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Effects of lottery wins on household labor supply

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Abstract

This paper analyzes the impact of lottery wins on household labor supply in the United Kingdom, using data from the British Household Panel Survey. We show that lottery wins do not have significant effects on hours of work of males, whilst female hours of work decrease in response to lottery wins. When we control for different lottery prize amounts, we find that large lottery wins reduce female annual hours of work by 120 hours one and two years after the prize. These results suggest that shocks in unearned income may take some time to appear but have a lasting impact.

Keywords: household labor supply, lottery win, fixed-effects models, British Household Panel Survey

JEL Codes: D13, D31, J22

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1. Introduction

This paper addresses the impact of winning the lottery on household labor supply. We consider that winning the lottery is an exogenous shock to the household economic environment and, as such, it may have an impact on household observed behaviors driven by various forces, such as intrahousehold effects (Theloudis et al., 2024), or standard income and wealth effects (Heathcote et al., 2014). As a consequence, households may respond to this shock by modifying their hours of work and, for large shocks and older individuals close to retirement, by quitting the labor force.

Some authors have studied the impact of various shocks to the household economic environment on observable behaviors, including gambling, gifts, lottery wins, and inheritances. Such positive shocks can generally be considered as unexpected income changes, and thus are assumed to be exogenous, after certain reasonable assumptions. In addition, they generally represent an improvement in the household's financial situation that may affect recipient decisions regarding earnings, labor supply, mortgages, consumption, or retirement, among other outcomes. Within this context, it is important to study how such wealth shocks affect household labor supply, to test the potential intrahousehold effects of large monetary cash transfers targeting specific household members on working times, such as pensions, tax reforms, or basic income programs, as they represent unexpected income changes that can have different effects compared to other income transfers, and generally have an intertemporal aspect, especially for large income shocks such as lottery wins. Nevertheless, many studies have failed to precisely document how individuals respond to exogenous changes in wealth and unearned income, as it is difficult to find a convincing exogenous unanticipated source of variation in these sources. Hence, in this paper, we investigate the extent to which a positive shock in unearned income, through a lottery win, influences household labor supply.

We use data from the British Household Panel Survey (BHPS) for the period 1997-2008, when information about lottery wins is gathered, to study the impact of lottery wins on labor supply of two-member households in the UK.[1] We consider a lottery win as a

[1] Existing research has used the BHPS to study the impact of the lottery on various household behaviors. Boertien (2012) shows that lottery wins reduce the probability of divorce three years later, Apouey and Clark (2015) study the impact of lottery prizes on physical and mental health, Cheng et al. (2018) study the relationship between lottery wins and health service utilization, Flèche et al. (2021) document a greater probability of being self-employed for those who win a lottery, and Costa-Font and Györi (2023) examine the effect of lottery wins on individual's overweight and body mass index (BMI).

major life event and adopt a collective household perspective (Chiappori, 1988, 1992), which has recently become the predominant theoretical framework in household economics for empirically studying household behaviors. Against the traditional unitary perspective, this approach enables us to analyze intrahousehold dynamics and resource allocation (Choukhmane et al., 2023). The data for this paper cover a consecutive 12-year time window, which allows us to explore any persistence behind the estimates. In doing so, we follow Theloudis et al. (2024), who found that shocks to the household economic environment, mainly through wage shocks, have a lasting impact on labor supply, and we analyze how current and past lottery wins impact current spouses' hours of work. Household decisions tend to respond gradually to wealth shocks, and simply estimating contemporaneous relationships may not capture the full effect of a positive shock in unearned income.

We exploit the panel structure of the BHPS and estimate fixed-effect models to control for unobserved and time-constant heterogeneity, capturing, for instance, different gambling profiles (i.e., not everyone plays the lottery), or different chances of winning the lottery (i.e., lottery wins are random events subject to actually playing). The UK lottery is one of the largest in the world and several authors have acknowledged that many people play lotteries (Wardle et al., 2007; Apouey and Clark, 2015; Flèche et al., 2021; Costa-Font and Györi, 2023). In addition, the panel dimension of the survey allows us to mitigate some potential concerns regarding unobserved permanent individual heterogeneity in preferences, by using the fixed-effects estimator. Consequently, we exploit within-person variations over time and consider lottery wins to be a random source of household economic resources in our identification strategy.

Our results suggest that winning the lottery is unrelated to husbands' annual hours of work. However, current female hours of work are affected by having won the lottery both in the present and in the past. If the husband wins the lottery at the current date, the wife reduces her current hours of work by about 26 hours per year. On the other hand, if he won the lottery one year ago, the current labor supply of the wife is found to decrease by about 28 hours per year. These results suggest that lottery wins flow from husbands to wives: if they win the lottery, their wivesfully appropriate the prize and modify their work hours. Furthermore, we use information on the amount of the lottery win and find that it is important. However, we also report gender-specific effects, concentrated in the female subsample: when the husband receives a small lottery win (worth between £0-500), the

wife reduces her working time by 31 hours in the same year and by 30 hours one year after the win. Conversely, if the wife receives a significant lottery win (worth more than £1,000), she reduces her working hours by 122 and 120 hours one and two years after the win, suggesting that they adjust their behavior with some lag, possibly due to rigid labor market behavior in the UK.

Our contribution to the literature is twofold. First, we contribute to the literature on wealth and earnings shocks by studying the impact of lottery wins on household labor supply behaviors (Blau and Goodstein, 2016; Cesarini et al., 2017; Niizeki and Hori, 2019; Theloudis et al., 2024), focusing on work hours rather than on labor force participation (Blau and Goodstein, 2016; Niizeki and Hori, 2019), labor earnings (Cesarini et al., 2017), or other household behaviors. Determining whether exogenous income shocks affect labor supply is an empirically demanding identification problem, due to the lack of exogenous changes in income (Imbens et al., 2001). Within this context, to the best of our knowledge, this is the first study to address whether household labor supply is impacted by lottery wins, and the study most closely related to ours is that of Cesarini et al. (2017), who study individual and household labor earnings responses to lottery prizes in Sweden.

Second, we study the impact of winning the lottery, both in the present and in the past, on current household labor supply. Prior studies focusing on wealth shocks and their relationships to household labor supply have primarily focused on static or contemporaneous relationships by exploiting information on inheritances (Blau and Goodstein, 2016; Niizeki and Hori, 2019). Nevertheless, lottery prizes and inheritances are income sources with significant differences across the recipients, since inheritances are typically related to the death of a parent and received by people at advanced stages of their lifecycle, while lottery wins are received by a subset of fortunate players, regardless of their age. Thus, considerable uncertainty remains about the persistence of any wealth effects on household labor supply, and we contribute to these studies by providing a first exploration of the impact of current and past lottery wins on household labor supply.

The rest of the paper is organized as follows. Section 2 provides a detailed background of wealth effects on various outcomes and discusses the related literature. Section 3 presents the data, sample selection, and variables. Section 4 outlines the econometric strategy, and Section 5 describes the results. Finally, Section 6 concludes.

2. Literature review

In this section, our objective is to give a summary of the related literature on income shock impacts, paying attention to the most recent articles published. Many studies have focused on wealth shock impacts on different outputs, such as marital stability, household labor earnings, mortgages, health status, consumption, fertility, and major life cycle decisions such as retirement. Among other exogenous wealth shocks, our literature review indicates that lottery wins, inheritance receipts, or gifts stand out, because these may result in sudden wealth, an exogenous change in income, and this financial improvement could result in changes in individual and household decisions.

