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Alcohol Consumption in an Empty Nest*

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Abstract

This paper contributes to the understanding of alcohol consumption in adulthood by investigating the impact of a specific life event: the transition to an empty nest, when adult children move out of the parental home. Our findings show a significant increase in alcohol consumption in an empty nest, characterised by more regular drinking patterns and a moderate increase in daily intake. The most affected groups include couples, high income individuals, those actively employed, and respondents aged 45-60. We also provide evidence on the mechanisms underlying this relationship, supporting a key role of relaxation and

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changes in time use.

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1 Introduction

In recent years, alcohol consumption in adulthood have become a significant social concern and a public health issue, driven by the combined effect of population aging and the rising trend in alcohol use within this demographic group (see, for instance, Office for National Statistics, 2021, 2018; Soler-Vila et al., 2019; Breslow et al., 2017; Rao and Roche, 2017). As a consequence of drinking habits, there has been an increase in alcohol-related health issues among older adults, leading to a rise in alcohol related hospital admissions.[1] For these reasons, there has been growing interest in understanding the determinants of alcohol consumption among older adults. This paper contributes to the analysis by examining the impact of a specific event: the transition to the empty nest, when adult children leave their parental home.

Even if nest leaving is an anticipated event, as parents are aware that their children will become adults and eventually move away, it determines a substantial change in everyday family life. Previous literature studied how parents may respond to this transition (Bareham and Seddon, 2022; Bouchard, 2014; Mitchell and Lovegreen, 2009). On the one hand, they may experience a loss after their children leave, determining negative outcomes, such as lone-

[1] For instance, in England during the first two decades of the 2000s, alcohol became a critical factor in determining disability among people in their 50s and 60s, and the proportion of hospital admissions primarily related to alcohol among those aged 65+ substantially increased (The Royal College of Psychiatrists, 2018).

liness and depression. On the other hand, the empty nest may be perceived as a relief and lead to an improvement in parental wellbeing. Another related strand of literature shows that drinking habits are influenced by life changes and transitions, such as job loss (Deb et al., 2011) or retirement of the spouse (Müller and Shaikh, 2018). We contribute to these studies by analysing, for the first time, how the an empty nest transition affects drinking behaviour of parents.

To this purpose we perform an empirical analysis using the English Longitudinal Study on Aging (ELSA), which is representative of the English population aged 50 and older. Crucially to our goal, the longitudinal dimension of the dataset allows us to control for individual unobserved heterogeneity, that is a potentially significant factor in shaping drinking behaviour.

Our results indicate that living in an empty nest increases alcohol consumption at the extensive and intensive margin. People in empty nests are more likely to drink (they have a 1 percentage point higher probability of having a drink in the last year), drink more regularly (about one extra day every 2 months) and consume more alcohol overall (about 6% more per week, which equates to roughly one-third of a drink per week on average). Heterogeneity analysis indicates that these results are driven by changes in behaviour of moderate drinkers, rather than non-drinkers or heavy drinkers. Hence, individuals living in an empty nest are more likely to drink alcohol 5/7 days a week, and experience a moderate increase in daily intake, averaging one additional drink on each drinking day. Moreover, this effect is particularly pronounced among couples, younger people (aged 45-60), those who are employed, and high-income individuals.

In the second part of the paper, we explore the mechanisms that explain how living in an empty nest influences parental drinking habits. Several potential channels may contribute to this effect. First, living in an empty nest may negatively impact parents' emotional well-being, leading to increased anxiety and depression. In turn, alcohol consumption may be used as a way to cope with this emotional distress, potentially resulting in higher levels of drinking. If adult children contribute only marginally to household expenses, the transition to an empty nest might alleviate financial pressures. This relaxation of monetary constraints could lead to a greater disposable income, potentially resulting in increased alcohol consumption. Finally, the departure of children can reduce daily demands and time constraints. Consequently, the empty nest may provide more opportunities for leisure and relaxation. To assess the relative importance of these mechanisms in explaining our results, we conduct additional analyses. We include control variables for potential mediators, such as symptoms of depression and indicators of social activities. Additionally, we use data from the UK Time Use Survey to compare the time use of individuals living with their children versus those who do not. Overall, our findings suggest that parents perceive the empty nest more as a relief than a loss. This perception appears to contribute to a moderate increase in alcohol use among parents, which is associated with greater relaxation and different use of leisure time.

The paper is organized as follows: Section 2 reviews the related literature. Section 3 discusses the data and variables, while Section 4 illustrates the estimation strategy. The main results are provided in Section 5. Section 6 concludes.

2 Related literature

Although we are not aware of any studies that assess how the "empty nest" – the situation where adult children leave the parental home – affects parents' alcohol consumption or health behaviour, two main strands of literature are related to our analysis. A first group of papers examines how living in an empty nest affect parents' mental health and emotional wellbeing. We discuss these studies in Section 2.1. Another strand of literature examines the determinants of drinking behaviour among the older adults. We review this literature in Section 2.2. Finally, in order to put our results into context, we illustrate the consequences and guidelines about alcohol consumption in Section 2.3.

2.1 The effect of the "empty nest"

Even if nest leaving is an anticipated event, as parents are aware that their children will become adults and eventually move away, it determines a substantial change in everyday family life. The effect of "the empty nest" has been studied in gerontology, psychology and sociology literature (see for instance Kristensen, König, and Hajek, 2021; Mitchell and Wister, 2015; Bouchard, 2014; Mitchell and Lovegreen, 2009).

Two competing psychological theories propose different hypotheses regarding the effect of nest leaving on parents (Bouchard, 2014). The *role loss* hypothesis suggests that parents experience a sense of loss after their children leave home, and predicts a decline in parental well-being when the role from which parents, particularly mothers, derive their sense of accomplishment ends. Early empirical research supports this hypothesis and indicates that parents, especially mothers and stay-at-home mothers, experience deleterious effects when their children leave home. This determines negative outcomes such as depression, alcoholism, identity crisis, and marital conflict. In contrast, the *role strain (relief)* perspective suggests that the empty-nest stage should lead to an improvement in parental well-being, as the presence of children at home increases exposure to stressors, such as daily demands, time constraints, and work–family conflicts. More recent evidence is in line with this theory, suggesting that the empty nest can be a positive time for parents, an opportunity for reconnection and a time to rekindle interests (Mitchell and Lovegreen, 2009).

Several factors are associated with the effect of the departure of children from home, and may contribute to explain this equivocal evidence. First, parents' characteristics such as age and working status determine how they deal with the departure of their children. Relatively younger parents report greater challenges associated with the transition to an empty nest. The smoother adjustment of older parents is explained by the fact that they had a longer period of mental preparation to ease into the transition (Mitchell and Lovegreen, 2009). Nest leaving can cause a midlife role loss for parents who work part-time or stay at home (Mitchell and Lovegreen, 2009). The weakening of the role loss impact over time may be related to the decrease in stay-at-home mothers. Also the frequency of contacts after nest leaving may play a relevant role. Tosi and Grundy (2019) find that regular parent-child contacts are associated with decreases in parents' symptoms of depression. Frequency of contacts may be easier if young adults live near to their parents after moving out and may be facilitated by the availability of digital communication (Kristensen, König, and Hajek, 2021).[2]

A number of papers investigating the impact of the empty nest focus on the so-called "boomerang moves", namely young adults who returned home after their initial leaving (Caputo, 2019; Tosi and Grundy, 2018; Courtin and Avendano, 2016; Aranda, 2015). These studies largely examine the Great Recession and show that parents with newly coresidential adult children experience an increase in depressive symptoms in Europe (Courtin and Avendano, 2016) and in the US (Caputo, 2019). However, this situation may be accentuated by young adults' problems of unemployment, financial distress, and marital instability. Boomerang moves could be distressing because they accompanied (and resulted from) an economic crisis.

The majority of papers in the literature implement cross-sectional empirical analyses. A few exceptions are Tosi and Grundy (2018) and Kristensen, König, and Hajek (2021) who use Fixed-Effect regression analyses, Courtin and Avendano (2016) who rely on an Instrumental variable estimation strategy (the instrument is the age, gender and country specific unemployment rate) and Aranda (2015) who uses a propensity score matching.

The closest papers to our analysis are Kristensen, König, and Hajek (2021) and Johar and Maruyama (2014). The former examine the longitudinal association between the transition to an empty nest and depressive symptoms and loneliness in Germany. They do not find any significant association, and claim that these results may be related to time and country

[2]Cultural background and expectations on reasons and timing for nest leaving are other factors that may contribute to explain heterogeneity in empirical findings (Mitchell and Lovegreen, 2009).

specific features, such as short distance between parents and children living areas and the increased use of digital communication. Johar and Maruyama (2014) study how parents' health in Indonesia is affected by coresidence, which represents the prevalent way to provide informal elderly care. They find worse health outcomes of elderly parents in coresidence.

2.2 The determinants of alcohol use of older adults

The relevance and consequences of alcohol use among the older adults stimulated research to understand its underlying causes. A first related factor is socialisation (Bareham and Seddon, 2022; Watt et al., 2014), that is one of the most common reasons for alcohol consumption among older adults (Bareham et al., 2019; Immonen, Valvanne, and Pitkälä, 2011). Even if the role of alcohol as a socialising factor is not unique to older age, social opportunities may reduce with aging, strengthening the positive correlation of alcohol use with social network and activity.[3]

Alcohol is also used by older adults to promote emotional wellbeing (Bareham and Seddon, 2022). This role reflects into two different aspects of drinking behaviour. On the one hand, people may drink to relieve depression, loneliness and anxiety (Immonen, Valvanne, and Pitkälä, 2011), supported by a positive correlation between depression and alcohol misuse (St. John, Montgomery, and Tyas, 2009). On the other hand, alcohol can prompt feelings of pleasure, and drinking can be a central part of rituals for relaxation. Drinking to relax, and appreciating the positive feelings associated with con-

[3]This association may not be linear. Soler-Vila et al. (2019) point out that social networks may rein in negative or unacceptable health behaviors, with social activity limiting heavy or binge drinking.

suming alcohol, are amongst the most common reasons older people in the UK report for alcohol use (Bareham and Seddon, 2022).

The role of alcohol in managing emotional wellbeing may become more significant following life transitions and life changes, common to older age (Bareham and Seddon, 2022; Soler-Vila et al., 2019). These transitions and the resulting changes in social networks could influence drinking behaviour.[4] In this context, literature studying the effect of other life changes on alcohol consumption can offer insights into the relevance of the empty nest transition for alcohol use. This evidence illustrates how important life changing events that affect households composition and habits may have spillover effects on individual behaviour. Retirement is a notable example, as both the departure of an adult child and the retirement of a family member can introduce comparable disruptions to family dynamics and time allocation. Müller and Shaikh (2018) examine the impact of own and partner's retirement on various health behaviors in Europe. Results show an increase in alcohol consumption following both own and partner's retirement;[5] the mechanisms behind this relationship, however, are not discussed. Eibich (2015) finds a significant and positive effect of retirement on self-reported health and mental health in Germany, and provides an illustration of the underlying mechanisms. He suggests three important mechanisms through which retirement affects health: (i) relief from work-related stress and strain; (ii) an increase in sleep dura-

[4]When evaluating similarities between different events, it is important to note that while some, such as a disease diagnosis or the loss of relatives, clearly lead to negative emotions, other events like retirement or empty nest may have ambiguous effects on stress, anxiety and depression.

