphs the 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 similarly flat profiles for five-year age intervals from age 30 to 64.

Table 1: Summary statistics

Consumption measures	*Males: RLMS* N	Mean	St.Dev.	p75	*Females: RLMS* N	Mean	St.Dev.	p75
Alcoholic Beverages (individual consumption)								
Share of beer	46985	29.30	35.34	38.46	45182	22.64	35.45	32.89
Share of home-brewed beer (starts in 2008)	14363	0.06	1.47	0	45182	0.01	0.36	0
Share of vodka	46985	52.86	39.70	92.31	45182	34.87	42.06	78.43
Share of home-produced vodka (samogon)	46985	8.66	24.29	0	45182	3.66	17.02	0
Share of wine	46985	7.37	20.86	0	45182	35.69	42.27	100
Share of other alcohol	46985	1.81	10.87	0	45182	3.13	15.18	0
Other goods (household-level expenditures)	*Houshehold expenditure shares: NOBUS*							
Share of subtropical fruits in fresh fruits	5028	18.90	33.04	26.32				
Share of choclate in desserts	3350	83.07	35.35	100				
Share of long-lived milk in milk	7488	5.53	21.06	0				
Share of frozen fruits in preserved fruits	680	20.68	39.72	0				
Share of yogurt in breakfast	5914	54.45	40.07	100				
Share of salmon in salted fish	3650	25.77	41.84	60.42				
Share of chicken in meat (NOBUS)	9492	51.39	43.55	100				
Share of chicken in meat (RLMS)	6513	59.60	42.01	100				
Socio-economic demographics								
All consumers age 18 and above	*Males: RLMS*				*Females: RLMS*			
Age	68350	42.45	16.39	54	97431	46.89	18.48	62
Birth year	68350	1961.33	17.27	1975	97431	1957.35	19.19	1973
Total monthly real income (in liters of milk)	65688	233.70	404.16	288.28	93734	186.53	351.70	252.9
Subjective health status (1=very good, 5=very bad)	68186	2.73	0.73	3	97105	2.98	0.74	3
Body weight (in kg)	64114	76.47	13.62	85	89068	69.50	15.10	80
I(married)	68350	0.67	0.47	1	97431	0.51	0.50	1
I(college degree)	68290	0.38	0.49	1	97431	0.39	0.49	1
Proxy for I(turned 18 in an urban area)	68322	0.44	0.50	1	97375	0.45	0.50	1
Typical daily alcohol intake (in grams of ethanol)	68350	101.40	131.95	146	97431	28.65	49.56	40
I(no alcohol consumed in the past 30 days)	68350	0.3	0.46	1	97431	0.54	0.5	1
Individuals with positive alcohol intake								
Age	46985	41.38	15.43	52	45182	41.86	15.42	53
Birth year	46985	1962.41	16.35	1976	45182	1962.44	15.96	1975
Total monthly real income (in liters of milk)	45280	245.06	426.55	300.28	43787	216.12	437.36	285.71
Subjective health status (1=very good, 5=very bad)	46884	2.69	0.67	3	45068	2.86	0.62	3
Body weight (in kg)	44180	76.67	13.68	85	42313	68.88	14.53	78
I(married)	46985	0.68	0.46	1	45182	0.57	0.50	1
I(college degree)	46950	0.40	0.49	1	45182	0.46	0.50	1
Proxy for I(turned 18 in an urban area)	46972	0.45	0.50	1	45164	0.51	0.50	1
Typical daily alcohol intake (in grams of ethanol)	46985	144.69	133.75	200	45182	61.79	57.00	80

Table 2: Long-run effect of Gorbachev's anti-alcohol campaign on relative alcohol preferences