Cesarini et al. (2017) study the effect of wealth on household labor earnings, using a sample of Swedish lottery players from high-quality administrative data during 1986-2010. The authors find that winning a lottery prize modestly reduces labor earnings, and this response is stronger for winners than for their spouses. This last result points to the importance of the lottery winner's identity and rejects the unitary household model. Furthermore, the study shows that winning a lottery prize has persistent effects over the ten years after the win. Picchio et al. (2018) analyze data on Dutch State Lottery winners from 2005 to 2008, finding that winning a lottery prize reduces labor earnings, both contemporaneously and three years after the win, although they do not find significant effects on labor force participation. When they remove large lottery wins (over €500,000), they only observe an instantaneous effect on labor earnings, suggesting that such labor earnings reduction is mainly concentrated among those who receive a significant lottery win. In a novel paper, Cesarini et al. (2023), using the same three samples of lottery players as in Cesarini et al. (2017), estimate the effects of lottery wins on marriage and fertility, finding interesting heterogenous results by winner's gender. Specifically, males increase their probability of marriage within five years after the lottery (medium-run) and of having children in all time horizons (two, five, and ten years after the lottery), while female winners increase their probability of divorce within two years after the lottery (short-run), but not ten years after the lottery (long-run).

For inheritances, Blau and Goodstein (2016) use data from the Health and Retirement Study (HRS) for a sample of older married couples in the US, focusing on labor force participation, and obtain that receiving an inheritance causes a reduction in the recipient's labor supply, but there is no impact on the recipient's spouse. The authors treat inheritance as a distribution factor, since it is not subject to laws regarding marital property division

at divorce in the US, pertaining to the recipient exclusively. In addition, the authors point to the importance of controlling for inheritance expectations, in order to interpret inheritances as a source of exogenous variation in wealth, since some inheritances are anticipated for some time and individuals may change their behavior before actually receiving the bequest, according to life-cycle models. Similarly, Niizeki and Hori (2019) use Japanese panel microdata, the Family and Lifestyle Survey of 2012, to explore the effect of inheritances in the extensive margin of work of individuals aged 21-51, showing that men's labor force participation does not respond to an inheritance, while women's labor force participation decreases following an inheritance. The authors also reject the unitary model, since whoever receives an inheritance reduces her/his labor supply.

The effect of inheritances and gifts on labor supply has been extensively analyzed in Europe recently (Bø et al., 2019; Doorley and Pestel, 2020; Malo and Sciulli, 2021; Basiglio, 2022; Tur-Sinai et al., 2022; Suari-Andreu, 2023). For instance, Doorley and Pestel (2020) examine the effect of inheritances in Germany, using data from the German Socio-Economic Panel (SOEP), finding that women are less likely to work full-time after receiving an inheritance and that their hours of work decrease after receiving an unexpected inheritance; this latter effect persists for three years after the unexpected receipt. By contrast, men appear not to respond. Basiglio (2022) takes a different approach, focusing on the likelihood of divorce, using Dutch panel data from 2002 to 2016. Her findings suggest different impacts according to the recipient, and when the shock (any inheritance and/or gift) is received by the wife the probability of the couple separating increases. Tur-Sinai et al. (2022) use data from the Survey of Health, Ageing and Retirement in Europe (SHARE), where information about inheritances and gifts worth more than €5,000 is gathered, showing no effects of inheritances and gifts on labor force participation, for men or women. Suari-Andreu (2023) also uses data from SHARE and focuses on the impact of receiving an inheritance on retirement, consumption, and labor supply, documenting that an inheritance does not have large effects on labor supply, retirement, or food consumption.

For the UK, the literature on wealth shocks has focused principally on the impact of lottery wins on different factors (Gardner and Oswald, 2007; Boertien, 2012; Apouey and Clark, 2015; Flèche et al., 2021; Costa-Font and Györi, 2023), using data from the BHPS. For example, Gardner and Oswald (2007) use data from a General Health Questionnaire (GHQ) conducted in the BHPS between 1996 and 2003, finding that lottery winners have significantly better psychological health. Boertien (2012) focuses on separation and finds

that lottery wins reduce the probability of separation only when men win, suggesting that a temporary change in income can distract people from problems within the household. Like Gardner and Oswald (2007), Apouey and Clark (2015) focus on health status, although they show different lottery impacts according to the health indicator. Specifically, lottery wins have no effect on overall health, but do have a positive effect on mental health. Flèche et al. (2021) study the dynamic effect of lottery wins one year before t on the likelihood of becoming self-employed in t, obtaining a significant increase in the probability of self-employment in year t for the top 25% of winners in $t-1$, both men and women, suggesting that the gender entrepreneurial gap could be reduced by improving women's capital access. Costa-Font and Györi (2023) examine the impact of lottery wins on individual BMI, from 2002 to 2007, finding that a lottery win of £1,000 reduces the probability of being overweight one year later by 3 percentage points, suggesting that the effects of lottery wins take a while to exert health effects. These estimates are particularly concentrated among low-education individuals.

In this paper, we contribute to the literature by examining, for the first time, the impact of lottery wins on household labor supply in the UK. We differ from prior research in other countries by taking a household perspective (Imbens et al., 2001; Picchio et al., 2018) and focusing on work hours (Cesarini et al., 2017). We do not limit our analysis to contemporaneous relationships, since we also study the lagged effects of lottery wins, differentiating us from Blau and Goodstein (2016) and Niizeki and Hori (2019), who study the impact of inheritances on household labor force participation in the US and Japan, respectively. Specifically, we examine the impact of lottery wins on household labor supply up to two years later, to document any persistence in this relationship. Although the BHPS ended in 2008, to the best of the authors' knowledge this dataset represents the only nationally representative survey, publicly available, with individual-level, longitudinal information on lottery wins over time, together with rich information on socio-demographics, labor, and household characteristics.

3. Data and variables

We use data from the BHPS for the years 1997-2008.[2] The BHPS is a nationally representative sample of over 5,000 households and 10,000 individuals across Great Britain, conducted between September and Christmas, for a total of 18 waves between 1991 and 2008, by the Institute for Social and Economic Research (ISER) of the University of Essex. The same individuals were re-interviewed in subsequent waves, so the BHPS is a panel data set. In addition, the design of the BHPS consists of following all participants, and if an individual leaves their original household to form a new one, he/she continues to be interviewed and all the new family members become part of the survey and are interviewed. As some panel members left the sample (either through death, emigration, or other forms of attrition) new panel members were incorporated throughout the survey period. Initially, the first wave in 1991 collected information from 10,300 individuals in 5,500 households, drawn from 250 postcode areas of Great Britain. In Wave 9 (survey year 1999) two additional samples equally split between Scotland and Wales were added to the panel sample of 2,000 households, and in Wave 11 (survey year 2001) an additional sample, of 2,900 households, from Northern Ireland, was included to cover the whole of the United Kingdom. By Wave 18 (2008), about 16,000 individuals participated in the survey.

Our empirical analysis focuses on 12 waves of data, over the period 1997-2008, when information on lottery wins, our key independent variable, is available. To collect lottery information, the following questions are asked: *"Since September 1st (year before), have you personally received any payments, or payment in kind, from a win on the football pools, national lottery or other form of gambling?"* in all survey waves since 1997. If this question was answered positively, then the respondent was asked: *"About how much in total did you receive (was this worth)? (win on the football pools, national lottery or other form of gambling)"*. Against alternative datasets, such as the SOEP where lottery win information, as well as inheritance information, are only available at the household level, in the BHPS the information regarding lottery wins is collected at the individual level, which allows us to distinguish the winning person within the household (if any). The responses to this question are not mutually exclusive within the household and positive

[2] In 2009, the BHPS was suspended and subsumed within a new survey, the Understanding Society Study (UK Household Longitudinal Study (UKHLS)). This resulted in many changes to the survey. Specifically, we do not use that sample in this analysis because it does not include information about lottery wins.

answers may be given by both husbands and wives at the same time. This is a tremendous advantage of the BHPS since many works have rejected the well-known income pooling hypothesis (i.e., resources are not equally distributed within the household). This enables us to go deeper into the intrahousehold allocation black box process.

Thus, we can distinguish lottery winners (and other gambling winners) from non-lottery winners, and how much in total do winners receive.[3] For this reason, the BHPS has already been used in numerous studies of the impact of lottery wins on various outcomes, such as health (Gardner and Oswald, 2007; Apouey and Clark, 2015; Costa-Font and Györi, 2023), marital stability (Boertien, 2012), self-employment (Flèche et al., 2021), and social ties (Costa-Font and Powdthavee, 2023). Furthermore, contrary to inheritance receipts, lottery winnings are unlikely to be anticipated.

We restrict the sample to two-member households formed by heterosexual spouses (married or cohabiting) between 21 and 65 years old at the time of the interview (Mazzocco, 2007), and that are observed for at least three consecutive years (Theloudis et al., 2024). As our analysis is focused on market work hours, we keep working couples only (i.e., households in which both the husband and wife report positive hours of work through the year). Furthermore, we drop all observations with missing values for the key variables of interest. These restrictions leave us with a final sample of 1,069 unique households whom we follow for at least three consecutive years, formed by a man (husband) and a woman (wife), corresponding to a total of 6,214 observations (household X year).

The core BHPS questionnaire includes a wide range of socio-demographic factors of households and individuals, such as income, socio-economic values, labor market behavior, education, household composition, and demographics, some of which we use as control variables in the empirical model. These include age (measured in years), wages (defined in pounds/hour, as total labor income over annual hours of work), self-employment status (a dummy taking value 1 for the self-employed, 0 for employees), marital status (value 1 for married couples, 0 otherwise), household size, the number of

[3] In the UK, a significant share of the population plays the lottery and the national lottery is, overwhelmingly, the main form of gambling (Wardle et al., 2007; Boertien, 2012; Apouey and Clark, 2015; Cheng et al., 2018; Flèche et al., 2021; Costa-Font and Györi, 2023; Costa-Font and Powdthavee, 2023). Thus, we use these questions to proxy for lottery wins, as done in prior studies using the BHPS (Gardner and Oswald, 2007; Boertien, 2012; van Kippersluis and Galama, 2014; Apouey and Clark, 2015; Cheng et al., 2018; Flèche et al., 2021; Costa-Font and Györi, 2023; Costa-Font and Powdthavee, 2023).

children, household non-labor earnings, and household wealth (defined as the combined amount received from interest and dividends for both partners).[4] All monetary and wealth amounts are deflated and expressed in 2005 British pounds using the UK Consumer Price Index (CPI).[5] We also include lagged controls for wages, household non-labor income, and wealth. To control for the potential impact of young kids on household labor supply (i.e., younger children demand more time from their parents), we differentiate between the number of children under five years old, and the number of children between five and fifteen years old. We also control for the region of residence (nineteen regions/metropolitan areas), and the survey year.

Descriptive statistics are reported in Table 1, including the mean as well as standard deviations on the individual-level and household-level variables. As for the main variables, male (female) hours of work are on average 1,910 (1,360) hours per year. Regarding lottery wins, about 15% of men in our sample report winning the lottery in the survey year, while the percentage of women winners is about 10.6%. However, the amounts of lottery wins are relatively small (the average lottery win is £23.4 for males and £38.0 for females), as expected, though high standard deviations suggest significant variability. Conditional on winning the lottery, the average amount for male winners is £156.585 and £359.440 for female winners, the average of respondents who received a medium-sized lottery win (i.e., £500-1,000) is 2.2% for male winners and 1.4% for female winners, while the average for large lottery prizes (i.e., more than £1,000) is 2.8% for males and 2.6% for females. Regarding the other variables, the average husband is about 45 years old, while the average wife is about 43 years old. The hourly wage of husbands is on average £13.4 per hour, against £9.7 per hour for wives, in line with Blundell et al. (2021). Furthermore, about 15.4% of males and 17.3% of females have a high education level, and 5.2% of males and 2.0% of females are self-employed. Finally, 94% of households report being legally married, and the average household has 3.5 members, with on average 1 kid (0.1 child on average between 0 and 4 years old, and 0.8 on average

[4] The survey provides information on amount received from interest and dividends divided into brackets. We assign the midpoint of the reference bracket and for the highest bracket we assign the lower bound, since it has no upper bound.

[5] We have extracted the CPI index from the Office for National Statistics (https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/d7bt/mm23, accessed 17 January 2023).

between 5 and 15 years old), and the total non-labor income and amount from interest and dividends are about £2,632.010 and £509.114, respectively.

Table 2 shows descriptive statistics differentiating among lottery winners and non-lottery winners, suggesting statistically significant differences in observable individual characteristics between these two groups of individuals. Specifically, male lottery winners work fewer hours, have lower wage rates, are older, and have lower education levels and self-employment rates. For females, winners work more hours, receive lower wages, are older and have lower education levels. All these differences are statistically significant.

4. Econometric strategy

We estimate how household labor supply is affected by lottery wins, using the fixed-effects estimator (i.e., the "within" estimator) on the following equation, separately for husbands ($j = 1$) and wives ($j = 2$):

$$Y_{it}^{j} = \alpha_i^j + \sum_{k=0}^{2}\left(\beta_{1k}^{j} Lottery_{it-k}^{1} + \beta_{2k}^{j} Lottery_{it-k}^{2} + \gamma_{1k}^{j} w_{it-k}^{1} + \gamma_{2k}^{j} w_{it-k}^{2} + \delta_k^j y_{it-k} + \rho_k^j a_{it-k}\right)$$
$$+\eta^{j'} X_{it}^{j} + \tau_{11}^{j} Y_{it-1}^{1} + \tau_{12}^{j} Y_{it-2}^{1} + \tau_{21}^{j} Y_{it-1}^{2} + \tau_{22}^{j} Y_{it-2}^{2} + \lambda_t + \theta_r + \varepsilon_{it}^{j}, \quad (1)$$

where i represents the surveyed household ($i = 1, \dots, N$), t denotes the survey year, and r the region of residence. The dependent variable Y_{it}^{j} is the annual hours of work of spouse j. $Lottery_{it-k}^{j}$ is a dummy variable taking value 1 if spouse j in household i won the lottery in period $t-k$, for $k = 0, 1, 2$, 0 otherwise, and w_{it-k}^{j}, y_{it-k}, and a_{it-k} represent log-wages, log-non-labor income, and log-wealth, respectively. Vector X_{it}^{j} represents time-varying socio-demographics, α_i^j represents household-fixed effects, λ_t is year fixed-effects, and θ_r region fixed-effects. Finally, ε_{it}^{j} is the error term and we cluster the standard errors at the household level to account for heteroskedasticity and arbitrary correlation of the error term at the household level over time. The variables in X_{it}^{j} include spouse j age and its square, to account for any non-linear effects of age on labor supply, self-employment status, marital status, household size, and the number of children in the household (aged 0-4, and 5-15). β_{1k}^{j} and β_{2k}^{j} are our coefficients of interest, measuring

the own and spouse lottery win effect on the annual labor supply of a given spouse j, both contemporaneously $k = 0$ and lagged ($k = 1, 2$).

According to prior literature, one major problem in estimating the impact of lottery wins on labor supply is that it is likely that unobserved time-invariant characteristics jointly influence lottery wins and labor supply behaviors, such as risk aversion, time-use preferences, or financial knowledge, among others. Therefore, it is important to capture fixed unobservable characteristics. Given the household panel structure of the BHPS, that follows the same individuals through time, we control for the unobserved heterogeneity of individuals and implement individual fixed-effects panel estimations, in order to remove any time-invariant unobserved heterogeneity in preferences. Specifically, the presence of α_i^j in Equation (1) indicates that we use individual fixed-effects panel estimations. This estimation method is preferred to ordinary least squares (OLS), which is subject to possible endogeneities, such as individual or household-level unobservable factors that may bias the OLS estimates.

One key piece of information provided by the BHPS is the amount of the lottery win received (individuals were asked to report the amount of a lottery win received during all waves since 1997). Since larger lottery wins represent larger increases in unearned income, this may affect labor supply behavior more strongly (Imbens et al., 2001; Sila and Sousa, 2014; van Kippersluis and Galama, 2014; Picchio et al., 2018). Thus, we run Eq. (1) replacing $Lottery_{it-k}^j$ with three dummy variables taking value 1 if spouse j in household i won a small lottery (worth equal to or less than £500), a medium lottery (worth more than £500 and equal to or lower than £1,000) and a large lottery (worth more than £1,000) in period $t - k$, for $k = 0, 1, 2$, and 0 otherwise, in order to examine whether those who received a larger lottery win were more likely to modify their annual hours of work, in comparison to those who do not win any lottery in period t, $t - 1$, and $t - 2$. In this case, β_{1k}^j and β_{2k}^j captures the effects of a small (higher than £0 and equal or lower than £500), medium (higher than £500 and equal or lower than £1,000) or large (higher than £1,000) lottery win on household labor supply.

5. Results and discussion

This section shows the results of estimating Eq. (1), focusing on two alternative indicators. We proceed as follows. First, we focus on a dummy variable that takes value 1 if either the husband or the wife won a lottery prize in period t, $t-1$, or $t-2$, respectively. Later, we focus on three alternative dummy variables that refer to different lottery prize amounts for each spouse within the household, keeping as reference category no lottery winners, as it is quite reasonable that spouses respond differently to lottery wins depending on the magnitude of the prize. Next, we conduct a battery of robustness checks using alternative sample selections, econometric specifications, and methods of estimation. Finally, we compare the results of this study with those of prior research, with focus either on inheritances or lottery wins in other geographical contexts.

5.1 Baseline results

Table 3 shows the main results of estimating Equation (1) on spouses' annual hours of work. These results show that a lottery win has a contemporaneous effect on the men's hours of work at the 10 percent significance level. Specifically, annual hours of work of men increase by 21.207 hours due to a spouse's lottery win. However, additional lags display no statistically significant coefficients, indicating that a past lottery win, independently of the winner, is not related to the work hours of men. The results for women suggest statistically significant effects of lottery wins on hours of work. Specifically, annual hours of work of women are reduced by 26.936 hours when their spouse wins the lottery in that year. Additionally, this effect is persistent until one year later, when the peak of the decline occurs, since if the spouse won the lottery the previous year, the annual current hours of work of women are reduced by 28.672 hours. Two years later, this effect disappears.[6]

In summary, while men's annual hours of work are not affected by lottery wins at standard significance levels, women tend to reduce their labor supply, both contemporaneously and one year after the win. This finding is in line with prior research which documents that labor supply elasticities are greater for women than for men

[6] Decreased paid work may be compensated by increased chores. Further research should study other time allocation responses, beyond labor supply, to economic shocks.

(Keane, 2011) and it rejects the unitary household model (Blau and Goodstein, 2016; Cesarini et al., 2017; Niizeki and Hori, 2019), since the identity of the wealth shock recipient matters.

So far, we have only studied the impact of lottery wins on work hours. However, we acknowledge that a simple dummy strategy for lottery wins ignores lottery win size and could substantially affect our results. Therefore, we next estimate Eq. (1) and replace the lottery win indicator variable for both spouses (in t, $t-1$, and $t-2$) with three dummy variables that takes value 1 for small lottery wins, medium lottery wins, and big lottery wins, in t, $t-1$ and $t-2$ for each spouse, and value 0 otherwise.

Column 1 of Table 4 shows that men do not change their annual hours of work, irrespective of the amount of the lottery prize, neither for own nor spouse lottery prizes. However, statistically significant effects are reported for the women's hours of work. Specifically, women's current annual hours of work are reduced by 31.526 hours if their husbands have won a small lottery prize in that year, and by 30.403 if their husband won a small lottery prize one year before. For large lottery wins, the results suggest that current hours of work by women are reduced by 122.162 hours if they won a lottery prize worth more than £1,000 one year before, and by 120.556 hours if they won such a large lottery prize two years before, suggesting some persistent effects of large lottery wins on current women's labor supply. All these estimates are statistically significant at the 5% level and confirm that a simple dummy variable strategy for lottery wins omits significant differences across lottery amounts. Consequently, a large lottery win significantly decreases women's labor supply, although this effect appears with some lag and not contemporaneously. The magnitudes are pretty similar and range from 120.556 to 122.162, suggesting a lasting impact of large lottery wins on labor supply and that this effect takes time to appear.[7] Consequently, the prior estimates that suggest that women reduce their current annual hours of work due to the receipt of a lottery win are due to lottery amounts concentrated in the upper and lower tails of the lottery amounts distribution, suggesting ultimately that women fully appropriate the prize and modify their current labor behavior.

[7] The results remain identical if we exclude household non-labor income and household wealth from the specifications, suggesting that those variables are not including either the amount of lottery win or the interest arising from lottery wins.

In the UK, most lottery wins accrued during marriage are treated as being owned by spouses equally and in the event of divorce all property acquired during marriage should be divided equally. As argued previously, we consider a lottery win as a shock to household resources, not a shock to individual wealth. Consequently, a lottery win does not empower or modify the bargaining power of a given spouse within the household. However, we find that a lottery win causes a change in household labor supply only for women, especially for large shocks, as women reduce their current labor supply due to this positive unearned income shock, and this effect appears to be persistent (at least until two years after the prize). Hence, from this perspective, women fully appropriate the benefits of the lottery win.

The fact that the distribution of lottery wins across the household matters, for small and large prizes, rejects a key prediction of the unitary household models. Specifically, it rejects the well-known income pooling hypothesis which suggests that it is the total amount of household resources that matters to household observed behavior, and the household pools all resources. This also suggests a non-random assignment of lottery wins within the household, and that men totally transfer the small prize to the non-winning spouse. On the other hand, if the woman wins a significant prize, this has no effect on the spouse labor supply.[8]

5.2 Additional checks, alternative specifications, and sample criteria

a. Testing the impact of lottery wins on full-time status. Another potential mechanism by which our estimates could be related to full-time labor supply decisions. Specifically, respondents could adjust their full-time status due to a wealth shock. The results appear in Table 5 for lottery wins, but do not suggest that workers adjust their full-time status due to a lottery win. For lottery amounts, the results are reported in Table 6 and do not suggest that workers reduce their full-time status.

[8] In Appendix Tables A1 and A2 we estimate the effects of lottery wins and lottery amounts on spouses' labor force participation. To do this, we modify slightly our sample selection and include those spouses who are not employed, and predict their hourly wages using a Mincer-style equation (i.e., using individual's and household's characteristics to predict each spouse's hourly wage rate). The results of the linear probability models, together with individual fixed-effects, do not suggest that lottery prizes reduce the probability of being in the labor force. This result is not surprising, given the age range covered and the lottery amounts of our sample.

b. Omitting individual-specific fixed-effects. Our main specification includes individual fixed-effects, and in Table 7 and 8 we present SURE estimates without fixed-effects, where we treat the BHPS as a repeated cross-section and account for correlation within households through the SUR method of estimation. We find that omitting individual fixed-effects strongly affects the results, suggesting that the inclusion of individual fixed-effects is essential to mitigate potential concerns regarding omitted variables bias.

c. Including individuals over 65 in the sample. Our baseline estimates focus on couples aged between 21 and 65. Alternatively, we include those over 65 in our estimations and re-run Eq. (1), respectively for lottery wins and large lottery wins. The results in Tables 9 and 10 are very similar to those previously reported, although the magnitudes for large lottery amounts in the female's estimates are somewhat greater.

d. Omitting self-employed workers. Initially, our sample selection focuses on working couples aged between 21 and 65 years, with three years of consecutive information. As can be seen in Table 1, 5.2 per cent of males and 2 per cent of females in our baseline sample are self-employed. Self-employed workers may be more flexible in choosing their working hours and, in this robustness check, we exclude self-employed individuals (almost 274 observations from 92 households) from the main sample and run Eq. (1), focusing on the effect of lottery wins on labor supply of the employed. The results of this robustness check are reported in Tables 11 and 12 and suggest similar results to the main results of Tables 2 and 3, although the magnitudes estimated for large lottery wins in the labor supply of females suggest that the peak of the decline for employees is reached two years after the lottery win. Current annual hours of work of males are increased by 179 hours if their spouses win a large lottery prize in that year. This may be explained by a bargaining effect within the household: large lottery prizes for females increase their bargaining power within the household and the spouse compensates by working longer hours.

e. Excluding duplications of lottery wins. One possible concern underlying our estimates could be related to the identity of the winner, as it is reasonable to think that even if a lottery win was received by a partner, it could be declared being received at the household level and men and women feel that the prize can be shared among them. At this point, we obtain that omitting same lottery wins significantly affects the estimates in Table 13, as winning a lottery does not affect current hours of work for females at the 5% level. This suggests that those prior estimates of Table 2 are related to joint prizes. On the other hand,

Table 14 suggests that women reduce their current annual hours of work by 113 hours if they won a large lottery prize one year before, and by 187.239 hours if they won a large lottery prize two years before.

5.3 Comparison with prior labor supply estimates

All in all, our results suggest gender-specific effects of lottery wins on household labor supply, and women fully appropriate lottery wins in the UK. Furthermore, we document long-lasting effects of large lottery wins on current women's labor supply, and this effect lasts a year until it effectively appears. The gender-related results align with a large amount of research documenting that labor supply decreases when unearned income increases and that labor supply is more elastic for females, who are traditionally considered to be less strongly attached to the labor market (Blau and Kahn, 2007; Keane, 2011), exploiting information for inheritances in Europe or Japan (Bø et al., 2019; Niizeki and Hori, 2019; Doorley and Pestel, 2020; Malo and Sciulli, 2021). However, prior estimates using lottery prizes in the US and Sweden (Imbens et al., 2001; Cesarini et al., 2017) have not documented any gender-specific heterogeneity, while Picchio et al. (2018) obtain labor earnings responses greater for male lottery players than for female lottery players. Hence, our results from this point of view are novel.[9]

We obtain modest responses for small lottery prizes, displayed on the labor supply of the females, and that responses are especially important in magnitude for large prizes, in line with prior research in Massachusetts (Imbens et al., 2001). These responses for small prizes contrast with Imbens et al. (2001), Cesarini et al. (2017) and Picchio et al. (2018). Specifically, Imbens et al. (2001) document no effect of lottery wins on the labor supply of the spouse, while Cesarini et al. (2017) obtain that labor responses are stronger for winners than for their spouses, and Picchio et al. (2018) show that smaller prizes only have effects for those who won the lottery. In our sample, small prizes are shared between spouses, and lottery wins flow from males to females.

We find that the responses for large prizes take some time to appear, one year in our sample, confirming our initial hypothesis that differentiating between short- and medium-

[9] We consider that Imbens et al. (2001) show that females reduce their working hours more as a result of large lottery wins, but the difference is not statistically significant, while Cesarini et al. (2017) find that labor earnings responses are greater for males than for females, but these differences are not statistically significant.

run responses is important to properly estimate labor supply responses to income shocks, in line with Picchio et al. (2018). In the UK, contrary to the Netherlands' labor market in which workers can easily adjust their labor supply at the intensive margin through part-time occupations (Picchio et al., 2018), it appears that it takes a while to effectively modify the labor supply and adjust to the new family circumstances, as the effect is observed one year after the lottery win, not in the same year, suggesting some rigidity of the labor market in the UK. This delayed effect appears despite the small lottery amounts of our sample, in comparison to prior research (Cesarini et al., 2017; Picchio et al., 2018).[10] This characteristic of our sample also contrasts with prior results in Sweden, since Cesarini et al. (2017) also show that Swedish lottery winners immediately reduce their earnings.

Finally, the restrictions imposed by our household level analysis preclude us from estimating long-run responses, which have been reported, in other contexts, even six years and ten years after winning a lottery at the individual level (Imbens et al., 2001; Cesarini et al., 2017), although our main estimates suggest that the peak of the decline is reached one year after the prize, and the magnitude two years later becomes smaller. Against this, Picchio et al. (2018), who also focus on medium-term responses three years after the prize, show that the impact of the prize on earnings persists over time and the peak is found three years after.

6. Conclusions and policy implications

This paper analyzes the impact of lottery wins on household labor supply, focusing on two-member households' annual hours of work. We adopt a household perspective, which allows us to study intrahousehold dynamics, and document different effects, depending on the identity of the winning spouse, on the one hand, and the spouse's labor supply, on the other. Using the British Household Panel Survey (BHPS), a large nationally representative household panel survey, we show that winning the lottery in the present and in the past has a negative effect on current work hours among women. In addition, small prizes received by the husband reduce the labor supply of the partner,

[10] In fact, Picchio et al. (2018) show that removing lottery prizes above €500,000 leads to solely instantaneous effects. In our sample, the maximum corresponds to a lottery prize of £151,027 among females.

while for large amounts females significantly decrease their annual hours of work. From a policy point of view, an exogenous change in wealth reduces the incentive to work among females, contrary to that of males. Prior research using lottery wins has not reported any heterogeneity by gender (Imbens et al., 2001; Cesarini et al., 2017) or has shown larger effects for males (Picchio et al., 2018).

Household labor supply estimates reject the unitary model of the household, since we find that lottery wins have differential impacts on husbands and wives, depending on the lottery winner, and thus we reject the well-known income pooling hypothesis, according to which the identity of the lottery winner should not affect household labor supply decisions. Consequently, it is important to adopt a household perspective when examining the effects of wealth shocks, as households do not pool the resources. We also find that lottery wins have a lasting impact on household behaviors, in line with Theloudis et al. (2024), and complementing existing research on lottery wins and other shocks, such as inheritances, that have been reported to be related to household labor force participation in a static setting (Blau and Goodstein, 2016; Niizeki and Hori, 2019).

One limitation of this paper is that we cannot account for lottery ticket spending, which could bias our estimates (Picchio et al., 2018; Kim and Oswald, 2021) since a lottery win is a random event subject to actually entering and playing the lottery. Unfortunately, the BHPS does not contain information about the number of times an individual has played the lottery or on players' expenditures on lottery tickets, only the amount of money won from the lottery. Thus, we can only distinguish among winners and non-winners in our econometric strategy, not between regular players, occasional players, and non-players. Alternative panel datasets, such as the SOEP, also suffer from this shortcoming. This suggests thar our estimates may be biased downwards. Nevertheless, the use of a panel household survey enables us to partially control for unobserved time-invariant individual heterogeneity in preferences and alleviate the problem of omitted information on lottery ticket spending, through the use of panel data estimators and assuming that lottery ticket spending is relatively constant over time (Kim and Oswald, 2021). Furthermore, recent evidence (Kim and Koh, 2021), suggests that controlling for ticket spending has minimal impact on estimates.

Despite these limitations, several implications emerge from this work and the study of lottery wins as random shocks to household wealth in the UK, a region where a large share of the population plays the lottery, makes our results of interest for policy makers.

In the current context where many countries have implemented social programmes aimed at alleviating income inequality, such as pensions, tax reforms, or basic income programmes, our results provide new insights into how individuals respond to exogenous changes in unearned income from a household perspective. Public policies should consider our results when designing income transfers, or basic income programs, since according to our results small cash transfers to males would flow from males to females within households in the UK. The results of this paper are also relevant in informing policy makers on the design of gambling taxes, since medium-sized lottery wins (large-sized lottery wins in our sample) discourage work among women in the UK. The fact that these prizes are not extremely large (greater than £1,000) may help policymakers in the design of transfers and evaluate the potential labor supply effects of realistic shocks to household resources, since few transfers involve large amounts.

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Table 1. Descriptive statistics

	Males		Females		Diff.
	Mean	Std. Dev.	Mean	Std. Dev.	(*p*-value)
Individual variables					
Work hours	1,910.089	372.448	1,360.330	475.154	(<0.001)
Lottery win	0.150	0.357	0.106	0.307	(<0.001)
Lottery amount	23.435	283.850	38.003	1,924.067	(0.554)
Lottery amount (conditional on winning)	156.585	719.704	359.440	5,911.547	(0.300)
Small lottery prize (equal or lower than £500)	0.951	0.217	0.960	0.195	(0.351)
Medium lottery prize (higher than £500 and equal or lower than £1,000)	0.022	0.145	0.014	0.116	(0.253)
Large lottery prize (higher than £1,000)	0.028	0.165	0.026	0.159	(0.801)
Age	45.029	8.428	43.180	8.305	(<0.001)
Wage rate (pounds per hour)	13.368	9.784	9.658	8.471	(<0.001)
Low education	0.464	0.499	0.513	0.500	(<0.001)
Middle education	0.382	0.486	0.313	0.464	(<0.001)
High education	0.154	0.361	0.173	0.378	(<0.001)
Self-employed	0.052	0.221	0.020	0.139	(<0.001)

	Mean	Std. Dev.
Household variables		
Married	0.939	0.238
# household members	3.483	1.067
# children aged 0-4	0.123	0.368
# children aged 5-15	0.800	0.950
Household non-labor income	2,632.010	4,780.927
Household wealth	509.114	2,679.695
# observations (household X year)	**6,214**	
# households	**1,069**	

Notes: Data from BHPS 1997-2008. The whole sample consists of working couples between 21 and 65 years old. *p*-values for the *t*-test on the equality of means for males vs. females are reported in parentheses.

Table 2. Descriptive statistics, winners and non-winners

	Males					Females				
	Non-winners		Winners		Diff.	Non-winners		Winners		Diff.
	Mean	Std. Dev.	Mean	Std. Dev.	(*p-value*)	Mean	Std. Dev.	Mean	Std. Dev.	(*p-value*)
Individual variables										
Work hours	1,930.612	415.615	1,881.221	299.145	(<0.001)	1,356.901	474.73	1,367.744	476.107	(<0.001)
Wage rate (pounds per hour)	13.762	9.678	12.814	9.907	(<0.001)	9.859	6.649	9.224	11.451	(<0.001)
Age	44.735	8.621	45.443	8.134	(0.001)	42.909	8.302	43.766	8.285	(<0.001)
Low education	0.454	0.498	0.479	0.500	(0.055)	0.475	0.499	0.597	0.491	(<0.001)
Middle education	0.366	0.482	0.405	0.491	(0.002)	0.329	0.47	0.28	0.449	(<0.001)
High education	0.180	0.385	0.117	0.321	(<0.001)	0.196	0.397	0.123	0.328	(<0.001)
Self-employed	0.058	0.234	0.042	0.201	(0.004)	0.019	0.137	0.021	0.143	(0.634)

Notes: The number of male non-winners is 674 (3,632 observations), 395 (2,582 observations) for male winners, 770 (4,249 observations) for female non-winners, and 299 (1,965 observations) for female winners. *p*-values for the *t*-test on the equality of means for non-winners vs. winners are reported in parentheses.

Table 3. Current and past impacts of lottery wins (*individual fixed-effects estimates*)

	Male	Female
Dependent variable: Annual hours of work		
Lottery win *t*		
Self	-12.164	11.600
	(9.680)	(15.435)
Spouse	21.207*	-26.936**
	(12.444)	(13.168)
Lottery win *t-1*		
Self	6.705	15.008
	(12.447)	(16.377)
Spouse	-8.951	-28.672**
	(12.627)	(14.524)
Lottery win *t-2*		
Self	5.413	1.672
	(10.107)	(13.996)
Spouse	-3.884	6.053
	(11.888)	(14.422)
Number of observations	3,786	3,786
Number of households	1,069	1,069
R-squared	0.152	0.281

Notes: All specifications include controls for wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, self-employment status, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged annual hours of work for both spouses (*t-1*, *t-2*). Robust standard errors, clustered at the household level, are reported in parentheses. Each regression also includes time and regional dummies, and individual fixed-effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table 4. Current and past impacts of lottery win amounts (*individual fixed-effects estimates*)

	Male	Female
Dependent variable: Annual hours of work		
Small lottery win *t*		
Self	-10.432	13.248
	(9.672)	(16.172)
Spouse	17.341	-31.526**
	(12.203)	(13.356)
Medium lottery win *t*		
Self	-70.916	34.824
	(78.164)	(73.142)
Spouse	54.202	43.808
	(50.647)	(34.807)
Large lottery win *t*		
Self	-29.057	-47.985
	(35.079)	(59.973)
Spouse	127.017	71.771
	(80.592)	(61.249)
Small lottery win *t-1*		
Self	5.616	19.788
	(12.644)	(16.967)
Spouse	-6.547	-30.403**
	(12.707)	(15.069)
Medium lottery win *t-1*		
Self	-1.483	-93.854
	(38.050)	(149.325)
Spouse	33.992	-9.029
	(31.715)	(29.012)
Large lottery win *t-1*		
Self	48.477	-122.162**
	(30.818)	(53.419)
Spouse	-97.459	31.307
	(108.899)	(47.685)
Small lottery win *t-2*		
Self	5.715	3.053
	(10.572)	(14.087)
Spouse	-4.625	6.610
	(11.580)	(15.089)
Medium lottery win *t-2*		
Self	-23.977	66.753
	(50.886)	(62.960)
Spouse	36.372	14.556
	(26.230)	(37.975)
Large lottery win *t-2*		
Self	45.011	-120.556**
	(35.328)	(59.630)
Spouse	-13.822	0.802
	(126.095)	(50.593)
Number of observations	3,786	3,786
Number of households	1,069	1,069
R-squared	0.155	0.285

Notes: All specifications include controls for wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, self-employment status, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged annual hours of work for both spouses (*t-1*, *t-2*). Robust standard errors, clustered at the household level, are reported in parentheses. Each regression also includes time and regional dummies, and individual fixed-effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table 5. Additional checks: Full-time status and lottery wins (*individual fixed-effects estimates*)

	Male	Female
Dependent variable: Full-time status		
Lottery win *t*		
Self	-0.001	0.015
	(0.006)	(0.024)
Spouse	0.014*	-0.023
	(0.008)	(0.018)
Lottery win *t-1*		
Self	0.012	-0.005
	(0.008)	(0.026)
Spouse	-0.004	-0.027
	(0.010)	(0.019)
Lottery win *t-2*		
Self	0.004	-0.010
	(0.006)	(0.021)
Spouse	0.000	-0.015
	(0.006)	(0.022)
Number of observations	3,786	3,786
Number of households	1,069	1,069
R-squared	0.092	0.088

Notes: All specifications include controls for wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, self-employment status, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged full-time status for both spouses (*t-1*, *t-2*). Robust standard errors, clustered at the household level, are reported in parentheses. Each regression also includes time and regional dummies, and individual fixed-effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table 6. Additional checks: Full-time status and lottery win amounts (*individual fixed-effects estimates*)

	Male	Female
Dependent variable: Full-time status		
Small lottery win *t*		
Self	0.000	0.013
	(0.007)	(0.024)
Spouse	0.013*	-0.029
	(0.008)	(0.018)
Medium lottery win *t*		
Self	-0.009	0.279***
	(0.017)	(0.080)
Spouse	0.063	0.051
	(0.041)	(0.070)
Large lottery win *t*		
Self	-0.015	-0.030
	(0.010)	(0.079)
Spouse	0.035	0.067
	(0.022)	(0.041)
Small lottery win *t-1*		
Self	0.012	-0.003
	(0.008)	(0.027)
Spouse	0.001	-0.031
	(0.009)	(0.019)
Medium lottery win *t-1*		
Self	0.009	-0.213
	(0.011)	(0.212)
Spouse	0.008	0.095
	(0.013)	(0.070)
Large lottery win *t-1*		
Self	0.026	-0.008
	(0.017)	(0.094)
Spouse	-0.190	0.009
	(0.130)	(0.052)
Small lottery win *t-2*		
Self	0.004	-0.010
	(0.007)	(0.021)
Spouse	0.002	-0.009
	(0.006)	(0.023)
Medium lottery win *t-2*		
Self	0.014	0.034
	(0.010)	(0.106)
Spouse	0.008	-0.177*
	(0.013)	(0.100)
Large lottery win *t-2*		
Self	0.012	-0.054
	(0.013)	(0.077)
Spouse	-0.127	-0.093
	(0.097)	(0.063)
Number of observations	3,786	3,786
Number of households	1,069	1,069
R-squared	0.101	0.092

Notes: All specifications include controls for wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, self-employment status, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged full-time status for both spouses (*t-1*, *t-2*). Robust standard errors, clustered at the household level, are reported in parentheses. Each regression also includes time and regional dummies, and individual fixed-effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table 7. Current and past impacts of lottery wins (*SURE estimates*)

	Male	Female
Dependent variable: Annual hours of work		
Lottery win *t*		
Self	-10.304	17.542
	(11.391)	(12.913)
Spouse	7.160	-31.834***
	(12.969)	(11.342)
Lottery win *t-1*		
Self	8.851	5.195
	(11.032)	(12.566)
Spouse	-22.579*	-10.933
	(12.612)	(10.973)
Lottery win *t-2*		
Self	4.384	-21.485*
	(10.715)	(12.390)
Spouse	0.804	6.063
	(12.439)	(10.650)
Number of observations	3,786	3,786
Number of households	1,069	1,069
R-squared	0.632	0.787

Notes: All specifications include controls for wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, self-employment status, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged annual hours of work for both spouses (*t-1*, *t-2*). Standard errors in parentheses. Each regression also includes time and regional dummies. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table 8. Current and past impacts of lottery win amounts (*SURE estimates*)

	Male	Female
Dependent variable: Annual hours of work		
Small lottery win *t*		
Self	-7.857	18.355
	(11.658)	(13.151)
Spouse	6.520	-35.343***
	(13.207)	(11.605)
Medium lottery win *t*		
Self	-32.573	1.799
	(74.035)	(158.570)
Spouse	-20.828	-5.680
	(159.406)	(73.664)
Large lottery win *t*		
Self	-47.862	-23.589
	(47.907)	(60.011)
Spouse	15.894	40.670
	(60.285)	(47.681)
Small lottery win *t-1*		
Self	9.541	5.274
	(11.237)	(12.804)
Spouse	-17.713	-9.963
	(12.852)	(11.178)
Medium lottery win *t-1*		
Self	14.450	-94.577
	(75.725)	(95.933)
Spouse	-27.244	-89.120
	(96.329)	(75.349)
Large lottery win *t-1*		
Self	-3.101	9.165
	(52.923)	(62.623)
Spouse	-146.752**	5.031
	(62.932)	(52.686)
Small lottery win *t-2*		
Self	2.504	-22.383*
	(10.924)	(12.598)
Spouse	-1.536	7.849
	(12.648)	(10.860)
Medium lottery win *t-2*		
Self	53.729	47.242
	(59.200)	(88.123)
Spouse	2.126	-20.906
	(88.546)	(58.931)
Large lottery win *t-2*		
Self	24.868	1.838
	(58.794)	(71.375)
Spouse	69.338	-58.816
	(71.710)	(58.537)
Number of observations	3,786	3,786
Number of households	1,069	1,069
R-squared	0.633	0.787

Notes: All specifications include controls for wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, self-employment status, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged annual hours of work for both spouses (*t-1*, *t-2*). Standard errors in parentheses. Each regression also includes time and regional dummies, and individual fixed-effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table 9. Including individuals over 65: Lottery wins (*individual fixed-effects estimates*)

	Male	Female
Dependent variable: Annual hours of work		
Lottery win *t*		
Self	-12.740	8.897
	(10.645)	(15.410)
Spouse	24.087*	-27.188**
	(12.535)	(13.075)
Lottery win *t-1*		
Self	4.522	15.321
	(13.210)	(16.272)
Spouse	-4.781	-29.241**
	(13.954)	(14.436)
Lottery win *t-2*		
Self	4.264	2.169
	(10.676)	(13.950)
Spouse	-2.672	4.473
	(13.110)	(14.415)
Number of observations	3,812	3,812
Number of households	1,076	1,076
R-squared	0.157	0.280

Notes: All specifications include controls for wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, self-employment status, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged annual hours of work for both spouses (*t-1*, *t-2*). Robust standard errors, clustered at the household level, are reported in parentheses. Each regression also includes time and regional dummies, and individual fixed-effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table 10. Including individuals over 65: Lottery win amounts (*individual fixed-effects estimates*)

	Male	Female
Dependent variable: Annual hours of work		
Small lottery win *t*		
Self	-10.928	11.249
	(10.699)	(16.138)
Spouse	19.887	-31.419**
	(12.205)	(13.259)
Medium lottery win *t*		
Self	-74.538	38.029
	(79.531)	(76.665)
Spouse	73.966	43.952
	(49.200)	(35.208)
Large lottery win *t*		
Self	-31.167	-68.995
	(35.551)	(60.683)
Spouse	137.840*	71.764
	(80.873)	(61.497)
Small lottery win *t-1*		
Self	3.181	21.006
	(13.440)	(16.793)
Spouse	-2.880	-30.525**
	(14.137)	(15.004)
Medium lottery win *t-1*		
Self	2.652	-95.378
	(39.715)	(149.214)
Spouse	40.961	-9.312
	(35.181)	(29.415)
Large lottery win *t-1*		
Self	47.879	-156.337***
	(30.782)	(58.119)
Spouse	-74.758	32.338
	(94.302)	(47.885)
Small lottery win *t-2*		
Self	4.358	4.034
	(11.192)	(14.018)
Spouse	-3.959	5.227
	(12.939)	(15.093)
Medium lottery win *t-2*		
Self	-20.566	65.094
	(50.422)	(62.636)
Spouse	40.978	13.057
	(29.810)	(37.840)
Large lottery win *t-2*		
Self	42.966	-151.859**
	(34.254)	(59.737)
Spouse	8.956	4.625
	(108.176)	(51.291)
Number of observations	3,812	3,812
Number of households	1.076	1,076
R-squared	0.160	0.284

Notes: All specifications include controls for wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, self-employment status, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged annual hours of work for both spouses (*t-1*, *t-2*). Robust standard errors, clustered at the household level, are reported in parentheses. Each regression also includes time and regional dummies, and individual fixed-effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table 11. Omitting self-employed workers: Lottery wins (*individual fixed-effects estimates*)

	Male	Female
Dependent variable: Annual hours of work		
Lottery win *t*		
Self	-6.470	2.247
	(8.967)	(15.658)
Spouse	24.188*	-29.008**
	(13.075)	(13.767)
Lottery win *t-1*		
Self	15.274	7.498
	(12.172)	(16.543)
Spouse	-3.491	-29.247*
	(12.076)	(15.897)
Lottery win *t-2*		
Self	10.042	-0.958
	(10.230)	(13.794)
Spouse	-5.370	7.863
	(11.974)	(14.910)
Number of observations	3,538	3,538
Number of households	984	984
R-squared	0.122	0.278

Notes: All specifications include controls for wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged annual hours of work for both spouses (*t-1*, *t-2*). Robust standard errors, clustered at the household level, are reported in parentheses. Each regression also includes time and regional dummies, and individual fixed-effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table 12. Omitting self-employed workers: Lottery win amounts (*individual fixed-effects estimates*)

	Male	Female
Dependent variable: Annual hours of work		
Small lottery win *t*		
Self	-3.864	2.658
	(8.948)	(16.099)
Spouse	17.595	-34.351**
	(12.805)	(14.106)
Medium lottery win *t*		
Self	-99.700	29.963
	(79.978)	(86.635)
Spouse	85.402*	67.313*
	(49.858)	(37.301)
Large lottery win *t*		
Self	-35.244	-19.782
	(36.530)	(60.631)
Spouse	179.421**	75.493
	(71.396)	(67.429)
Small lottery win *t-1*		
Self	14.541	11.863
	(12.305)	(16.947)
Spouse	-2.790	-31.522*
	(11.896)	(16.338)
Medium lottery win *t-1*		
Self	20.376	-105.440
	(34.774)	(150.357)
Spouse	47.189	-24.039
	(34.276)	(25.288)
Large lottery win *t-1*		
Self	39.106	-112.675**
	(26.944)	(55.273)
Spouse	-52.684	55.916
	(119.032)	(50.664)
Small lottery win *t-2*		
Self	11.013	2.415
	(10.624)	(13.991)
Spouse	-5.110	7.625
	(11.770)	(15.495)
Medium lottery win *t-2*		
Self	-54.781	59.800
	(56.070)	(57.361)
Spouse	43.668	9.485
	(31.903)	(36.862)
Large lottery win *t-2*		
Self	55.682	-170.265**
	(41.654)	(78.909)
Spouse	-21.698	23.235
	(127.878)	(57.006)
Number of observations	3,538	3,538
Number of households	984	984
R-squared	0.127	0.282

Notes: All specifications include controls for wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged annual hours of work for both spouses (*t-1*, *t-2*). Robust standard errors, clustered at the household level, are reported in parentheses. Each regression also includes time and regional dummies, and individual fixed-effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table 13. Current and past impacts of lottery wins (*individual fixed-effects estimates, no same amounts*)

	Male	Female
Dependent variable: Annual hours of work		
Lottery win *t*		
Self	-11.574	2.140
	(9.937)	(17.149)
Spouse	22.287	-24.879*
	(13.671)	(13.857)
Lottery win *t-1*		
Self	10.609	9.033
	(12.730)	(18.228)
Spouse	-1.340	-30.817*
	(13.290)	(16.044)
Lottery win *t-2*		
Self	1.749	6.548
	(10.283)	(14.944)
Spouse	-0.229	6.088
	(12.213)	(15.900)
Number of observations	3,643	3,643
Number of households	1,053	1,053
R-squared	0.155	0.274

Notes: All specifications include controls for wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, self-employment status, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged annual hours of work for both spouses (*t-1*, *t-2*). Robust standard errors, clustered at the household level, are reported in parentheses. Each regression also includes time and regional dummies, and individual fixed-effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table 14. Current and past impacts of lottery win amounts (*individual fixed-effects estimates, no same amounts*)

	Male	Female
Dependent variable: Annual hours of work		
Small lottery win *t*		
Self	-10.848	2.838
	(9.968)	(17.614)
Spouse	18.454	-30.633**
	(13.418)	(14.359)
Medium lottery win *t*		
Self	-29.838	-52.648
	(52.260)	(35.005)
Spouse	42.045	43.524
	(34.050)	(38.266)
Large lottery win *t*		
Self	-22.363	-36.289
	(31.895)	(61.436)
Spouse	107.768	75.606
	(85.121)	(70.970)
Small lottery win *t-1*		
Self	9.412	13.254
	(12.719)	(18.728)
Spouse	2.931	-32.826*
	(13.400)	(16.787)
Medium lottery win *t-1*		
Self	31.418	-102.391
	(53.483)	(148.604)
Spouse	38.400	-2.102
	(33.145)	(32.710)
Large lottery win *t-1*		
Self	30.712	-113.006***
	(32.242)	(40.155)
Spouse	-177.449	13.066
	(126.856)	(54.754)
Small lottery win *t-2*		
Self	2.875	10.294
	(10.636)	(14.999)
Spouse	2.156	7.191
	(11.873)	(16.654)
Medium lottery win *t-2*		
Self	-10.359	92.550
	(50.280)	(64.895)
Spouse	47.637	29.617
	(30.017)	(40.872)
Large lottery win *t-2*		
Self	5.743	-187.239**
	(27.523)	(72.565)
Spouse	-164.369	-45.283
	(147.242)	(48.345)
Number of observations	3,643	3,643
Number of households	1,053	1,053
R-squared	0.158	0.278

Notes: All specifications include controls for wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, self-employment status, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged annual hours of work for both spouses (*t-1*, *t-2*). Robust standard errors, clustered at the household level, are reported in

parentheses. Each regression also includes time and regional dummies, and individual fixed-effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

APPENDIX

Table A1. Labor force participation and lottery wins (*individual fixed-effects estimates*)

	Male	Female
Dependent variable: LFP		
Lottery win *t*		
Self	-0.010	0.029**
	(0.010)	(0.013)
Spouse	0.011	0.004
	(0.011)	(0.012)
Lottery win *t-1*		
Self	-0.001	-0.002
	(0.009)	(0.013)
Spouse	-0.003	-0.004
	(0.010)	(0.012)
Lottery win *t-2*		
Self	-0.013	-0.027**
	(0.010)	(0.014)
Spouse	-0.013	-0.017
	(0.011)	(0.011)
Number of observations	7,175	7,175
Number of households	1,798	1,798
R-squared	0.096	0.137

Notes: All specifications include controls for predicted wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, self-employment status, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged LFP for both spouses (*t-1*, *t-2*). Robust standard errors, clustered at the household level, are reported in parentheses. Each regression also includes time and regional dummies, and individual fixed-effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table A2. Labor force participation and lottery win amounts (*individual fixed-effects estimates*)

	Male	Female
Dependent variable: LFP		
Small lottery win *t*		
Self	-0.009	0.030**
	(0.010)	(0.013)
Spouse	0.011	0.002
	(0.011)	(0.012)
Medium lottery win *t*		
Self	-0.005	-0.066
	(0.013)	(0.095)
Spouse	0.033	0.034
	(0.060)	(0.053)
Large lottery win *t*		
Self	-0.057	0.022
	(0.053)	(0.056)
Spouse	-0.007	-0.003
	(0.064)	(0.038)
Small lottery win *t-1*		
Self	0.001	0.002
	(0.009)	(0.013)
Spouse	-0.005	-0.007
	(0.010)	(0.012)
Medium lottery win *t-1*		
Self	-0.021	-0.117
	(0.015)	(0.091)
Spouse	0.092	0.055
	(0.060)	(0.081)
Large lottery win *t-1*		
Self	-0.050	-0.051
	(0.048)	(0.050)
Spouse	0.040**	0.067*
	(0.019)	(0.037)
Small lottery win *t-2*		
Self	-0.011	-0.028**
	(0.010)	(0.014)
Spouse	-0.016	-0.013
	(0.011)	(0.011)
Medium lottery win *t-2*		
Self	-0.048*	0.086*
	(0.025)	(0.049)
Spouse	0.085	-0.029
	(0.083)	(0.053)
Large lottery win *t-2*		
Self	-0.053	0.038
	(0.053)	(0.043)
Spouse	0.029	-0.127
	(0.024)	(0.077)
Number of observations	7,175	7,175
Number of households	1,798	1,798
R-squared	0.097	0.139

Notes: All specifications include controls for predicted wages of both spouses (in *t*, *t-1*, *t-2*), age and age squared, self-employment status, marital status, household size, number of children, household non-labor income (in *t*, *t-1*, *t-2*), household wealth (in *t*, *t-1*, *t-2*) and lagged LFP for both spouses (*t-1*, *t-2*). Robust standard errors, clustered at the household level, are reported in parentheses. Each regression also includes time and regional dummies, and individual fixed-effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.