[5]More precisely, they show that spousal retirement has a positive effect on the frequency of alcohol intake, the number of drinks consumed per day, and binge drinking. Own retirement also increases the frequency of alcohol intake, but not the amount consumed.

tion; and (iii) an increase in physical activity. Celidoni et al. (2020) do not find any significant response of drinking behaviour to retirement in Europe, although they estimate a significant response of diet habits. Finally, Deb et al. (2011) examines the impact of job loss on alcohol consumption of individuals older than 50 in the US. Their results show heterogeneity in the increase of alcohol consumption after a job loss.

2.3 Alcohol consumption and health

Alcohol consumption has long been associated with heightened morbidity and mortality, primarily linked to various causes including liver cirrhosis, mental health disorders, brain damages, multiple types of cancer, and pancreatitis (WHO, 2000). Initially, the prevailing notion was that only heavy alcohol intake posed significant risks, with a widely held belief that moderate consumption conferred health benefits, particularly in protecting against cardiovascular diseases. This belief was reinforced by media portrayal and the perceived positive social aspects of alcohol consumption. Thus, despite being a toxin and an altering substance with high potential for adverse effects, alcohol remained socially acceptable due to its perceived health "benefits".

However, studies as early as the 1990s, such as those by Yuan, Ross, and Gao (1997) and Hart and Hole (1999), cited in WHO reports, challenged this belief by suggesting that even moderate alcohol consumption could be detrimental to health. Over the past two decades, the medical community has increasingly reached a consensus that there is no safe level of alcohol consumption, or at the very least, the threshold for non-harmful consumption is lower than before. Guidelines from the UK National Health Service (NHS) recommend consuming no more than 14 units of alcohol per week, roughly equivalent to 6 pints of 4% beer or 6 standard (125ml) glasses of wine. The NHS website itself underscores the cautionary nature of its recommendations, stating that the 14-unit-per-week threshold is described as "low risk rather than "safe" because there's no safe drinking level".[6] Australian guidelines are even more stringent, lowering the threshold to 10 units per week (no more than 4 per day). They also clearly state that "the less you drink, the lower your risk of harm from alcohol" (Conigrave et al., 2021).

The medical rationale behind these recommendations extends beyond the scope of this discussion but can be summarized by two key points: firstly, the once-perceived positive effects of moderate alcohol consumption are now less certain, and secondly, there is a heightened understanding of the long-term adverse effects of alcohol, even in moderate amounts.

Moreover, to comprehensively assess the individual, social, and economic impacts of alcohol consumption, it is essential to consider also its non-medical consequences. These include motor vehicle accidents, injuries, increased aggression, and other significant negative effects that extend beyond traditional health considerations.

Finally, the consequences of alcohol consumption are more severe among older individuals. First, due to physiological changes associated with ageing, older adults have a reduced tolerance to alcohol. Moreover, there is potential for alcohol–drug interactions and alcohol use may exacerbate chronic health

[6] https://www.nhs.uk/live-well/alcohol-advice/the-risks-of-drinking-too-much/, accessed on May 13, 2024.

problems. For these reasons, older adults are at increased risk of adverse effects from relatively modest levels of intake (Bareham and Seddon, 2022; Soler-Vila et al., 2019; Deb et al., 2011). According to Breslow et al. (2017), the US National Institute on Alcohol Abuse and Alcoholism recommends that men and women aged 65+ limit consumption to no more than 3 drinks on any day and 7 drinks per week.

3 The data

For the study, we use The English Longitudinal Study of Ageing (ELSA) dataset (Banks et al., 2024), which collects data on health, social, wellbeing and economic circumstances in England. The ELSA sample has been designed to represent people aged 50 and over, living in private households, along with their spouses. Information is also collected about children and household composition. The ELSA dataset possesses two key features that make it particularly valuable for our study: first, it focuses on individuals aged 50 and over, which aligns with our target age group; second, its long-lasting panel structure enables us to observe the same individuals over nearly 20 years and helps mitigate the effects of unobserved heterogeneity in regression models. For the analysis we select waves 1 to 9, covering the period 2002/2003-2018/2019, before the outbreak of the COVID-19 pandemics. Most of the variables used in the analysis are taken from the harmonized ELSA dataset (version G.3), which specifically derives variables that are consistent over time, complemented by original variables whenever necessary.

The working sample for this study is smaller than the complete ELSA sample. First, we select individuals (sampled household heads or their partners) aged 45 to 75.[7] On one hand, individuals younger than 45 are underrepresented in ELSA, as they are outside the target group. On the other hand, alcohol (non-)consumption of individuals older than 75 maybe less related to their free choice and progressively more conditioned by health status and other conditions outside their control. Second, we exclude from the sample all individuals who do not have children, since the concept of "nest leaving" is meaningless in this case.[8] Third, to exploit the longitudinal dimension of the dataset, we only consider individuals observed at least twice, with no missing values in the relevant variables in each period. Finally, we exclude all "boomerang children", namely observations referred to individuals whose children move back to live with parents. Indeed, the effects of the "nest leaving", that is children leaving their origin household to start a new household, and the effects of the "boomerang children" moving back to their origin household after the "failure" of their previous household are not symmetric and cannot be analyzed jointly (see also Caputo, 2019; Courtin and Avendano, 2016). The resulting sample size for the baseline model is 50,189 observations, constituted by 14,224 respondents observed, on average, 3.5 times. Descriptive statistics are shown in Table 1.

Empty nest. Household respondents in the ELSA survey are asked to identify all household members, which can include biological children, adopted children, foster children, and step-children. A household is defined to have

[7]We also check the robustness of our results in the 50-75 sample.

[8]We also check the robustness of our results also to this sample restriction, including in the sample also individuals with no children.

a co-resident child if the respondent reported that any child co-resides with respondent or spouse. The variable of interest, *Empty nest*, takes a value of 1 if the respondent has children who do not live with parents and 0 if they have children living in the household. The distribution of the share of waves with co-residing children by household is plotted in Figure 1. A significant portion of respondents do not live with their children during any of the waves we observe (represented by the first bar labeled "0 waves"). In some cases, respondents co-reside with their children throughout all the waves (represented by the last bar). The remaining observations reflect situations where an empty nest occurs only during certain periods of the analysis.

Alcohol consumption. The outcome of the study is alcohol consumption. However, there are several ways to define and measure alcohol consumption, each one with own characteristics and possible interpretations. Given the data availability, we choose three different measures of alcohol consumption:

1. *Ever drink*: this is a binary variable taking value 1 if the respondent has had at least one alcoholic drink during the last 12 months and 0 otherwise. This variable refers to the "extensive margin" of alcohol consumption, identifying only the relatively small share of nondrinkers. This measure is available in all waves.

2. *Drinking days per week*: this variable measures the number of days the respondent reported having an alcoholic drink in the previous seven days. It is particularly useful to describe "habitual" alcohol consumers, even if there are no information about the quantity of alcohol intakes.

A value of 0 is assigned to all individuals who reported not to have had a drink in the last seven days. This measure is available from Wave 2 onward.

3. *Drinks per week*: this is the number of drinks the respondent reported drinking during the last 7 days. Also in this case, a value of 0 is assigned to all individuals who reported they did not have any drink in the previous week. We use both the level and the inverse hyperbolic sine of the variable, that allows to measure the percent variation without losing non-positive values as for the traditional logarithmic transformation. Unfortunately, this variable is available only from Wave 4 onward. A word of caution is useful here on the definition of "drinks": ELSA surveys the respondent as to the number of measures of spirits, glasses of wine, and pints of beer. This variable is the sum of these three different types of drinks. However, this concept of drink is different from "alcohol unit" that is a standard measure of alcohol consumption and is used in the medical literature and in the guidelines reviewed in the previous section. Just as an example, a pint of beer with 5.2% volume of alcohol corresponds to 3 alcohol units and a 175ml glass of wine at 12% contains 2.1 alcohol units.

In the empirical analysis we use all the three variables to give a more nuanced picture of the change in alcohol consumption habits in an empty nest. A graphical representation of their distribution in our sample is plotted in Figures 2 - 4.

Figure 5 presents the age and cohort profiles of alcohol consumption in our sample, focusing on the three margins we analyse. To this purpose we distinguish between 5 cohorts: those born before 1940, between 1941-45, 1946-50, 1951-55, and after 1956. For each cohort, alcohol consumption remains relatively flat or slightly declines with age. A notable decrease in drinking is observed only in the number of drinks per week, which drops by 1-2 drinks after the age of 65. When comparing alcohol consumption dynamics across cohorts, we see a reduction in drinking intensity among the youngest cohorts, although the differences across cohorts are relatively modest.

4 The empirical strategy

The aim of the empirical analysis is to identify the possible causal relation between empty nest, as defined in the previous section, and alcohol consumption. In doing this, we rely on the longitudinal dimension of the dataset, which allows us to observe the same individual before and after the emty nest transition and to control for the time-invariant unobserved heterogeneity. Indeed, there are several individual features, of parents and children, that may simultaneously affect children's decision to leave (or stay in) the parental household and parental alcohol consumption habits. Some of them, such as household composition and job status, are observable and included among regressors. Many others, such as gender, cohort of birth, education, lifetime income, preferences, values and traits, risk aversion, of both parents and children, are time invariant and captured by individual fixed effects. As a result, we estimate the following equation:

$$Drink_{it} = \alpha Empty_{it} + \beta X_{it} + w_t + c_i + \varepsilon_{it} \quad (1)$$

where subscripts i and t denote individual and time period, respectively. $Drink_{it}$ measures alcohol consumption, either at the extensive or intensive margins and $Empty_{it}$, the variable of interest, captures whether there are no children living in parental home at time t. w_t denotes wave dummies, c_i is the individual fixed effect and ε_{it} is the idiosyncratic error term. We also add a vector of time varying controls, X_{it}, that includes in the baseline specification only the household composition, more specifically whether the parent has a partner in the household, and the job status, that is whether the parent has a job. Notably, many observable individual characteristics cannot be explicitly included in the model since they are time invariant and therefore collinear to the individual fixed effects. The advantage of controlling for unobservable characteristics comes at the cost of not being able to evaluate the effect of such variables on drinking habits.

There are two possible sources of endogeneity that may bias the results. The first is reverse causality: in principle, parents' alcohol consumption and drinking habits may influence children's decision to leave or stay in the household. However, we believe this mechanism is only at work when drinking habits are pathological and can be assimilated to a health condition, but with unclear effects, since individuals may actually decide to *leave* parental household due to alcoholic parents or to provide care to parents *through coresidence*. Whenever alcohol consumption is within a non-pathological range, we believe that reverse causality is a negligible issue. To rule out this mechanism, we show the robustness of the main findings to excluding individuals drinking more than 36 drinks per week (corresponding to the top centile in the number of drinks). Moreover, it is worth noting that, in our empirical framework, reverse causality does not refer to individual specific alcohol habits which are time invariant. Unobserved heterogeneity (c_i in equation 1) also includes attitudes toward alcohol use such as whether parents are binge drinkers or typically consume moderate amounts of alcohol. Our estimate results are robust to any correlation between unobserved heterogeneity and regressors, including the "Empty" variable.

The second source of endogeneity is omitted variable bias. Our baseline specification employs Fixed-Effect methods, robust to the correlation between time-invariant unobserved heterogeneity and the regressors. However, a source of concern relates to the potential correlation of living in an empty nest with time-varying unobserved confounders, which may not be fully captured by the unobserved heterogeneity. To address this issue, we check the robustness of our baseline results after controlling for some of the observable factors that may jointly influence nest leaving decisions and alcohol consumption, such as health status, income and wealth shocks.[9] Moreover, we exploit the methodology developed by Oster (2019) to evaluate the possible degree of omitted variable bias under the assumption that the selection on the observed controls is correlated to the selection on unobservables.[10]

[9]We decide not to include these variables in the baseline model for two main reasons: one is that some of these variables have a larger number of missing values, thus reducing the sample size; the other is that they may suffer from reverse causality issues.

[10]More precisely, following the parametrization suggested by Oster (2019), we assume that the degree of variation which can be accounted for by both observed and unobserved

Finally, we can assess the heterogeneous effect of time-invariant observable individual characteristics by interacting the individual variable with the empty nest indicator in the baseline regression model. In this case, the regression model takes the following form:

$$Drink_{it} = \alpha Empty_{it} + \gamma Empty_{it} \times Char_i + \beta X_{it} + w_t + c_i + \varepsilon_{it} \quad (2)$$

where the variables have the same meaning as in Eq.(1) and $Empty_{it} \times Char_i$ is the interaction between the empty nest variable and the time-invariant observable individual characteristic. In case the characteristic is time-varying at individual level, such as for job status, marital status or income quantile, then the non-interacted term ($Char_{it}$) is added as follows:

$$Drink_{it} = \alpha Empty_{it} + \delta Char_{it} + \gamma Empty_{it} \times Char_{it} + \beta X_{it} + w_t + c_i + \varepsilon_{it}. \quad (3)$$

5 Results

Table 2 shows the results of the baseline model for the three dependent variables we consider in the analysis. Column (1) describes the effect of empty nest at the "extensive margin", that is whether individuals reported any alcohol consumption in the previous 12 months. Individuals living in an empty nest have a 1 percentage point higher probability of having had an

variables is proportional to the variance explained by the covariates. Also, $R_{max} = 1.3\tilde{R}$, where R_{max} is the R^2 obtained in the hypothetical regression of the dependent variable on both observed and unobserved regressors; $\tilde{R}$, is the R^2 of the regression of the dependent variable on observables. Bryan et al. (2022) apply this methodology in a longitudinal framework using Fixed-Effect methods.

alcoholic drink during the last year, once controlling for having a partner, having a job, the year of the interview and all the time-invariant individual characteristics. Descriptive statistics show that 89.4% of the sample reported alcohol consumption in the last 12 months. There are then two ways to interpret this coefficient: on the one hand, living in an empty nest increase by about 1% (0.009/0.894) the probability of drinking alcohol; on the other hand, living with children decreases the probability of drinking alcohol by about 8.5% (0.009/0.106), a much more sizable result. Living in a couple and having a job do not seem to have significant effects on the probability of alcohol consumption, once controlling for age, gender, preferences, and so on.

Columns (2) – (4) show the effect of the empty nest on the "intensive margin", quantified by the frequency of alcohol consumption (2) and the number of drinks per week, measured in linear terms (3) and using the inverse hyperbolic sine transformation (4). As for drinking days per week, the marginal effect is significant and equal to 0.118, that is about one additional day every two months (an effect of 0.118 days per week corresponds to one day every $7/0.118 = 59.3$ days). Regarding the number of drinks per week, living in an empty nest increases the number of alcoholic drinks by 0.431 per week. While this effect may seem relatively low, it is useful to recall the difference between drinks and alcohol units discussed in section 2.2. A pint of beer at 5.2% alcohol volume corresponds to 3 alcohol units. 0.43 of this drink is then equivalent to more than 1 alcohol unit, that is about 7% of maximum consumption according to the UK guidelines (14 alcohol units per week). If we consider that alcohol consumption is on average 5.8 drinks per week – that is very close or slightly above to the maximum recommended quantity – a 7% marginal increase may easily result in exceeding the threshold. A more conservative back of the envelope estimate that considers an average of 2 alcohol units per drink leads to an effect of about .85 alcohol unit, still remarkable. Results in Column (4) focus on the effect in relative terms. On average, the alcohol consumption in an empty nest increases by about 5.6%. Considering the distribution of alcohol consumption, this corresponds to about one fifth of drinks at the median (3 drinks per week), half drink at 75th percentile (8 drinks per week) and one drink at 90th percentile (16 drinks per week). These effects are even larger if we compute the intensive margins on drinkers only (see the next subsection), disregarding from these estimates the individuals who reported 0 drinks in the last week, that is 10,359 over 30,585 individuals. In addition, alcohol consumption declines over time, *ceteris paribus*. The effects of wave dummies are all negative and increasing in absolute values for all the outcomes considered in the analysis. It is important to note that, in this context, time and age effect cannot be separately identified. Once we control for the year of birth through the unobserved heterogeneity, age and time are indeed collinear.

Finally, the last line of Table 2 reports the degree of selection on unobservables relative to observables (the parameter δ) that would be necessary to explain away the results. With the exception of the extensive margin (column 1), the absolute value of δ is always greater than the rule of thumb cut-off of 1 indicated by Oster (2019), which suggests $|\delta| > 1$ leaves limited scope for unobservables to explain the results.

5.1 Robustness checks

This section aims to assess the robustness of the results by considering alternative sample selections and empirical specifications that might impact our findings. We start considering alternative sample selections. The samples used to estimate the equation for alternative outcomes in Table 2 differ due to the availability of outcome variables across waves: The extensive margin variable is asked in every wave, while the other two variables are only included starting from wave 2 or wave 4. Table 3 shows the results on a consistent sample of 30,411 individuals observed in waves 4-9. The main results are confirmed, although the statistical significance of the extensive margin is reduced.

The decision to include in the baseline sample only individuals with children is somewhat arbitrary, although sensitive. However, if we include in the reference group also individuals who have no living children results are virtually unchanged (Table 4). Table 5 illustrates the intensive margins when restricting the sample to individuals who actually drank alcohol in the past year. As expected, the effects are larger compared to the baseline model by about 10-15%, reinforcing the relevance of nest leaving in explaining alcohol consumption.

In cases of heavy or binge drinking, the living arrangements of adult children may be influenced by their parents' alcohol use. This could result in children either living with their parents longer to provide support or leaving earlier due to difficult living environment. To address this potential reverse causality and ensure robustness of our findings, we exclude from our estimation sample individuals who consume more than 36 drinks per week, which corresponds to the top percentile in terms of the number of drinks. Table 6 confirm the robustness of the results in this sample.

We also check the robustness of our findings to the potential correlation in the error term within the same household and to the inclusion of potentially relevant omitted variables. Individuals within the same household can influence each other's alcohol consumption behavior. To account for this, we cluster standard errors at the household level. However, we exclude individuals from the sample who change partners during the panel, as the panel dimension must be nested within clusters, and individuals who switch clusters need to be removed from the sample. Results, reported in Table 7, indicate that the effects are slightly larger and more significant compared to the unclustered model. Consequently, we opt to use the more conservative unclustered model as our benchmark, which has a larger sample size and includes individuals who change partners.

Shocks to parental health or their financial situation may jointly influence nest leaving decisions and alcohol consumption. We check the robustness of our baseline findings to the inclusion of these variables in Table 8, that reports estimate effect of the "Empty nest" variables when controlling for, alternatively, subjective health status, (inverse hyperbolic sine of) total household income and (inverse hyperbolic sine of) non-housing financial wealth. The significance and magnitude of our findings is robust to this alternative specifications.

Our empirical framework is, in principle, well-suited for the application of the estimator recently proposed by Callaway and Sant'Anna (2021), which accounts for variations in treatment timing in a two-way fixed-effects environment. However, in practice, the efficiency of this estimator is highly dependent on the availability of a balanced panel. Whenever the panel is not balanced, the authors suggest to rely on the repeated cross section version of the estimator (Appendix B in Callaway and Sant'Anna, 2021; Rios-Avila, Sant'Anna, and Callaway, 2021). Following their approach, we estimate the effect of nest leaving on drinking habits using the new estimator: results are displayed in Figure 6, where the average treatment of the treated is plotted before and after the last child left parental home, and are consistent with the main results of the paper. Overall, there is a positive effect of nest leaving on alcohol consumption, this effect being relatively small and not very persistent over time.

5.2 Non linearities and heterogeneity

As illustrated in Section 5, we find, a relevant and significant effect of nest leaving on alcohol consumption. On average, parents living in an empty nest drink about 0.2 more days and 0.4 more drinks per week. However, this average effect can be unevenly distributed across the population, depending on individual drinking habits. For instance, it may be driven by heavy drinkers increasing their alcohol intake or by moderate consumers beginning to drink on a more regular basis. To explore this further, we separately estimate the probability of drinking at least a certain number of days per week (0-7 days) and the probability of consuming at least a certain number of drinks per week (0-14 drinks). Estimate results for drinking days and number of drinks are plotted in Figures 7 and 8, respectively.[11] Figure 7 indicates that living in an empty nest increases the probability of drinking more regularly, namely 5/7 days a week, while Figure 8 shows an increased probability of consuming at least 4/7 drinks per week. Overall, these findings suggest that individuals living in an empty nest tend to adopt more regular drinking habits, with a moderate increase in daily alcohol intake (about one drink on each drinking day).

In addition, there are several observable individual characteristics that may influence the estimated effect of empty nest on alcohol consumption. We investigate these possible sources of heterogeneity by estimating fixed effects models with interacted terms as in Eq.(2) and Eq.(3). From both kinds of models we compute the marginal effects by categories and we plot the results for all dependent variables.[12] Understanding which individuals change their alcohol consumption in response to nest leaving is important for at least two reasons. First, it contributes to a more comprehensive understanding of this phenomenon, which is essential for designing effective policy interventions. Second, this evidence can provide some intuition about the channels behind the relationship between nest leaving and alcohol consumption. We will discuss the latter aspect in the next section.

A relevant source of heterogeneity seems to be the marital status. Figure 9 shows that the effects are significant only for individuals living with a partner, that are individuals who do not end up living alone after the last child leaves the household of origin. A second time-varying characteristic

[11] Estimate results are shown in Tables A.1 and A.2 in Appendix A.

[12] The sample used in these and following models in this subsection is the same as the baseline model in Table 2.

that has an impact on the estimated coefficient is the job status (Figure 10). Keeping constant age and cohort, alcohol consumption increases significantly in an empty nest only for individuals with a job, while the impact is not statistically significant for individuals without a job. In addition, individuals with income above the median seem to increase alcohol consumption more than poorer individuals (Figure 11), even after controlling for job status.

As for time-invariant characteristics, the effect of empty nest on alcohol consumption declines sharply with age (Figure 12), the effect becoming insignificant after the age of 65. It is worth noting that we cannot separately identify here the effect of age and cohort, which both contribute in explaining the evidence in Figure 12. Descriptive evidence in Figure 5 shows that alcohol consumption exhibits a declining pattern with both age and cohort. The effect declines also with children age (Figures 13 and 14), that is however correlated (0.75) to individual age. Finally, there are no clear trends for college graduate (Figure 15) and gender (Figure 16). In short, nest leaving increases alcohol intake mostly for couples, individuals with high income, those actively employed, and respondents aged 45-60.

A way to assess the magnitude of the estimated effect of nest leaving on alcohol intake is by comparing it to the impact of other major life events. While no prior studies have specifically examined the effect of nest leaving, a relevant comparison can be made with the retirement of a spouse. Unlike one's own retirement, which involves changes in own daily activities, or unemployment, which brings financial and psychological stress, a spouse's retirement represents a significant transition without these additional burdens. To our knowledge, Müller and Shaikh (2018) is the only study that analyze the impact of a spouse's retirement on various outcomes, including drinking habits, across European countries. However, direct comparison remains challenging. First, their study focuses on individuals around the official retirement age and estimates the impact on "retirement age compliers"—those who retire due to eligibility for old-age pensions. This group tends to be more educated, married, and predominantly female than the average old person in their sample, aligning closely with those most affected by nest leaving (Section 5.2). Second, differences in data collection methods further complicate comparisons. Müller and Shaikh (2018) measure alcohol consumption frequency using categorical variables and intensity as the number of drinks per day, whereas our study measures intake on a weekly basis. Despite these differences, we find a comparable impact on the number of drinking days per week. Spouse retirement leads the typical individual in the sample to increase their drinking frequency from "once or twice a week" to "three/four days a week" or "five/six days a week". This is in line with results in Figure 7. Similarly, the effect of spouse retirement on drinking intensity is comparable to the impact of nest leaving. Müller and Shaikh (2018) report an increase of 2.8 drinks per day, affecting an average of 2.4 days per week. This translates to approximately 0.5 additional drinks per week, a magnitude comparable to our finding for couples (Figure 9.)

5.3 Potential mechanisms

Alternative mechanisms might explain the positive relationship between living in an empty nest and alcohol consumption, as discussed in Section 2.

First, parents may perceive their children's departure as a significant role loss, which can negatively affect their emotional well-being and increase anxiety and depression (Bouchard, 2014; Mitchell and Lovegreen, 2009). Alcohol consumption might then be used as a way to alleviate this emotional distress (Bareham and Seddon, 2022; Immonen, Valvanne, and Pitkälä, 2011), potentially explaining the observed link between empty nest and higher alcohol consumption. Second, living without children could ease financial constraints, especially if coresident children contributed only marginally to household expenses. Therefore, an increase in disposable income associate with nest leaving may determine an increase in alcohol use. Finally, the absence of children can reduce the exposure to stressors, such as time constraints, family tensions and daily demands (Bouchard, 2014). This reduction in stress might lead to a more active social life, which is often associated with increased alcohol use (Watt et al., 2014). Additionally, drinking can became a central part of rituals for relaxation (Bareham and Seddon, 2022). Thus, the use of alcohol for relaxation may be linked to a different use of leisure time, and not necessarily with social activities.

To evaluate the relative importance of these mechanisms in explaining our results, we conduct two additional analyses. First, we extend our baseline regression by including variables that may act as mediators, such as symptoms of depression and indicators of social activities. If the results remain robust to this augmented specification, it would suggest that the examined mediators have a limited role in explaining the relationship between living in an empty nest and alcohol consumption. Second, we use data from the UK Time Use Survey to compare the time use of individuals living with their children versus those who do not. The results from these two analyses, combined with insights from the heterogeneity analysis in Section 5.2, contribute understanding the mechanisms behind our main findings.

Regarding the first analysis, we include additional controls to the baseline regression model (Eq.(1)): depressive symptoms (measured by the CESD score, on a scale from 0, no symptoms of depression, to 8, maximum symptoms);[13] satisfaction with life (on a 1/7 scale; average from 5 questions); a dummy indicator for whether respondent had any frequent (i.e., at least weekly) contact with any of their relatives or friends in person;[14] an indicator for participation in social activities (member of an organization, club or society and attends at least one committee meeting in a year).

Table 9 shows that, although the additional controls do impact drinking behaviors, they do not affect the relationship between living in an empty nest and alcohol consumption. None of the variables added weaken the effect of empty nesting on alcohol use, suggesting that these channels do not significantly mediate our findings.

In particular, depression symptoms and satisfaction with life, that are usually invoked by the literature, are not key drivers of increased alcohol use in an empty nest. This interpretation is supported by the association between "Empty nest" and individual depression symptoms. Fixed-Effect regressions reported in Table 10 show that who leaves in an empty nest is less likely to report negative symptoms, such as feeling depresses, sad or that

[13]The depression symptoms to construct the CESD indicator are: Felt depressed; Feeling that everything was an effort; Sleep was restless; Felt happy; Felt lonely; Felt sad; Felt he/she could not get going; Felt he/she enjoyed life.

[14]Results are robust to alternative definitions of regular meeting with friends.

everything is an effort, and more likely to report positive ones, such as being happy. These results support the "role strain relief" rather than the "role of loss" hypothesis (Bouchard, 2014). This interpretation is also supported by the heterogeneity results discussed in the previous section, showing that the effect of empty nest is stronger for individuals who are less exposed to loneliness and depression, namely younger, married and working respondents. An alternative channel could be related to liquidity constraints, which may be tighter when parents coreside with their adult children. However, as discussed in the previous section, the effect of empty nest on alcohol consumption is stronger for high-income individuals, suggesting that liquidity constraints play only a minor role in explaining our main results.

Overall, our findings seem to suggest that the effect of an empty nest on alcohol use may be driven by relaxation and a different use of time for parents who do not coreside with their adult children.

To gain a deeper understanding of how parents' time use changes following their children's departure, we analyze data from the UK Time Use Survey 2014-2015. This survey tracks respondents' daily activities through a time diary, allowing us to provide additional evidence on the relevance of the mechanisms discussed above. We analyze differences in daily activity patterns between individuals with and without co-resident children to understand how living in an empty nest influences household behavior and alcohol consumption. For this purpose, we select a sample designed to mimic the ELSA sample used for the baseline analysis. We focus individuals aged 45-75, who are or have been in a stable relation, namely those who are married, cohabiting divorced, separated or widowed. The sample consists of 6745 observations, namely 3374 individuals who fill the time diary in a weekend, a working day or both. The UK Time Use Survey also includes some socio-demographic characteristics, including whether they co-reside with children. It is then possible to compute correlations between living with/out children and the time use individuals allocate to several daily activities. Since in the corresponding ELSA sample (aged 45-75 who have been in a stable relation), only 12% of respondents in this group do not have children, this analysis provides an approximate description of the role of empty nest, althought the cross-sectional nature of the dataset do not allow to control for unobservable traits. All the activities are hierarchically grouped, and we select those related to the mechanisms we want to investigate.[15] After controlling for covariates that proxy for socio-economic status, family type and attitudes,[16] we compare time use of individuals whith/out coresiding children. Results of the correlation between empty nest and and the minutes per day spent on each of these activities are show in Figure 17. Individuals living in an empty nest spend more then 30 minutes less in activities related to household and family care. Among them, respondents reduce by about 7 minutes per day the time spent in both food management and household upkeep. On the other hand, on average, they spend 6 more minutes in gardening and pet care, 20 more minutes sleeping, watching TV (20 minutes) and reading (3

[15] There are 11 categories: Personal care/sleep, Employment, Study, Household and family care, Volunteer work and meetings, Social life and entertainment, Sports and outdoor activities, Hobbies and games, Mass media, Travel, Other. We exclude Study and the residual category.

[16] The other covariates included are: gender, age and age squared, employment status, relationship status (couple), age at which education was completed, income and income squared, whether the individual has income from investments, managerial job status, housing tenure, car ownership, and whether the observation refers to a weekday.

minutes). Finally, we also find that people living in an empty nest significantly increase the number of times they eat or drink out by 10% (0.4 times a month, with an average of 4 times a month; this result is not reported in the figure). The results from this analysis confirm our previous findings, supporting the role strain (relief) perspective. Specifically, we observe a reduction in time spent on house chores and an increase in time allocated to resting and leisure activities. Overall, these findings align with the notion that relaxation plays a significant role in explaining the relationship between living in an empty nest and increased alcohol consumption.

6 Conclusion

This paper is a first attempt to investigate the consequences of nest leaving on alcohol consumption and to quantify its effects. The estimates presented in the paper show that, on average, individuals aged 45-75 in the UK increase their alcohol consumption by about $5-6\%$ after their children leave the parental home. Although we are not able to definitely determine the mechanisms that lead to this result, our findings suggest that the increase in alcohol consumption is likely attributable to a "relaxation effect", due to more free time and reduced stress from cohabitation. In contrast, there seems to be no role for depressive symptoms or (dis)satisfaction with life. Notably, the alcohol consumption increases among younger individuals, with a job, with a higher income, living in a couple, and with a higher educational level.

Quantifying the exact costs of increased alcohol consumption in terms of health and economic impacts is challenging. However, we can attempt some back of the envelope estimates. As for health status, the most recent literature shows that there is no "safe" alcohol consumption, and progressively lowered the recommended maximum consumption thresholds. The medical literature has identified various thresholds for alcohol-related diseases, which are influenced by factors such as age, gender, weight and other morbidity conditions, that make a quantification beyond the scope of the present paper. However, it is important to notice that the increase in alcohol consumption estimated in this paper is not negligible, especially because it refers to an adult and elderly population, that is at higher risk for health issues.

Regarding economic costs, several papers have attempted to estimate both direct and indirect societal costs of alcohol consumption (see among others the reviews by Thavorncharoensap et al., 2009; Manthey et al., 2021). These estimates are often tentative and can vary widely. For instance, Gavurova and Tarhanicova (2021) try to rationalize the methodology to estimate alcohol-related costs and apply it to excessive alcohol consumption in the Czech Republic, estimating the cost at 2.32 billions of US$, which is approximately 0.66% of GDP. However, the literature reviews show that there is no agreement in the literature about the definition of direct and indirect alcohol-related costs, with direct costs ranging from 4% to 52% (Thavorncharoensap et al., 2009, Table 5). In the context of the United Kingdom, Scarborough et al. (2011) provide an estimate of the economic cost to the NHS related to diet, physical inactivity, smoking, alcohol and overweight/obesity. The direct economic cost of alcohol is estimated at about 3.3 billions GBP (about 0.2% of 2006-2007 GDP). This figure likely underestimates the total cost, as it only accounts for direct NHS costs and excludes other direct costs and all indirect costs. Estimating the economic costs of alcohol consumption following nest leaving among individuals aged 50 or older is highly complex and falls beyond the scope of this paper. However, given the broader estimates of alcohol-related costs and the rising healthcare expenditures in recent decades, even a modest change in the quantity and frequency of alcohol consumption could have a significant impact on the economic burden borne by society. Moreover, as empty nest is experienced by the vast majority of parents, the seemingly small magnitude of its effect may be amplified at the population level.

Policy interventions aimed at reducing alcohol use and abuse have often focus on older adults in empty-nest households, such as the UK program "*Drink Wise Age Well*" (see, for instance, the advertisement in Figure 18). Our findings on the significant increase in alcohol intake after nest leaving support such initiatives, while our heterogeneity and channel analyses offer insights for enhancing their effectiveness. Our study shows that alcohol consumption tends to increase after children leave home, particularly among younger, employed individuals with higher incomes, higher education levels, and living with a partner. This increase appears to stem from a sense of "relaxation" rather than depression. Notably, it is not concentrated among heavy drinkers but instead reflects a shift toward more regular drinking, with a moderate rise in daily intake. These findings suggest that targeted interventions and awareness campaigns could be more effective in addressing the risks of increased alcohol use when specifically aimed at these groups of lone parents. Such efforts should emphasize the potential harms of moderate but sustained alcohol consumption, which is common among those experiencing empty nest syndrome. By raising awareness of these risks, policies can better prevent and manage the long-term consequences of shifting drinking behaviors.

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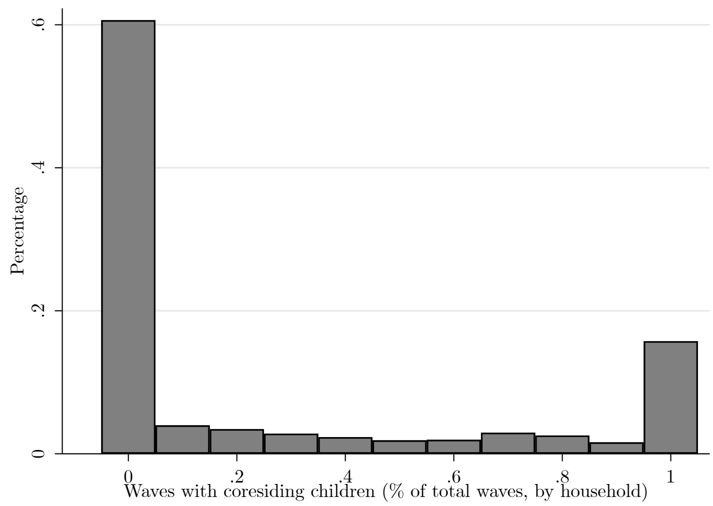
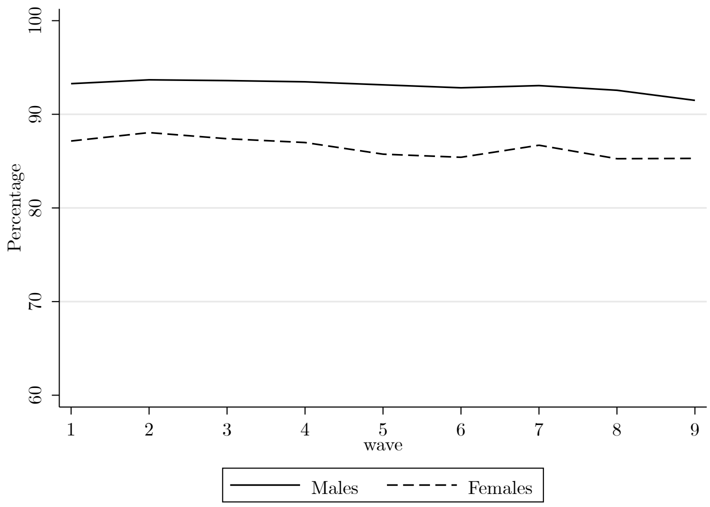
Figures

Figure 1: The '*Empty nest*': Within-household distribution



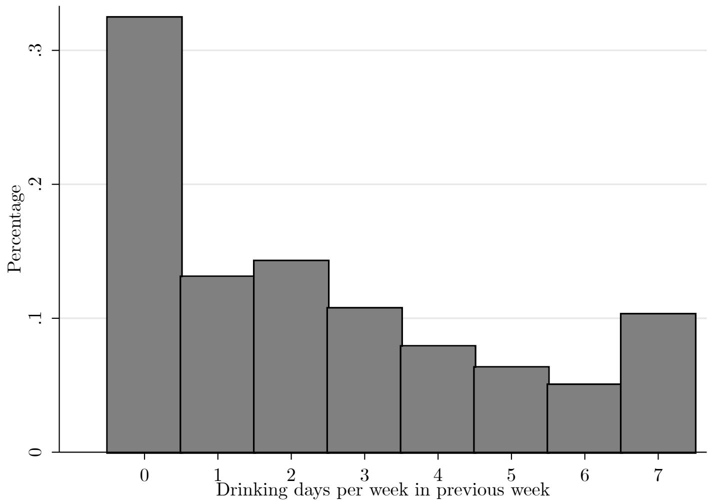
Notes: ELSA waves 1-9. We calculate, for each household, the ratio of the number of waves in which a coresident child is observed to the total number of waves the household is observed. The graph displays the distribution of this ratio across households.

Figure 2: The '*Ever drink*': Descriptive dynamics



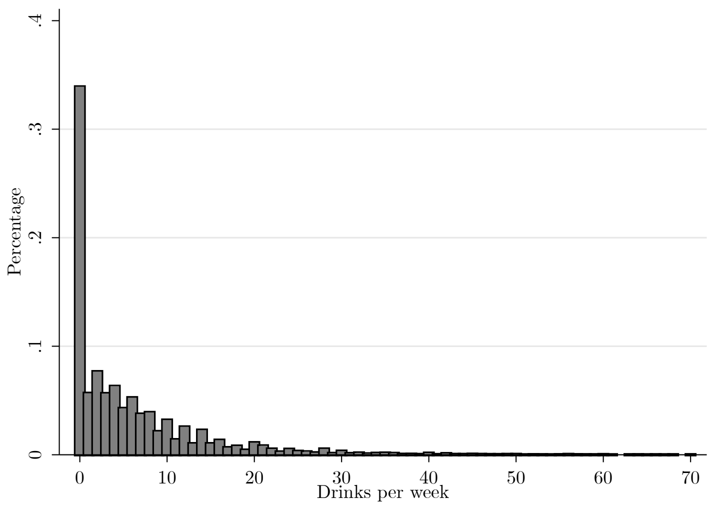
Notes: ELSA waves 1-9. '*Ever drink*' a binary variable taking value 1 if the respondent has had at least one alcoholic drink during the last 12 months and 0 otherwise. The graph shows the percentace of respondents with *Ever drink* =1, by gender and wave.

Figure 3: ‘*Drinking days per week*’: Distribution



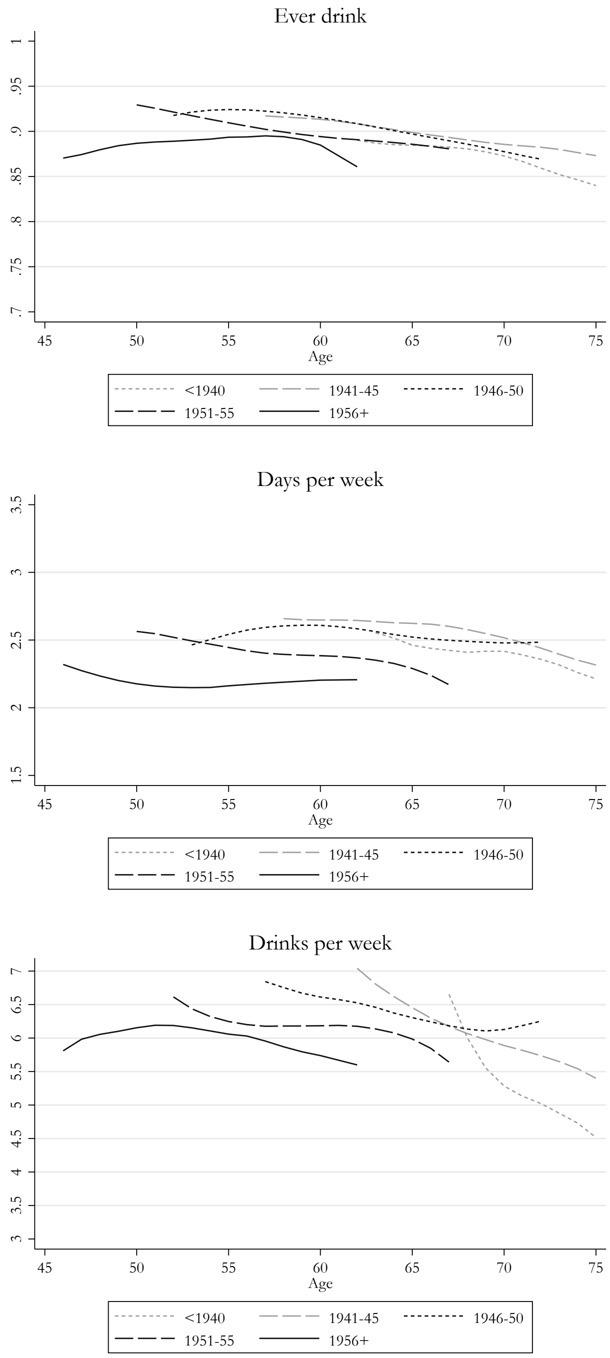
Notes: ELSA waves 2-9. The graph shows the variable‘*Drinking days per week*’, measuring the number of days the respondent reported having an alcoholic drink in the previous seven days; a value of 0 is assigned to all individuals who reported they did not have any drink in the previous week.

Figure 4: ‘*Drinks per week*’: Distribution



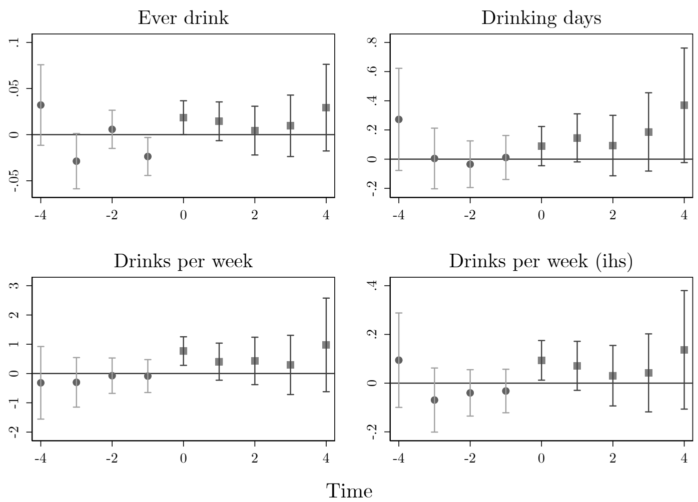
Notes: ELSA waves 4-9. The graph shows the distribution of the number of drinks the respondent reported drinking during the last 7 days; a value of 0 is assigned to all individuals who reported they did not have any drink in the previous week.

Figure 5: Descriptives: Cohort-age patterns of alcohol consumption



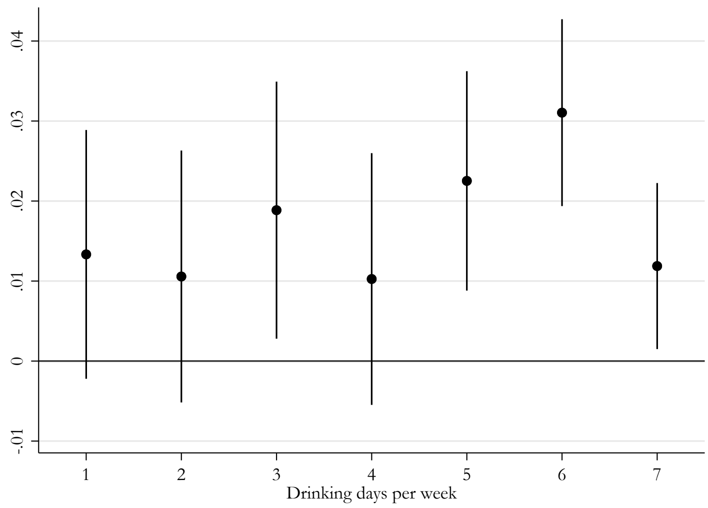
Notes: Age profiles of alcohol consumption, by cohort. The three panels plots, respectively, the outcomes '*Ever drink*', '*Drinking days per week*' and '*Drinks per week*' deined in Section 3. Graphs are obtained by applying a smoothness filter (local OLS regression). Age-cohort cells with less than 200 observations are excluded.

Figure 6: Callaway and Sant'Anna (2021) estimators



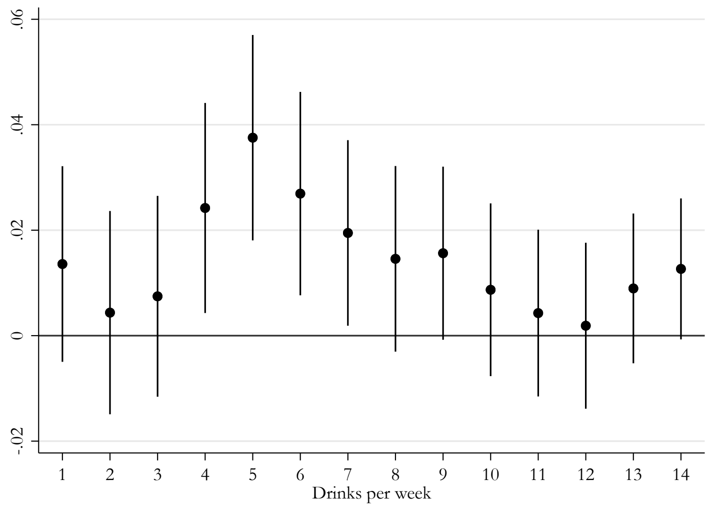
Notes: Average treatment of the treated and confidence intervals (90% level). Control variables as in the baseline model. Consistent sample: 19,129 in waves 4-9.

Figure 7: Non linearities: drinking days per week (ihs)



Notes: The graph shows the marginal effect and confidence intervals (90% level) of empty nest on the probability of drinking at least X days per week. Estimate results are reposrted in Table A.1.

Figure 8: Non linearities: drinks per week (ihs)

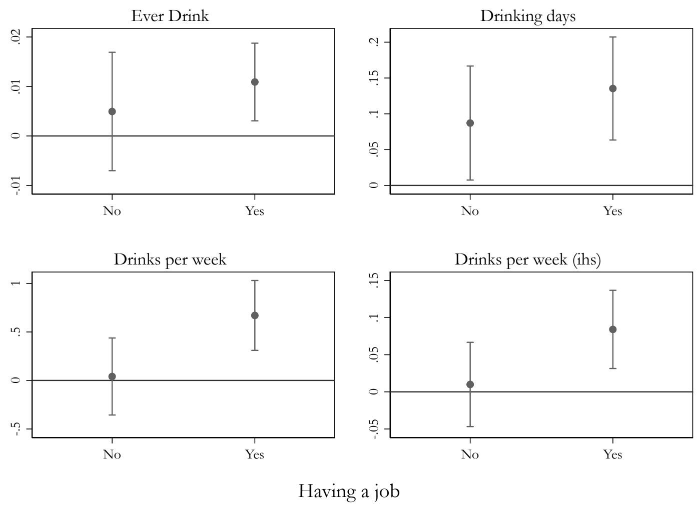


Notes: The graph shows the marginal effect and confidence intervals (90% level) of empty nest on the probability of drinking X drinks per week. Estimate results are reposrted in Table A.2.

Figure 9: Heterogeneity: Marital status

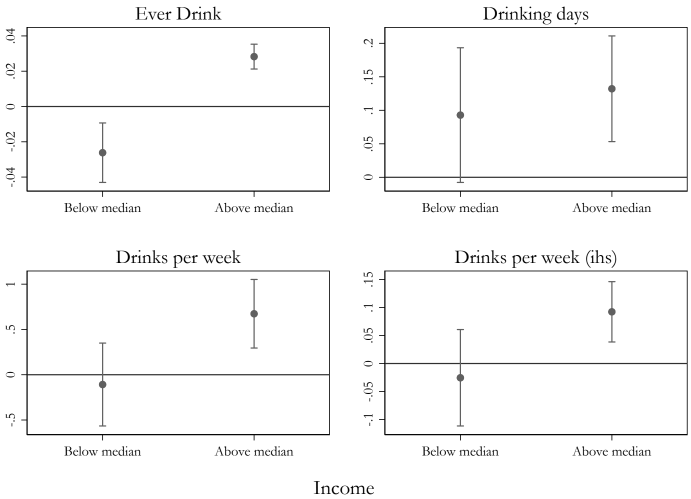
Notes: Marginal effect and confidence intervals (90% level) of variable *Empty* obtained by the FE estimate in eq.(3). The average values of dependent variables in the estimating sample for singles and couples are: Ever drink: 0.84 (S) and 0.91 (C); Drinking days per week: 1.90 (S) and 2.51 (C); Drinks per week: 4.67 (S) and 6.11 (C).

Figure 10: Heterogeneity: Job status



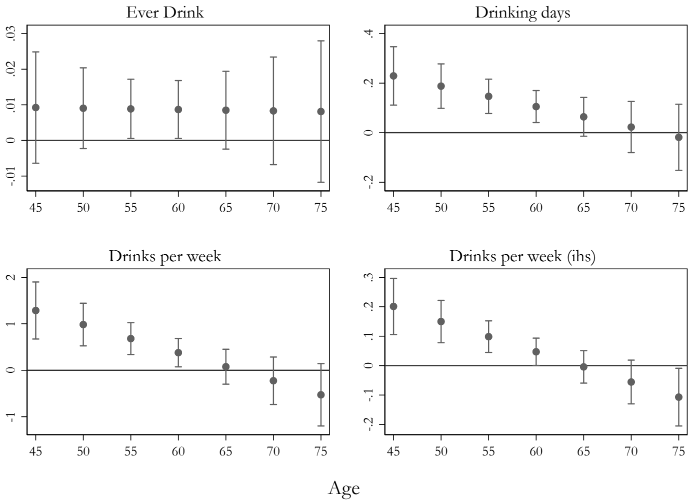
Notes: Marginal effect and confidence intervals (90% level) of variable *Empty* obtained by the FE estimate in eq.(3). The average values of dependent variables in the estimating sample for working/Not working respondents are: Ever drink: 0.87 (NW) and 0.93 (W); Drinking days per week: 2.30 (NW) and 2.52 (W); Drinks per week: 5.44 (NW) and 6.45 (W).

Figure 11: Heterogeneity: Income distribution



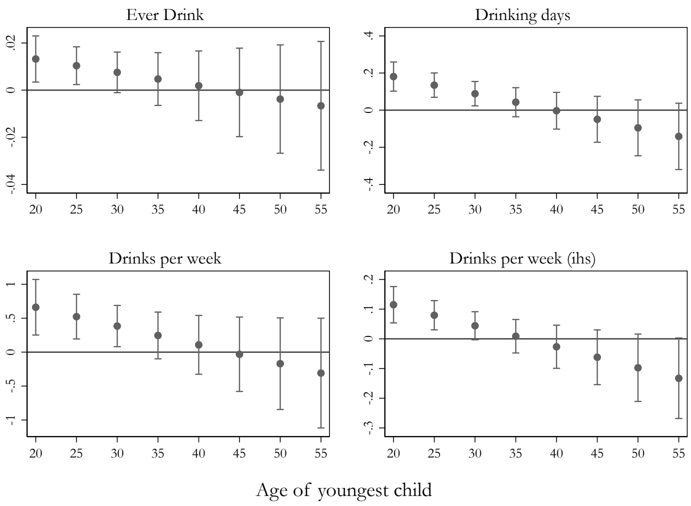
Notes: Marginal effect and confidence intervals (90% level) of variable *Empty* obtained by the FE estimate in eq.(3). The average values of dependent variables in the estimating sample for bottom/top sample are: Ever drink: 0.85 (B) and 0.94 (A); Drinking days per week: 1.82 (B) and 2.87 (A); Drinks per week: 4.88 (B) and 7.24 (A).

Figure 12: Heterogeneity: Age



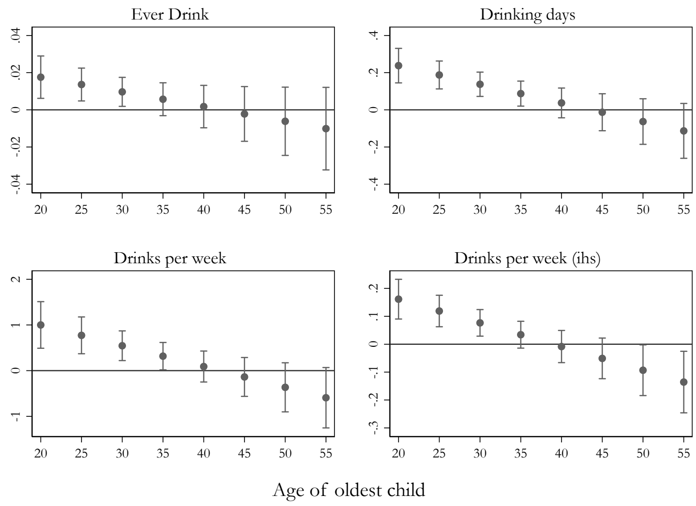
Notes: Marginal effect and confidence intervals (90% level) of variable *Empty* obtained by the FE estimate in eq.(2).

Figure 13: Heterogeneity: Age of youngest child



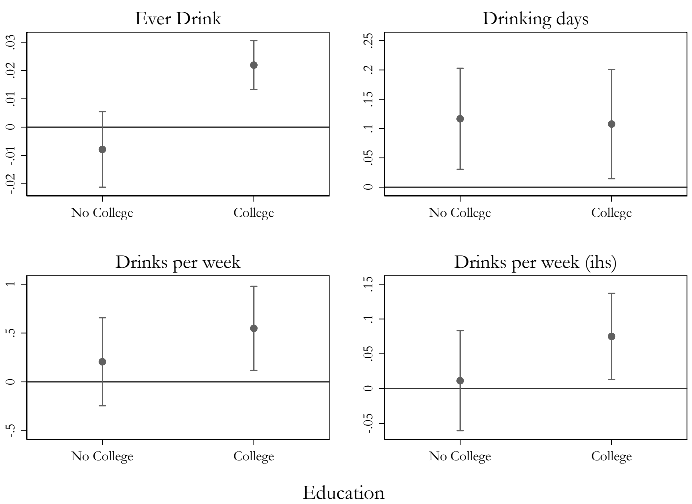
Notes: Marginal effect and confidence intervals (90% level) of variable *Empty* obtained by the FE estimate in eq.(3).

Figure 14: Heterogeneity: Age of oldest child



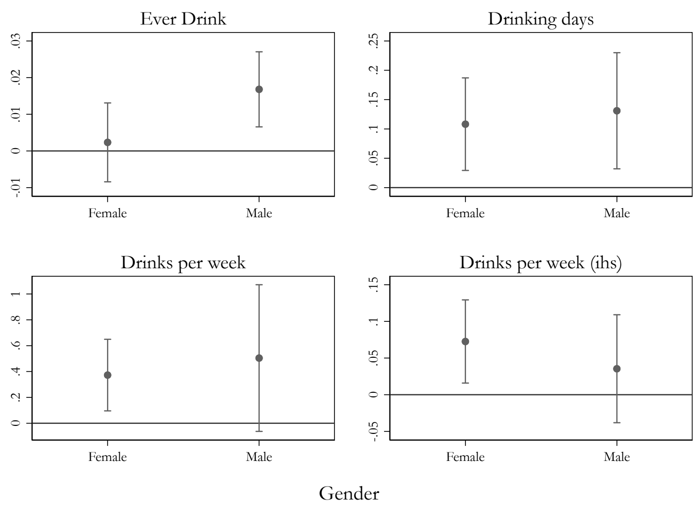
Notes: Marginal effect and confidence intervals (90% level) of variable *Empty* obtained by the FE estimate in eq.(3).

Figure 15: Heterogeneity: Educational level



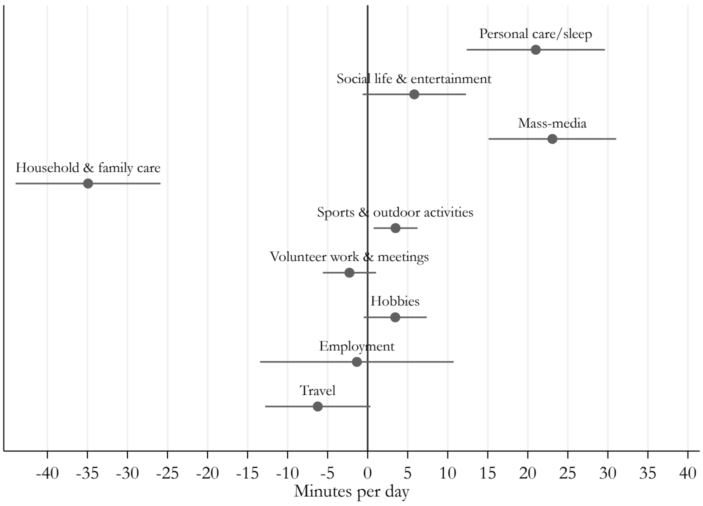
Notes: Marginal effect and confidence intervals (90% level) of variable *Empty* obtained by the FE estimate in eq.(2). The average values of dependent variables in the estimating sample for females and males are: Ever drink: 0.87 (NC) and 0.93 (C); Drinking days per week: 2.01 (NC) and 2.90 (C); Drinks per week: 4.90 (NC) and 7.02 (C).

Figure 16: Heterogeneity: Gender



Notes: Marginal effect and confidence intervals (90% level) of variable *Empty* obtained by the FE estimate in eq.(2). The average values of dependent variables in the estimating sample for females and males are: Ever drink: 0.87 (F) and 0.93 (M); Drinking days per week: 1.99 (F) and 2.91 (M); Drinks per week: 4.12 (F) and 8.06 (M).

Figure 17: Correlation between *Empty* and time use (UK Time Use Survey)



Notes: Estimated coefficient and confidence interval (90%) for variable *Empty*, based on UK Time Use Survey 2014-15. OLS regressions, robust standard errors. Sample includes: Couples, widowed, separated and divorced individuals age 45-70 (6745 obs). Also includes: gender, age and age squared, work, couple, age finished education, income and income squared, whether income from investments, managerial job, housing tenure, car ownership, whether refers to weekday.

Figure 18: Drink Wise, Age Well Programme

Source: drinkwiseagewell.org.uk.

Tables

Table 1: Descriptive statistics

Variable	Mean	Std. Dev.
Outcome variables		
Ever drink	0.894	0.308
Drinking days per week	2.39	2.375
Drinks per week	5.832	8.464
Drinks per week (ihs)	1.646	1.384
Independent variables		
Empty nest	0.723	0.448
Couple	0.805	0.396
Work	0.397	0.489

Notes: Statistics are computed on the baseline sample for each variable: *Ever drink*: 50189 observations (waves 1-9); Drinking days per week: 41226 observations (waves 2-9); Drinks per week: 30585 observations (waves 4-9). Statistics for the independent variables are based on the larger sample: 50189 observations (waves 1-9).

Table 2: Baseline model

	(1) Ever drink	(2) Drinking days per week	(3) Drinks per week	(4) Drinks (ihs) per week
Empty nest	0.009*	0.118***	0.431**	0.056**
	(0.005)	(0.039)	(0.185)	(0.028)
Couple	0.003	0.047	-0.235	-0.061*
	(0.008)	(0.056)	(0.240)	(0.037)
Work	-0.003	0.005	-0.028	0.004
	(0.004)	(0.028)	(0.141)	(0.019)
Wave 2	-0.015***	.	.	.
	(0.003)	.	.	.
Wave 3	-0.026***	-0.018	.	.
	(0.004)	(0.025)	.	.
Wave 4	-0.037***	-0.082***	.	.
	(0.004)	(0.027)	.	.
Wave 5	-0.046***	-0.174***	-0.140	-0.057***
	(0.004)	(0.028)	(0.105)	(0.013)
Wave 6	-0.060***	-0.210***	-0.364***	-0.101***
	(0.005)	(0.031)	(0.101)	(0.015)
Wave 7	-0.067***	-0.282***	-0.641***	-0.154***
	(0.005)	(0.034)	(0.112)	(0.016)
Wave 8	-0.079***	-0.368***	-0.819***	-0.208***
	(0.006)	(0.036)	(0.128)	(0.019)
Wave 9	-0.089***	-0.411***	-0.849***	-0.241***
	(0.006)	(0.039)	(0.145)	(0.021)
Constant	0.927***	2.441***	6.140***	1.767***
	(0.008)	(0.059)	(0.255)	(0.038)
Obs.	50189	41226	30585	30585
Oster δ for $\beta = 0$	-0.621	-1.652	-2.573	-1.226

Notes: *** p<0.01, ** p<0.05, * p<0.1. Fixed-Effect estimates; Robust standard errors in parentheses.

Table 3: Robustness check: Consistent sample

	(1) Ever drink	(2) Drinking days per week	(3) Drinks per week	(4) Drinks (ihs) per week
Empty nest	0.005	0.122***	0.438**	0.054*
	(0.006)	(0.045)	(0.183)	(0.028)
Couple	-0.009	0.029	-0.250	-0.065*
	(0.010)	(0.067)	(0.242)	(0.037)
Work	-0.001	0.021	-0.029	0.002
	(0.004)	(0.032)	(0.142)	(0.019)
Wave 5	-0.008***	-0.090***	-0.142	-0.054***
	(0.003)	(0.022)	(0.105)	(0.013)
Wave 6	-0.024***	-0.125***	-0.370***	-0.100***
	(0.004)	(0.026)	(0.101)	(0.015)
Wave 7	-0.031***	-0.200***	-0.628***	-0.151***
	(0.004)	(0.028)	(0.112)	(0.016)
Wave 8	-0.043***	-0.286***	-0.810***	-0.206***
	(0.005)	(0.031)	(0.128)	(0.018)
Wave 9	-0.054***	-0.322***	-0.827***	-0.240***
	(0.006)	(0.036)	(0.145)	(0.021)
Constant	0.916***	2.388***	6.133***	1.769***
	(0.009)	(0.066)	(0.256)	(0.038)
Obs.	30411	30411	30411	30411

Notes: *** p<0.01, ** p<0.05, * p<0.1. Fixed-Effect estimates; Robust standard errors in parentheses. The table reports estimation results based on the sample in which all outcome variables are observed.

Table 4: Robustness check: Inclusion of individuals with no living children

	(1) Ever drink	(2) Drinking days per week	(3) Drinks per week	(4) Drinks (ihs) per week
Empty	0.008*	0.103***	0.516***	0.067**
	(0.004)	(0.036)	(0.174)	(0.026)
No child	0.007	0.102**	0.169	0.022
	(0.005)	(0.043)	(0.219)	(0.030)
Couple	-0.000	0.025	-0.134	-0.043
	(0.007)	(0.052)	(0.223)	(0.034)
Work	-0.002	-0.013	0.048	0.008
	(0.003)	(0.025)	(0.124)	(0.017)
Wave 2	-0.013***	.	.	.
	(0.003)	.	.	.
Wave 3	-0.024***	-0.007	.	.
	(0.003)	(0.023)	.	.
Wave 4	-0.036***	-0.080***	.	.
	(0.004)	(0.025)	.	.
Wave 5	-0.047***	-0.168***	-0.121	-0.059***
	(0.004)	(0.026)	(0.095)	(0.012)
Wave 6	-0.060***	-0.204***	-0.360***	-0.101***
	(0.004)	(0.028)	(0.092)	(0.013)
Wave 7	-0.068***	-0.289***	-0.651***	-0.155***
	(0.005)	(0.030)	(0.103)	(0.015)
Wave 8	-0.079***	-0.361***	-0.729***	-0.199***
	(0.005)	(0.033)	(0.115)	(0.017)
Wave 9	-0.089***	-0.410***	-0.808***	-0.240***
	(0.006)	(0.036)	(0.132)	(0.019)
Constant	0.930***	2.512***	6.152***	1.771***
	(0.007)	(0.053)	(0.228)	(0.034)
Obs.	59377	49194	36801	36801

Notes: *** p<0.01, ** p<0.05, * p<0.1. Fixed-Effect estimates; Robust standard errors in parentheses. The sample includes individuals with no living children in the reference group.

Table 5: Robustness check: Drinkers only

	(1) Drinking days per week	(2) Drinks per week	(3) Drinks (ihs) per week
Empty nest	0.130***	0.500**	0.064**
	(0.042)	(0.204)	(0.031)
Couple	0.069	-0.238	-0.068*
	(0.062)	(0.272)	(0.041)
Work	-0.005	-0.060	-0.004
	(0.030)	(0.154)	(0.020)
Wave 3	-0.009	.	.
	(0.028)	.	.
Wave 4	-0.082***	.	.
	(0.030)	.	.
Wave 5	-0.178***	-0.133	-0.058***
	(0.031)	(0.117)	(0.014)
Wave 6	-0.214***	-0.380***	-0.103***
	(0.035)	(0.114)	(0.016)
Wave 7	-0.289***	-0.674***	-0.158***
	(0.037)	(0.126)	(0.018)
Wave 8	-0.375***	-0.821***	-0.210***
	(0.040)	(0.141)	(0.020)
Wave 9	-0.419***	-0.862***	-0.242***
	(0.044)	(0.164)	(0.023)
Constant	2.709***	6.844***	1.977***
	(0.066)	(0.288)	(0.042)
Obs.	36762	27183	27183

Notes: *** p<0.01, ** p<0.05, * p<0.1. Fixed-Effect estimates; Robust standard errors in parentheses. The sample is restricted to individuals who have consumed at least one alcoholic drink in the last 12 months.

Table 6: Robustness check: Excluding outliers

	(1) Ever drink	(2) Drinking days per week	(3) Drinks per week	(4) Drinks (ihs) per week
Empty nest	0.006	0.119***	0.338**	0.056**
	(0.006)	(0.045)	(0.138)	(0.028)
Couple	-0.009	0.034	-0.153	-0.059
	(0.010)	(0.068)	(0.193)	(0.037)
Work	-0.000	0.024	0.012	0.006
	(0.004)	(0.032)	(0.096)	(0.019)
Wave 5	-0.008**	-0.089***	-0.203***	-0.057***
	(0.003)	(0.022)	(0.069)	(0.013)
Wave 6	-0.024***	-0.124***	-0.360***	-0.100***
	(0.004)	(0.026)	(0.077)	(0.015)
Wave 7	-0.031***	-0.197***	-0.573***	-0.150***
	(0.004)	(0.029)	(0.083)	(0.016)
Wave 8	-0.043***	-0.280***	-0.754***	-0.204***
	(0.005)	(0.031)	(0.094)	(0.018)
Wave 9	-0.054***	-0.320***	-0.817***	-0.239***
	(0.006)	(0.036)	(0.106)	(0.021)
Constant	0.915***	2.338***	5.620***	1.730***
	(0.009)	(0.067)	(0.194)	(0.038)
Obs.	30236	30074	30240	30240

Notes: *** p<0.01, ** p<0.05, * p<0.1. Fixed-Effect estimates; Robust standard errors in parentheses.Individuals who consumed more than 36 drinks per week (the top percentile in terms of the number of drinks) are excluded from the estimation sample.

Table 7: Robustness check: Clustered standard errors

	(1) Ever drink	(2) Drinking days per week	(3) Drinks per week	(4) Drinks (ihs) per week
Empty nest	0.011**	0.113***	0.500***	0.066**
	(0.005)	(0.043)	(0.188)	(0.031)
Couple	0.009	-0.013	-0.377	-0.071*
	(0.010)	(0.070)	(0.279)	(0.042)
Work	-0.004	0.000	-0.037	0.000
	(0.004)	(0.030)	(0.145)	(0.020)
Wave 2	-0.016***	.	.	.
	(0.003)	.	.	.
Wave 3	-0.028***	-0.012	.	.
	(0.004)	(0.027)	.	.
Wave 4	-0.040***	-0.082***	.	.
	(0.004)	(0.030)	.	.
Wave 5	-0.047***	-0.163***	-0.135	-0.056***
	(0.005)	(0.031)	(0.113)	(0.014)
Wave 6	-0.061***	-0.197***	-0.309***	-0.094***
	(0.005)	(0.034)	(0.107)	(0.016)
Wave 7	-0.070***	-0.272***	-0.629***	-0.155***
	(0.006)	(0.037)	(0.119)	(0.018)
Wave 8	-0.080***	-0.351***	-0.817***	-0.204***
	(0.006)	(0.039)	(0.133)	(0.020)
Wave 9	-0.091***	-0.392***	-0.834***	-0.234***
	(0.007)	(0.043)	(0.153)	(0.023)
Constant	0.922***	2.491***	6.216***	1.771***
	(0.009)	(0.070)	(0.286)	(0.043)
Obs.	46306	37971	28220	28220

Notes: *** p<0.01, ** p<0.05, * p<0.1. Fixed-Effect estimates; Standard errors in parentheses are robust and cluster at the household level.

Table 8: Robustness check: Additional controls.

	(1) Ever drink	(2) Drinking days per week	(3) Drinks per week	(4) Drinks (ihs) per week
		Baseline model		
Empty nest	0.009*	0.118***	0.431**	0.056**
	(0.005)	(0.039)	(0.185)	(0.028)
Obs.	50189	41226	30585	30585
		Control for subjective health		
Empty nest	0.009*	0.103**	0.431**	0.056**
	(0.005)	(0.041)	(0.185)	(0.028)
Good health status (self-reported)	0.005*	0.120***	0.284***	0.073***
	(0.003)	(0.022)	(0.092)	(0.014)
Obs.	44779	35873	30576	30576
		Control for income		
Empty nest	0.010**	0.128***	0.415**	0.060**
	(0.005)	(0.040)	(0.183)	(0.029)
Total hh income (ihs)	0.003*	-0.001	0.094**	0.019***
	(0.001)	(0.010)	(0.042)	(0.006)
Obs.	49310	40518	30055	30055
		Control for wealth		
Empty nest	0.010**	0.125***	0.409**	0.058**
	(0.005)	(0.039)	(0.183)	(0.029)
Non-housing financial wealth (ihs)	-0.000	0.005***	0.005	0.003**
	(0.000)	(0.002)	(0.009)	(0.001)
Obs.	49316	40521	30058	30058

Notes: *** p<0.01, ** p<0.05, * p<0.1. Fixed-Effect estimates; Robust standard errors in parentheses. Regressors included and not shown: work, couple, wave dummies. The top panel reposrts estimate results from Table 2. The top panel reports estimation results from Table 2. The following panel reports estimation results when including variables for good health status, household income, and non-housing financial wealth.

Table 9: Mediating factors

	(1) Ever drink	(2) Drinking days per week	(3) Drinks per week	(4) Drinks (ihs) per week
		Baseline model		
Empty nest	0.009*	0.118***	0.431**	0.056**
	(0.005)	(0.039)	(0.185)	(0.028)
Obs.	50189	41226	30585	30585
		Depressive symptoms		
Empty nest	0.009*	0.114***	0.412**	0.052*
	(0.005)	(0.039)	(0.185)	(0.028)
Depressive symptoms	-0.000	-0.036***	-0.068**	-0.025***
	(0.001)	(0.006)	(0.027)	(0.004)
Obs.	49946	41098	30486	30486
		Life satisfaction		
Empty nest	0.005	0.121***	0.457**	0.055*
	(0.005)	(0.039)	(0.186)	(0.028)
Life satisfaction	0.004**	0.050***	0.072	0.025***
	(0.002)	(0.011)	(0.051)	(0.007)
Obs.	41196	40743	30197	30197
		Friends and family		
Empty nest	0.010**	0.119***	0.524***	0.069**
	(0.005)	(0.040)	(0.192)	(0.029)
Weekly contacts	0.004	0.038*	0.192**	0.043***
	(0.003)	(0.020)	(0.092)	(0.015)
Obs.	46136	38468	28451	28451
		Social activities		
Empty nest	0.010**	0.113***	0.513***	0.070**
	(0.005)	(0.041)	(0.198)	(0.030)
Participation	0.002	0.040	0.167	0.062***
	(0.003)	(0.026)	(0.119)	(0.018)
Obs.	43741	36588	28103	28103

Notes: *** p<0.01, ** p<0.05, * p<0.1. Fixed-Effect estimates; Robust standard errors in parentheses. Regressors included and not shown: work, couple, wave dummies. The top panel reports estimation results from Table 2. The following panel reports estimation results when including variables for depressive symptoms, life satisfaction, Frequency of contacts with family and friends, participation in social activities.

Table 10: Depression Symptoms

	Depressed	Everything effort	Restless sleep	Happy	Lonely	Sad	No get going	Enjoy life
Empty nest	-0.023***	-0.021***	-0.003	0.010*	0.002	-0.014*	-0.011	0.005
	(0.007)	(0.007)	(0.009)	(0.006)	(0.006)	(0.008)	(0.007)	(0.006)
Couple	-0.045***	-0.013	-0.030**	0.050***	-0.201***	-0.127***	-0.025***	0.056***
	(0.008)	(0.009)	(0.012)	(0.008)	(0.007)	(0.010)	(0.010)	(0.007)
Work	-0.011**	0.007	-0.002	0.003	-0.021***	-0.010*	-0.015***	0.001
	(0.005)	(0.005)	(0.007)	(0.004)	(0.004)	(0.006)	(0.006)	(0.004)
Constant	0.215***	0.210***	0.438***	0.834***	0.284***	0.319***	0.217***	0.856***
	(0.009)	(0.010)	(0.013)	(0.009)	(0.008)	(0.011)	(0.011)	(0.008)
Obs.	54600	54593	54602	54492	54600	54581	54586	54497

Notes: *** p<0.01, ** p<0.05, * p<0.1. Fixed-Effect estimates; Robust standard errors in parentheses. Regressors included and not shown: wave dummies.

A Appendix: Additional Tables

Table A.1: Non linearities: drinking days per week

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Drink at least:	1 day	2 days	3 days	4 days	5 days	6 days	7 days
Empty nest	0.013	0.011	0.019*	0.010	0.023***	0.031***	0.012*
	(0.009)	(0.010)	(0.010)	(0.010)	(0.008)	(0.007)	(0.006)
Couple	-0.025*	0.001	0.006	0.013	0.023**	0.021**	0.009
	(0.013)	(0.013)	(0.013)	(0.013)	(0.012)	(0.010)	(0.008)
Work	0.003	0.001	-0.002	-0.006	-0.002	0.004	0.006
	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)	(0.005)
Wave 3	-0.003	0.002	0.000	-0.003	-0.004	-0.007	-0.004
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.004)
Wave 4	-0.028***	-0.018***	-0.007	-0.000	-0.010*	-0.012**	-0.007
	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)	(0.005)
Wave 5	-0.054***	-0.041***	-0.027***	-0.019***	-0.015**	-0.013**	-0.005
	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)	(0.005)	(0.005)
Wave 6	-0.068***	-0.055***	-0.028***	-0.015**	-0.015**	-0.019***	-0.011**
	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)	(0.006)	(0.005)
Wave 7	-0.085***	-0.069***	-0.047***	-0.024***	-0.022***	-0.022***	-0.013**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.006)
Wave 8	-0.100***	-0.087***	-0.061***	-0.043***	-0.034***	-0.029***	-0.014**
	(0.008)	(0.009)	(0.009)	(0.008)	(0.008)	(0.007)	(0.006)
Wave 9	-0.121***	-0.089***	-0.063***	-0.040***	-0.041***	-0.037***	-0.020***
	(0.009)	(0.009)	(0.010)	(0.009)	(0.008)	(0.007)	(0.007)
Constant	0.738***	0.577***	0.411***	0.296***	0.198***	0.128***	0.093***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.012)	(0.011)	(0.009)
Obs.	41226	41226	41226	41226	41226	41226	41226
Mean dep. var.	0.68	0.54	0.40	0.29	0.22	0.15	0.10

Notes: *** p<0.01, ** p<0.05, * p<0.1. Fixed-Effect estimates; Robust standard errors in parentheses. Outcome variables y_k are dummies equal 1 if the number of drinking days per week is days $\geq k$.

Table A.2: Non linearities: drinks per week

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Drink at least:	1	2	3	4	5	6	7
Empty nest	0.014	0.004	0.007	0.024**	0.038***	0.027**	0.019*
	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.011)
Couple	-0.033**	-0.016	-0.014	-0.029*	-0.014	-0.024	-0.003
	(0.015)	(0.016)	(0.015)	(0.016)	(0.016)	(0.015)	(0.015)
Work	0.003	0.001	0.005	0.002	0.001	0.002	-0.001
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)
Constant	0.720***	0.651***	0.566***	0.513***	0.428***	0.396***	0.328***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.015)
Obs.	30585	30585	30585	30585	30585	30585	30585
Mean dep. var.	0.66	0.60	0.53	0.47	0.41	0.37	0.31

	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Drink at least:	8	9	10	11	12	13	14
Empty nest	0.015	0.016	0.009	0.004	0.002	0.009	0.013
	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.009)	(0.008)
Couple	-0.002	0.006	-0.000	0.000	0.004	0.014	0.007
	(0.014)	(0.013)	(0.013)	(0.013)	(0.012)	(0.012)	(0.011)
Work	-0.003	-0.007	-0.002	-0.004	-0.000	-0.005	-0.004
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)
Constant	0.291***	0.244***	0.230***	0.198***	0.181***	0.143***	0.133***
	(0.015)	(0.014)	(0.014)	(0.013)	(0.013)	(0.012)	(0.012)
Obs.	30585	30585	30585	30585	30585	30585	30585
Mean dep. var.	0.28	0.24	0.22	0.18	0.17	0.14	0.13

Notes: *** p<0.01, ** p<0.05, * p<0.1. Fixed-Effect estimates; Robust standard errors in parentheses. Outcome variables y_k are dummies equal 1 if the number of drinks week is $\geq k$. Regressors included and not shown: wave dummies.

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