Dependent variable: Share of vodka (columns 1-7) or beer (8)	Baseline	Two control groups	Top quartile dropped	All adolescent before 1991	Full sample 1994-2011	Start at age 16	Female sample	Share of Beer
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I(urban) x I(adolescent in 1987-1991)	-6.540***		-6.095***	-7.108***	-5.144***	-5.597***	-6.043***	3.859**
	[2.065]		[2.094]	[2.031]	[1.742]	[1.903]	[2.152]	[1.787]
I(urban) x I(adolescent before 1987)		7.354***						
		[2.201]						
I(urban) x I(adolescent after 1991)		5.225**						
		[2.271]						
I(adolescent in 1987-1991)	4.774***		5.563***	5.069***	3.437***	3.401**	4.229**	-3.477***
	[1.531]		[1.621]	[1.518]	[1.297]	[1.464]	[1.807]	[1.266]
I(adolescent before 1987)		-4.947**						
		[2.039]						
I(adolescent after 1991)		-4.366**						
		[1.900]						
I(urban)	2.620**	-3.937**	2.544**	1.791*	0.536	2.639**	-0.987	0.101
	[1.043]	[1.981]	[1.115]	[0.930]	[0.770]	[1.071]	[1.076]	[0.842]
Alcohol intake (in grams of ethanol)	0.054***	0.054***	0.306***	0.050***	0.029***	0.054***	0.236***	-0.093***
	[0.004]	[0.004]	[0.007]	[0.003]	[0.002]	[0.004]	[0.012]	[0.004]
Relative price of beer to vodka	1.788	1.783	0.949	1.380	2.197	1.853	2.144	-1.219
	[2.025]	[2.022]	[1.948]	[1.861]	[1.627]	[2.031]	[4.014]	[1.635]
Log(real income)	0.557***	0.552***	0.543**	0.774***	0.324**	0.557***	0.092	0.807***
	[0.194]	[0.194]	[0.222]	[0.189]	[0.152]	[0.194]	[0.115]	[0.155]
Socio-economic demographics	YES	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Age FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	19,373	19,373	15,250	25,528	35,351	19,373	19,178	19,373
R-squared	0.100	0.101	0.235	0.099	0.128	0.100	0.194	0.179

Notes: Socio-economic demographic controls include education, martial status, body weight, and subjective health status. Robust standard errors, clustered by individual, are provided in parentheses. ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 3: Effect of relative alcohol preferences on male mortality

	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 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]
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]
Alcohol intake (liters of pure alcohol)	1.108**	0.750	0.897	0.902	1.354***	1.052**	1.091**	0.906
	[0.525]	[0.559]	[0.546]	[0.652]	[0.461]	[0.475]	[0.474]	[0.638]
Socio-economic demographics	YES	YES	YES	YES	YES	YES	YES	YES
Heavy drinking indicator				YES				YES
Observations	6,623	6,623	6,623	6,623	7,506	7,506	7,506	7,506

Panel B: Aggregate data, 1970-2013	(1)	(2)	(3)	(4)
Aggregate share of vodka sales (in %)	0.022***		0.024***	0.017**
	[0.003]		[0.006]	[0.007]
Aggregate share of beer sales (in %)		-0.035***	0.004	0.004
		[0.005]	[0.011]	[0.029]
Total alcohol sales per capita (liters of pure alcohol)	0.080***	0.106***	0.076***	
	[0.017]	[0.021]	[0.019]	
Vodka sales per capita (liters of pure alcohol)				0.128
				[0.099]
Beer sales per capita (liters of pure alcohol)				0.015
				[0.297]
Time trend	YES	YES	YES	YES
Observations	44	44	44	44
R-squared	0.778	0.692	0.778	0.789

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

Notes: In Panel A, socio-economic demographic controls include education, martial status, body weight, subjective health status, and indicators for whether the individual does not drink, whether he smokes, and whether he lives in an urban area. The heavy drinking indicator in column 4 identifies individuals in the top quartile of the total alcohol consumption distribution. Robust standard errors, clustered by individual, in parentheses. ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 4: Identification of long-run alcohol preferences using 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]
Socio-economic demographics		YES		YES			YES	YES
Region FE		YES		YES			YES	YES
Year FE		YES		YES			YES	YES
Age FE		YES		YES			YES	YES
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
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: Socio-economic demographic controls include education, martial status, body weight, and subjective health status. Robust standard errors, clustered by individual, are provided in parentheses. ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 5: Identifying long-run preferences for non-alcoholic goods

Dependent variable: Share of non-alcoholic goods	*share of new goods (NOBUS)*								*share of chicken (RLMS)*	
	all new goods	subtropical fruits	chocolate	yogurt	long-lasting milk	frozen fruits	salted salmon	chicken		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
I(born in 1990s)									16.232***	9.408*
									[4.465]	[4.945]
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]	[1.457]	[2.669]
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]	[1.704]	[2.359]
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]		[0.187]
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]		[0.846]
Average age of head of household and spouse										-0.103
										[0.074]
Relative price of chicken to pork										4.524
										[5.027]
Relative price of chicken to beef										-0.440
										[4.765]
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: Robust standard errors, clustered by household or individual, are reported in parentheses. ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively.