

The Sentimental Propagation of Lottery Winnings: Evidence from the Spanish Christmas Lottery

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Abstract

We exploit the Spanish Christmas lottery and consumer confidence survey data to investigate the impact of highly geographically clustered lottery winnings on consumer sentiment and durable consumption. We show that, albeit not receiving wins, consumers in winning provinces report substantially more optimistic beliefs about the economic conditions in Spain than consumers in other regions. We argue that this variation in beliefs is orthogonal to changes in regional fundamentals and find that the surge in sentiment affects durable consumption spending intentions. Young, less educated, low-income and unemployed individuals react stronger to the sentiment shock. At the aggregate level, lottery wins induce significant demand effects, reducing unemployment and increasing job creation and CPI prices.

JEL Codes: D12, E21, E32, E62

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1 Introduction

In the classical quote of Chapter 12 of General Theory, [Keynes \(1936\)](#) mentions: “a characteristic of human nature is...that a large proportion of our positive activities depend on spontaneous optimism rather than on a mathematical expectation.” Many studies have resuscitated this idea to show that expectations shape economic behavior. Early studies like the ones of [Blanchard \(1993\)](#) and [Hall \(1993\)](#) associate the 1990-1991 recession with an exogenous shift in pessimism. Similarly, [Akerlof and Shiller \(2010\)](#) argued that “declining animal spirits” were the main reason for the Great Recession. [Cochrane \(1994\)](#) rationalized the positive relation between sentiment and economic activity by arguing that sentiment reflects news about future economic conditions. Many years later [Beaudry and Portier \(2006\)](#) brought this link at the center of macroeconomic research and later [Barsky and Sims \(2012\)](#) established that confidence innovations relate to news about the business cycle but also that animal spirits could also matter.

Most of those studies provided indirect evidence on the effects of autonomous changes in sentiments in economic activity. Exceptions are the work of [Lagerborg, Pappa and Ravn \(2022\)](#) who show that sentiments are an important driver of cyclical fluctuations using mass shootings as an instrument for autonomous changes in sentiments that are unrelated to fundamentals, and the work of [Gillitzer and Prasad \(2018\)](#), [Benhabib and Spiegel \(2019\)](#) and [Mian, Sufi and Khoshkhou \(2021\)](#) who use variation in consumer sentiment associated with political preferences to investigate whether innovations to consumer sentiment have a causal effect on consumption. This paper uses the exceptional nature of the Spanish Christmas lottery to estimate jointly the individual and aggregate effects of lottery wins that are shared among many people living in the same province and accentuates the role of consumer confidence for the transmission of these shocks¹. We show that lottery shocks impact significantly consumers’ sentiment and this brings demand effects that improve macroeconomic conditions in the winning regions.

The Spanish Lottery has three characteristics that are different from other lotteries: (i) Large size and quantity of prizes each year, (ii) Clustering of prizes to individuals living in the same Spanish province, and (iii) High level of participation. Each winner of the first prize, known as *El Gordo* (the fatty), receives around €20,000 per euro played, and the standard ticket costs €20. Moreover, winners of the second and third top prizes receive €6,250 and €2,500 per euro played, respectively. Importantly for our experiment, winners tend to be geographically clustered. Instead of awarding one big prize to a few individuals, as is the case of most lottery schemes, the top prizes are awarded to several thousand individuals sharing the same ticket number. Usually, one lottery outlay sells most (if not all) of the series of a single number in the

¹The response of consumption and hours to lottery income for lottery winners has been studied extensively. (See, e.g., [Imbens, Rubin and Sacerdote \(2001\)](#) for evidence using a lottery in Massachusetts in the mid-1980s, [Fagereng, Holm and Natvik \(2018\)](#) using Norwegian data, [Lindqvist, Östling and Cesarini \(2020\)](#), using Swedish data, [Oswald and Winkelmann \(2019\)](#) using German data, [Kuhn et al. \(2011\)](#) using lottery winnings of Dutch Postcode Lottery and [Picchio, Suetens and van Ours \(2018\)](#) using Dutch State Lottery prizes. Here, we do not wish to analyze the effects of the income shock for the households that receive money transfers. Instead, we want to analyze the effects of the positive news of the lottery arrival on sentiment in the region.

lottery. The winning provinces receive an income shock equivalent, on average, to 0.2 percent of their GDP. For the provinces that receive the maximum lottery prize per capita, the income shock represents, on average, around 3.4 percent of provincial GDP.² Finally, because sharing Christmas lottery tickets is a social tradition, the lottery has an extremely high participation rate that is reflected in the high prizes for the winners.

We employ data from the monthly consumer sentiment survey conducted by the Center of Sociological Research (CIS). Each month around 1,000-1,500 nationally representative households across Spain are asked questions related to their past and intended consumption behavior and their current views and expectations about their own personal finances, as well as about their employment status considering the evolution of the Spanish labor market and the overall economic outlook of Spain. Following the University of Michigan Survey, we construct regional indices of confidence for the current (ICC) and expected macroeconomic conditions (ICE) and show using local projections (See, e.g., [Jordà \(2005\)](#)) that confidence reacts positively and significantly on impact to lottery wins at the regional level. To explore in depth the sentimental propagation of lottery wins, we use binary choice and ordinal regression models to study the effects of the lottery win on individual sentiment and consumption behavior using the same survey data. Lottery wins change significantly consumer sentiment at the individual level. Households become temporarily more optimistic about their current and future income and employment and tend to update upwards their expectations about the evolution of the Spanish economy if they live in a province that won the lottery. In line with the results found in the existing literature (see, e.g., [Kuhn et al. \(2011\)](#) and [Attanasio et al. \(2020\)](#)), we also find that households in winning provinces increase significantly their consumption of durable goods, in particular, the consumption of furniture and vehicles - relative to household residing out of these provinces - the first six months after the lottery win.

The increase in sentiment can be attributed to both news about future economic fundamentals and animal spirits. We try to disentangle the two channels using all available data and provide convincing evidence that lottery wins satisfy the exclusion restriction of having no direct effect on spending intentions. First, given that the probability of being a prize receiver in a winning province is only 0.015%, the lottery win is most likely unrelated to both current and future individual income. Second, surveyed households do not report a significant increase in their ability to pay bills after a lottery win, indicating that the lottery win does not increase the individual income of the respondents.

The Spanish Christmas lottery and in particular its top prize, *El Gordo*, has a long history in Spain, and people probably understand that if a town in their region wins the lottery, this will probably stimulate the regional economy. In order to discard such an interpretation, we first notice that sentiment increases significantly for questions related to the evolution of the Spanish economy as a whole. If winning the lottery carries news about a possible expansion in the

²The average lottery prize as a share of GDP has been computed using data from 2005-2017. Unfortunately, there is no available GDP data at the province level since 2018.

region, rational agents should not expect this expansion to affect the rest of Spain. Hence, the positive reaction of expectations about the Spanish economy can only be attributed to increased optimism rather than news about regional fundamentals. This is further confirmed when we look at regions with active secessionist movements, like Catalonia and the Basque Country where people can clearly distinguish between national and regional conditions. In these regions, although agents are in general pessimistic about the future of the Spanish economy relative to other regions, the change in sentiment they experience is not different than the change in sentiment observed in other regions after a lottery win. Finally, we show that business sentiment does not react significantly to the lottery shock.

To see if the beliefs captured in sentiment surveys affect consumption, we match individual consumers' expectations of future economic conditions from the consumer sentiment survey to their intended durable consumption spending. We find that consumers who have a more positive economic outlook for their future employment based on their assessment of the Spanish labor market and a more positive outlook for the future economic conditions in Spain report more positive spending intentions. We also show that lottery wins affect more significantly the sentiment and intended consumption of young, less educated, unemployed, and low-income households and that the effect of lottery wins on sentiment is stronger during recessions.

Next, we examine the dynamic effects of the Spanish lottery shock on macroeconomic conditions using monthly Spanish province-level data. We find that lottery wins have significant and economically important stimulative effects at the provincial level. On average, after a province wins a lottery of 1000 euros per capita the unemployment rate falls sluggishly reaching its maximum fall (-0.3 percentage points) after a year and it remains significantly low 20 months after the initial impact. The significant drop in unemployment cannot be attributed to a reduction in participation induced by the wealth effect of the lottery win. We show that the number of short and long-run contracts signed by individuals registered as unemployed in the National Employment Agency and labor market tightness (defined as the ratio of total contracts per number of unemployed) rise significantly and persistently after the lottery prize shock. Furthermore, the price level in the winning province increases persistently reaching its maximum 17 months after the shock, and exhibits a slow mean reversion, returning to its pre-shock value after approximately two years. We also explore whether the lottery shocks have effects on the housing market and find that neither rental prices nor mortgages are significantly affected by the shock in the winning provinces.

We are not the first to use the data from the Spanish Christmas Lottery to address economic issues. [Bagues and Esteve-Volart \(2016\)](#) use lottery prizes to identify random increases in provincial income and study how it affects electoral outcomes. They also report significant expansionary effects of lottery wins using annual data and show that the incumbent party tends to obtain relatively more votes in those provinces that won the prize in election years. [Bermejo et al. \(2021\)](#) also use annual data and find that firm and job creation rises significantly in winning

provinces, suggesting that the money windfalls induce supply-side effects, especially in recessions and for firms that are financially constrained. Relative to these studies, we use more granular and monthly data and bring evidence on the effects of lotteries on sentiment apart from their macroeconomic consequences. Moreover, our results support that the short-run expansion in the winning provinces is demand-driven and operates through sentiment. [Kent and Martinez \(2020\)](#) also investigate how lottery wins impact local economic activity. By means of historical annual data since 1900, they find that consumption increases in those towns that won the lottery, which is consistent with our results. However, they find evidence supporting that lottery wins lead to a slowdown in economic activity and deter new migration to towns that won the big prizes in recent decades. By contrast, we rather focus on the short-run effects of lottery prizes on demand and consumer sentiment by using more recent monthly data.

The remainder of the paper is structured as follows. Section 2 describes the data. Section 3 introduces the methodology and presents the results on the effects of lottery wins on sentiments at the aggregate and the individual level. Section 4 presents the effects of lottery wins on consumption at the individual level. Section 5 presents the aggregate effects of lottery wins and Section 6 describes various robustness checks. Section 7 concludes. An Online Appendix gathers further results discussed in the main text, as well as the outputs of several robustness checks.

2 Data

2.1 Spanish Christmas Lottery

The Spanish Christmas Lottery (*Lotería de Navidad*) is a national lottery scheme that is held every Christmas since 1812, and is considered one of the biggest lottery events worldwide. The draw takes place on December 22nd of each year and it is organized by the National Lottery and Gambling Agency (*Loterías y Apuestas del Estado*).

Christmas Lottery tickets have five-digit numbers and are available at a cost of €200. The amount of numbers played between 2005 and 2010 was 85,000 and has increased to up to 100,000 numbers since 2011. Each number is printed multiple times in so-called *series* (an average of 170 series per number were printed every year since 2005). Because the €200 tickets may be too expensive for many purchasers, each of the tickets is split into 10 identical sub-tickets (or fractions) sold for €20. Each one of these fractions is known as *décimo* (1/10 of the value of the total ticket). It is very common to buy a share of a *decimo*, called a *participación* (participation in English), through local associations, workplaces, sports teams, etc. These shares usually cost between €1 and €5.

Lottery tickets are sold in official lottery outlays located throughout the country.³ Out of the total lottery emission, 70% is distributed as prizes while the remaining 30% is devoted to

³Since 2015 lottery prizes can also be purchased online. However, the lottery online sales only represent about 1% of the total sales.

commissions paid to outlets, internal revenue, and administration costs. There are three main prizes: the top prize, popularly known as *El Gordo*, which awards to each fraction holder of the winning number €20,000 per euro played, and the second and third prizes which reward winners with €6,250 and €2,500 per euro played, respectively. This means that all holders of a *decimo* of the top prize winning number would win €400,000. The individuals holding a *decimo* of the second or third prize winning number would win €125,000 and €50,000, respectively. The top prizes represent around half of the total payout assigned to prizes. There are also several smaller prizes ranging from €300 to €1 per euro played. Usually, one lottery outlay sells most (if not all) of the series of a single number. The Spanish Christmas Lottery constitutes a collective game, meaning that Spaniards like to share *decimos* with relatives, friends, and co-workers. This implies not only that most of the winners of a lottery number usually live in the same area (province or village) but also that the main top prizes end up being distributed as smaller prizes to several individuals living in the same location.

2.1.1 Lottery Data

Data on prizes and expenditure on Christmas Lottery by province were assembled using information from the National Lottery and Gambling Agency (*Sociedad Estatal Loterías y Apuestas del Estado*) and the dataset constructed by [Bagues and Esteve-Volart \(2016\)](#). Although holders of winning tickets can cash out the corresponding lottery prize on the same day of the draw (December 22nd), we impute reception of lottery prizes to next January as it usually takes time to actually receive the money transfer (bank transaction costs, bank holidays, etc.) For that reason, we use observations regarding the gross income distributed by the three main top prizes in each province, ranging from January 2006 to 2020. We do not observe the remaining several smaller prizes that are also awarded the Christmas Lottery. However, given the random nature of the event, it can be assumed that their geographical distribution is proportional to the lottery expenditure by province (see also, [Bagues and Esteve-Volart \(2016\)](#)). We compute the after-tax revenue derived from the top lottery prizes and obtain a measure of net lottery-prize revenue per capita. We also observe the expenditure on the Christmas lottery per capita at the province level over the same time period.

Panel A of Table 1 presents descriptive statistics for the Christmas lottery at the province level. The average individual pays out 58 Euros to the lottery and receives on average 19.9 Euros and their probability of winning is 0.007%. These numbers reveal that the choice to participate in the lottery is more sentimental than rational to start with. Panel B summarizes the Christmas lottery expenditure and top prizes per capita in the winning provinces. The average expenditure per capita in those Spanish provinces is around €61, while the average lottery prize is around €42 per capita and the probability of being a winner in a winning province is 0.015%.

Table 1: Summary Statistics - Christmas Lottery data at the province level

	Mean (1)	St. dev. (2)	Min. (3)	Max. (4)	N (5)
A Christmas Lottery: All provinces					
Top prizes pc (in euros)	19.96	168.18	0.00	3414.72	750
Number awarded tickets (in 1000 pers.)	0.07	0.37	0.00	4.61	750
Top prizes (% of GDP)	0.08	0.76	0.00	14.81	650
Expenditure pc (in euros)	58.37	29.04	17.17	222.19	750
B Christmas Lottery: Winning provinces					
Top prizes pc (in euros)	41.47	240.74	0.02	3414.72	361
Number awarded tickets (in 1000 pers.)	0.15	0.53	0.00	4.61	361
Top prizes (% GDP)	0.20	1.16	0.00	14.81	278
Expenditure pc (in euros)	60.72	28.36	20.80	222.19	361
C Christmas Lottery: Winning provinces with max prize pc					
Top prizes pc (in euros)	722.49	966.83	70.74	3414.72	15
Number awarded tickets (in 1000 pers.)	1.66	1.45	0.09	4.61	15
Top prizes (% GDP)	3.35	4.41	0.22	14.81	13
Expenditures pc (in euros)	70.43	29.42	36.85	128.51	15

Top prizes and expenditures per capita are computed using data from May 2005 - Jan 2021. Top prizes (% of GDP) are computed using data from 2005 to 2018

Panel C of Table 1 reports summary statistics for those provinces that were awarded the maximum prize per capita in each year of our sample period. In these winning provinces, the average top lottery prize represents around 3.4% of provincial GDP and about €722 in per capita terms. The expenditures per capita reflect the high participation of Spaniards in the lottery while the variation in the rewards per capita suggests that in some cases the monetary transfers received by the winners are substantial. The numbers in this last table might justify the Spaniards' choice to participate in the lottery. Conditional on living in a province that won the maximum prize per capita, the probability of having a winning ticket varies between 0.009% and 0.461%. Hence, as often argued by Spanish people, participation in the lottery is justified by the fact that in case you do not participate you feel more like a loser. What we want to point out for the sake of our analysis is that the fraction of households within a "winning" province that actually won the lottery is really very small. We will return to this observation later in the following subsections.

2.2 Sentiment and Consumption Data

We collect individual-level data on Spanish confidence and consumption attitudes from monthly surveys conducted by the Center of Sociological Research, which follows closely the methodology adopted by the University of Michigan's Survey of Consumer Confidence, (*Centro de Investigaciones Sociológicas-CIS*) from April 2013 to January 2020 for which individual unit responses, as well as a full range of individual characteristics, are available. We start our sample in April 2013 because survey respondents were not reporting their household income before that date. Each month around 1,000-1,500 nationally representative households across Spain are asked questions related to their consumption of durable goods and own personal finances and employment status as well as about the economic situation of the Spanish economy.

The questions that concern consumers' assessment of their current and expected own financial and employment status and the state of the Spanish economy are summarized below:

1. **Q1S (Q1F)** Would you say that your household economic conditions are better off, worse off, or just about the same compared to six months ago (*in six months from now?*)?
2. **Q2S (Q2F)** Would you say that the current economic situation of Spain would allow you to improve your employment status, would worsen your employment status, would have no impact on your employment status compared to six months ago (*in six months from now?*)?
3. **Q3S (Q3F)** Would you say the current state of the Spanish economy is better, worse, or about the same compared to six months ago (*in six months from now?*)?

For each of these six questions, the surveyed households can either give a positive, neutral or negative answer. We code the answers in ascending order in the regressions.

Surveyed individuals are also asked whether they have purchased any durable goods during the past six months or whether they intend to buy durables in the next six months. We construct the following indices to measure the responses of durable consumption:

1. **(DC)** denotes durable consumption and takes value 1 if the household has purchased at least one durable good in the past six months.
2. **(FDC)** denotes future durable consumption and takes values from 1 to 3 if the household expects their consumption on any durable good to decrease, remain the same or increase in one year from now.

Moreover, households are asked to specify what type of durable goods they have purchased. To take advantage of this information we construct indices for the following durable goods categories: (i) car and motorbikes (**DCcar**); (ii) furniture (**DCfurn**); (iii) large home appliances (**DCLargeApp**) and (iv) small appliances (**DCSmallApp**). For each of these categories, the index takes the value 1 if the household has purchased at least one of these items.

We additionally retrieve socio-economic information on each interviewed household—such as age, gender, marital status, employment status, income quantile, and education level. For the sake of brevity, we provide details on the individual characteristics data and also present tables describing the percentage of positive, neutral and negative answers by households' socio-economic characteristics and durable consumption and consumer sentiment questions, in the Online Appendix (Section B and B.1, respectively). Younger, highly-educated, and high-income households are more likely to have purchased a vehicle, furniture, and small and large home appliances in the near past. The opposite holds for older, less-educated, and lower-income households. As regards consumer sentiment, highly-educated, not-married, employed households tend to be more optimistic regarding their current household income. In contrast, less-educated, poorer and older households tend to give, on average, more negative answers when asked about their current and future economic and financial conditions and about the actual and future evolution of the Spanish economy.

2.3 Macroeconomic Data

Data on unemployment and labor contracts by province is obtained at monthly frequency from the National Employment Agency (*Servicio Público Estatal de Empleo*). Provincial and national CPI, number of mortgages, and population are obtained from the Spanish Statistical Office (*Instituto Nacional de Estadística*). We obtain also monthly data on employment by province from Social Security Statistics (*Seguridad Social Estadísticas, SSE*). According to Spanish law, any employer must register their employees with the Spanish Social Security authorities. We use the data available by SSE to recover employment dynamics at the province level. We construct a series for the unemployment rate coming from the two distinct data sources. According to the constructed data, the average weighted unemployment rate at the province level is 20.7 percent, while at the national level, this number equals 17.5 percent for the period under consideration. We believe that this divergence is due to measurement errors in the data on employment provided by the SSE and, for that reason, we also use the ratio of unemployed over province population as an alternative measure for tracking down the dynamics of the labor market and present results for the responses of logged unemployment. For the aggregate unemployment rate series at monthly frequency for Spain we retrieve data from the OECD indicators database. The data has been seasonally adjusted using the Seasonal and Trend decomposition provided by Loess (STL decomposition). See the Online Appendix [A.2](#) for more complete data definitions and sources.

3 Effects of lottery wins on sentiment

3.1 Effects of Lottery Shocks on Aggregate Sentiment

We start by investigating whether the lottery prize arrival in a region affects aggregate regional sentiment. To this end, following the methodology of the University of Michigan Survey, we aggregate the answers to the confidence questions across respondents and across questions at the province level to produce two broad indices: the Index of Current Economic Conditions (ICC) and the Index of Consumer Expectations (ICE). The ICC relates to current sentiment and is based on answers to the questions concerning consumers' assessment of their own current financial and economic situation as well as the current state of the Spanish economy (i.e., Q1S-Q3S). The ICE summarizes answers to questions about consumers' expectations for their future household finances, their employment status given the Spanish labor market conditions, and the evolution of the Spanish economy as a whole (i.e., Q1F-Q3F).

The Spanish consumer confidence survey is designed to be representative at the national level, but the CIS does not guarantee that the sample will be representative of the population within each separate province during each month. In order to mitigate measurement error in our data set due to sampling variation within the survey at the province level we average over two-month responses following [Aguiar, Hurst and Karabarbounis \(2013\)](#). Also, to keep the

representativeness of the consumer sentiment indices at the province level, we keep in our sample those monthly observations for which the provincial ICC and ICE are constructed with at least 25 respondents. A representativeness threshold of 25 respondents implies that we have at least 25 survey answers for each of the three questions included in the computation of ICE and ICC, respectively. The details about the construction of these aggregates are referred to in the Online Appendix B.3 for economy of space.

To control for potentially confounding events, other than lottery wins, that may affect consumer sentiment in the winning provinces and to provide a more causal interpretation to the results, we follow Jordà (2005) and adopt local projections (LP) for the longest possible sample we have available, that is, 2011M11 - 2020M1. For each variable and each horizon $h \geq 0$ we run the following linear LP model:

$$S_{j,t+h} = \alpha_{j,h} + \beta_h \text{LotteryPrize}_{j,t} + \delta_h \text{LotteryExp}_{j,t-1} + \sum_{k=1}^{12} \psi_{k,h} X_{t-k} + \sum_{s=1}^{12} \lambda_s M_s + \varepsilon_{j,t+h} \quad (1)$$

where $S_{j,t+h}$ is the variable of interest for province j at time $t+h$, $\text{LotteryPrize}_{j,t}$ is after-tax Christmas Lottery prize per capita (in 1000 euros) in province j at time t and $\text{LotteryExp}_{j,t}$ is the corresponding Christmas Lottery expenditure per capita in province j at time $t-1$.

We include Christmas Lottery expenditures in our regression since this variable might affect the probability of winning the lottery *in a specific province* and also to identify correctly the treatment effect and make our results comparable to those in previous studies (See Bagues and Esteve-Volart (2016) and Bermejo et al. (2021)). The Christmas Lottery event is random and, thus, the coefficient β_h would identify the causal effect of the lottery shock at time t in province j on consumer sentiment at time $t+h$ in province j . To make sure our results are not driven by local or aggregate shocks that correlate spuriously with the regional money windfalls, the vector $X_{j,t}$ includes lags of provincial and aggregate unemployment rate and CPI inflation. To also control for any potential pre-trend in consumer sentiments, we add to our specification four lags of sentiment indices and add province-fixed effects α_j and a set of monthly dummies M_s in equation (1). All variables are detrended using a fourth-order polynomial.⁴ Standard errors are robust and clustered at the province level.

Figure 1 documents that winning the lottery rewards strongly affects aggregate sentiment. After a lottery shock, both sentiment indices for current and future economic conditions significantly increase for up to one year. Since the indices range between 0 and 200, their response implies that winning a lottery prize can change on average the households' sentiment in a province from being completely pessimistic about the economic conditions to being completely optimistic⁵. One might worry that when we perform this exercise we do not control for the fact that lottery

⁴In the Online Appendix E.4 we show that results are similar if we use growth rates or use the HP filter to detrend the data.

⁵Similar results hold for the lottery rewards net of expenditure for lottery tickets. See Figure 5 in the Online Appendix E.2

expenditure might be endogenous to sentiment. In Online Appendix A.1 we investigate whether the two aggregate sentiment indices affect the per capita lottery expenditure. Results do not support any significant causal relationship between aggregate sentiment and lottery expenditures neither contemporaneously nor at any lags.

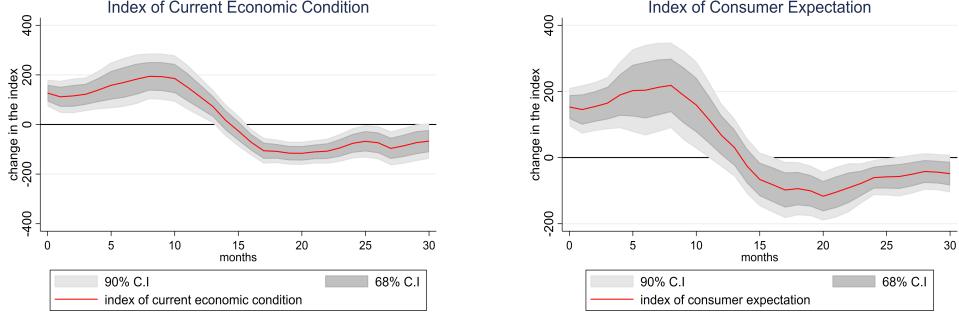


Figure 1: Effect of Christmas Lottery Prizes on the Index of Current Economic Condition and the Index of Consumer Expectation

Impulse responses to Christmas Lottery prizes. The left panel presents the responses in the linear LP model (1) for the index of consumer current condition, while the right panel presents the responses of the index of consumer expectation. To increase the representativeness of the indices at the regional level, we focus on data with at least 25 respondents in each province and, for each question, we use responses for two consecutive months. Christmas Lottery prizes are net of taxes and measured in 1000 euros per capita. The sample period covered is 2011M11-2020M1. Standard errors are robust and clustered at the province level and response functions are smoothed by centered moving average.

Table 2 reports the first-stage F-statistics for the null hypothesis that the lottery awards have no explanatory power for consumer confidence on impact and one month after the shock, respectively. We report F-test statistics for both ICC and ICE in our sample for the null of standard conditional homoscedasticity and clustered standard errors. The standard F-statistic for ICC equals 42.7 on impact, and lowers to 23.6 one month after the shock. Lottery wins affect less significantly sentiment about future economic conditions on impact, although the F-statistics it is still relatively high and equals 10.8 and surges to 65 one month after the shock.

Table 2: F-statistics of the first-stage regression of Christmas Lottery prizes on consumer confidence. Sample 2011M11-2020M1

Horizon (months)	F statistics for ICC	F statistics for ICE
$h = 0$	42.7	10.8
$h = 1$	23.6	65

Hence, lottery wins stimulate average sentiment significantly in the short run. [Bagues and Esteve-Volart \(2016\)](#) find that the incumbent party tends to obtain relatively more votes in the provinces that won the lottery, attributing this effect to a temporary increase in happiness that is making voters more lenient toward the incumbent. Their intuition is consistent with our findings. Yet, these authors do not use the surveys we exploit in this study and reach this conclusion by rejecting some alternative hypotheses. We instead provide direct evidence on the effects of lottery awards on economic sentiment.

3.2 Effects of Lottery Wins on Individual Sentiment

The results from aggregating sentiment responses strongly suggest that sentiment is affected positively by lottery wins. Given the aggregation issues mentioned above, now we evaluate the credibility of our results about the impact of lottery wins on consumer confidence, by looking at individual-level survey responses mapped to Spanish regions.

Existing studies suggest that lottery wins are associated with high overall life satisfaction that persists for over a decade (See, e.g., [Lindqvist, Östling and Cesarini \(2020\)](#)) and that winning the lottery brings happiness (See, e.g., [Oswald and Winkelmann \(2019\)](#)). Although we do not have information about happiness or life satisfaction in our sample and we cannot detect the winners, we do observe consumers' sentiments about economic conditions. In this section, we analyze whether those households living in awarded provinces tend to be more optimistic about their current and future household finances and employment prospects and about the current and future evolution of the general economic conditions in Spain. In order to study the effects of lottery wins on economic sentiment we adopt the following ordered probit model:

$$c_{i,j,t,s} = \alpha + \beta \text{LotteryPrize}_{j,t,s} + \delta \text{LotteryExp}_{j,t,s} + \gamma X_{i,j,t,s} + \sum_{s,j} \lambda_{s,j} D_{s,j} + \epsilon_{i,j,t,s} \quad (2)$$

where $c_{i,j,t,s}$ denotes the survey responses of individual i in province j at year t and month s regarding economic sentiment, $\text{LotteryPrize}_{j,s,t}$ is a dummy variable that takes the value of 1 if Christmas Lottery income is awarded in the province j at year t and month s and $\text{LotteryExp}_{j,t,s}$ is the corresponding expenditure on the Lottery in per capita terms.

Although the Christmas Lottery event is genuinely random and, thus, the coefficients β would identify the causal effect the lottery win in the province on individual sentiment, individual characteristics, as well as economic conditions, are also relevant in determining sentiment and household consumption (see also [Benhabib and Spiegel \(2019\)](#); [Mian, Sufi and Khoshkhou \(2021\)](#)). To address concerns regarding the endogeneity of household consumption choices with respect to individual economic conditions we include as further controls a vector of individual characteristics ($X_{i,j,t,s}$) The vector of individual characteristics comprises age, gender, marital status, education level, employment status, and household income. Finally, we also add a set of month times province dummies ($D_{s,j}$) control for regional shocks affecting sentiment.

Table 3 presents the estimation results of Equation (4) for the answers related to current and future household income (first and second column), current and future employment prospects based on the evolution of the labor market in Spain (third and fourth column) and current and future economic conditions in the Spanish economy (last two columns). The estimates clearly suggest that lottery wins affect significantly and positively consumers' sentiment about current and future economic conditions for all the variables they are questioned about.

Table 3: Survey evidence on the effects of Spanish Christmas Lottery on consumer sentiment

	(1)	(2)	(3)	(4)	(5)	(6)
	Household Income	Future Household Income	Employment Prospects	Future Employment Prospects	Spanish Economy	Future Spanish Economy
Lottery Prize Dummy	0.119*** (0.045)	0.131*** (0.037)	0.180*** (0.053)	0.099** (0.050)	0.113*** (0.040)	0.108** (0.043)
Lottery Expenditures	23.922*** (3.236)	14.205*** (2.966)	6.076** (2.385)	-18.748*** (2.819)	-5.767* (3.265)	-15.075*** (2.981)
Month \times Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Observations	117476	112951	112047	106086	114776	109441
Pseudo R^2	0.051	0.041	0.025	0.014	0.022	0.014

Columns (1)-(6) provide results from an ordered probit where the dependent variable are questions Q1C-Q1F. *Lottery Prize Dummy* takes value 1 if awarded Christmas lottery tickets were distributed in that province. *Lottery Expenditures* are expressed in 1000 euros per capita. Robust standard errors clustered by province are reported in parentheses. The sample includes information from consumer confidence monthly surveys conducted by the Spanish CIS between April 2013 and January 2020. Significance * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Following the analysis of the aggregate indices, we next examine the persistence of the sentiment responses to the lottery win. For that, we first redefine our treatment variable, $\text{LotteryPrize}_{j,t,s}$, to vary across provinces and months and interact it with monthly dummies $M_{s,t}$. Thus, our baseline empirical specification in Equation (4) is modified as follows:

$$c_{i,j,t,s} = \alpha + \sum_{s=1}^{11} \beta_s (\text{LotteryPrize}_{j,t} \times M_{s,t}) + \delta \text{LotteryExp}_{j,t,s} + \gamma X_{i,j,t,s} + \sum_{j,s} \lambda_{s,j} D_{s,j} + \epsilon_{i,j,t,s} \quad (3)$$

The interaction term $\sum_{s=1}^{11} \beta_s (\text{LotteryPrize}_{j,t} \times M_{s,t})$ takes value 1 in those provinces awarded with the Christmas Lottery not only in January but also in the subsequent months after the lottery draw. This captures the dynamic effects of the lottery shock on sentiment for those households living in the winning regions compared to households residing in the non-winning regions.

Figure 2 plots the β_s coefficients and their 95% confidence intervals from estimating Equation (3) using an ordered probit model where the dependent variable is each of the six consumer sentiment questions. The positive effect on sentiment for those households living in the winning provinces is instantaneous and dies out after five (six) months for current (future) household income (see Panel 2a). Consumers become also more optimistic about their current and future employment perspectives, conditional on the labor market of Spain, while their sentiment about current labor conditions persists their expectations about future employment subdue two months after the lottery shock (See Panel 2b). Similarly, Panel 2c shows that household's sentiment for the current and future state of the Spanish economy increases significantly on impact and one period after the lottery award and tones down in the subsequent months.

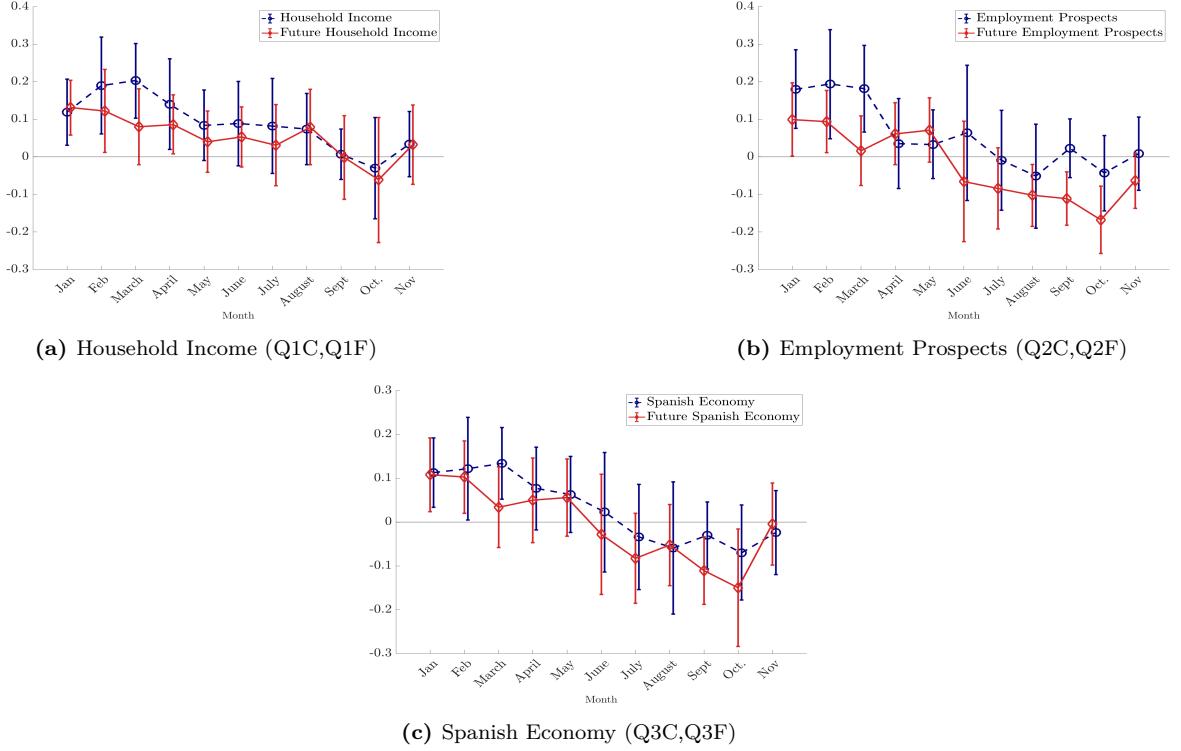


Figure 2: Dynamic effects of Christmas Lottery on consumer sentiment

The Figures plot the β_s coefficients and their 95% CI from estimating equation (3) using a ordered probit model. The dependent variables in Panel 2a Q1C (blue circled line) and Q1F (red diamond line). The dependent variables in Panel 2b are Q2C (blue circled line) and Q2F (red diamond line). The dependent variables in Panel 2c are Q3C (blue circled line) and Q3F (red diamond line) Standard errors are robust and clustered at the province level. We deliberately estimate the effects of lottery shocks on confidence up to November because the Christmas Lottery draw takes place every December in our sample.

4 Lottery wins, Consumer Sentiment and Durable Consumption

4.1 Effects of Lottery Shocks on Durable Consumption

Changes in expectations about future economic conditions are considered to be an important source of variation in consumer spending (see, e.g., [Blanchard \(1993\)](#), [Hall \(1993\)](#) and [Gillitzer and Prasad \(2018\)](#)). In what follows we perform various exercises to identify the link between consumer sentiment due to lottery wins and consumption behavior. We start by investigating whether the surveyed households living in winning provinces are more likely to report durable goods purchases during the subsequent months of the lottery wins. To do so, given that the survey question on durable consumption asks households about any durable goods purchases in the last six months, we adopt the same empirical specification as in Equation (3) and investigate how the responses about realized consumption for durables varies the months after the lottery wins. This strategy provides us with more flexibility in capturing the timing of household consumption choices after the lottery draw takes place.

Figure 3a plots the marginal effects associated with the β_s coefficients and their 95 percent confidence intervals from a probit model in Equation (3). The dependent variable is a dummy that takes the value of 1 when households give a positive answer to the question related to durable consumption in the last six months (DC). The evidence suggests that exogenous variations in local income affect significantly realized durable consumption. Households living in provinces awarded with Christmas lottery prizes are 5% more likely to report having purchased at least one durable good around six months after the win. It is worth highlighting that the surveyed households are asked about their durable consumption purchases in the last six months. This implies that the peak observed in Figure 3a after six months does not correspond to an increase in consumption after six months but rather that the maximal effect of the lottery on accumulated consumption shows six months after the shock.

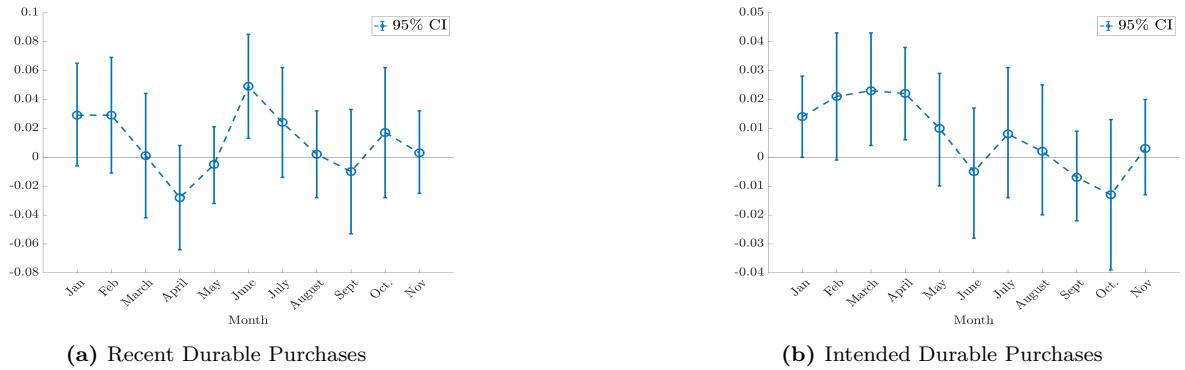


Figure 3: Effects of Christmas Lottery on realized and intended household durable consumption

This figure plots the marginal effects associated to the β_s coefficients and their 95% CI from estimating Equation (3) using a probit model and an ordered probit model, respectively. The dependent variable in Panel 3a is DC. The dependent variable in Panel 3b is FDC. Standard errors are robust and clustered at the province level

Luckily, the respondents, apart from being asked about the expectations about their personal finances and employment and the Spanish economy, they are also asked about their future durable consumption plans in the same survey (FDC question). Figure 3b plots the marginal effects associated with the β_s coefficients and their 95 percent confidence intervals from the ordered probit model when we use intended consumption as the dependent variable. To be precise, the dependent variable is a categorical variable that takes the values 1-3 if households plan to decrease/maintain/increase their durable consumption in the near future (one year from now). The estimated results suggest that living in provinces awarded with the Christmas lottery significantly increases the probability of households reporting an increase in future consumption by 2-3 percentage points in the next four months after the lottery win.

We continue by examining the responses of realized consumption for the different durable categories available in the survey. Figure 4 reveals that the significant increase in the probability of having purchased at least one durable good reported in Figure 3a is driven by household consumption of furniture and vehicles (see Panels 4a and 4b). In particular, households living in winning provinces are more likely to report having purchased a car or motorbike in the, two or

six months following the win. They are also around 3% more likely to report having purchased furniture goods in January and around 2% more likely to have purchased furniture in a period between five to seven months after the win. In the month after the win households are also 2% more likely to have purchased a computer or a large house appliance. These results align well with a version of the life-cycle consumption model in which households adjust the timing of durables purchases to smooth consumption (See, e.g., [Browning and Crossley \(2009\)](#)). They are also very consistent with the results of [Kuhn et al. \(2011\)](#) that also report significant effects of lottery wins on car expenditures and other durable expenditures.

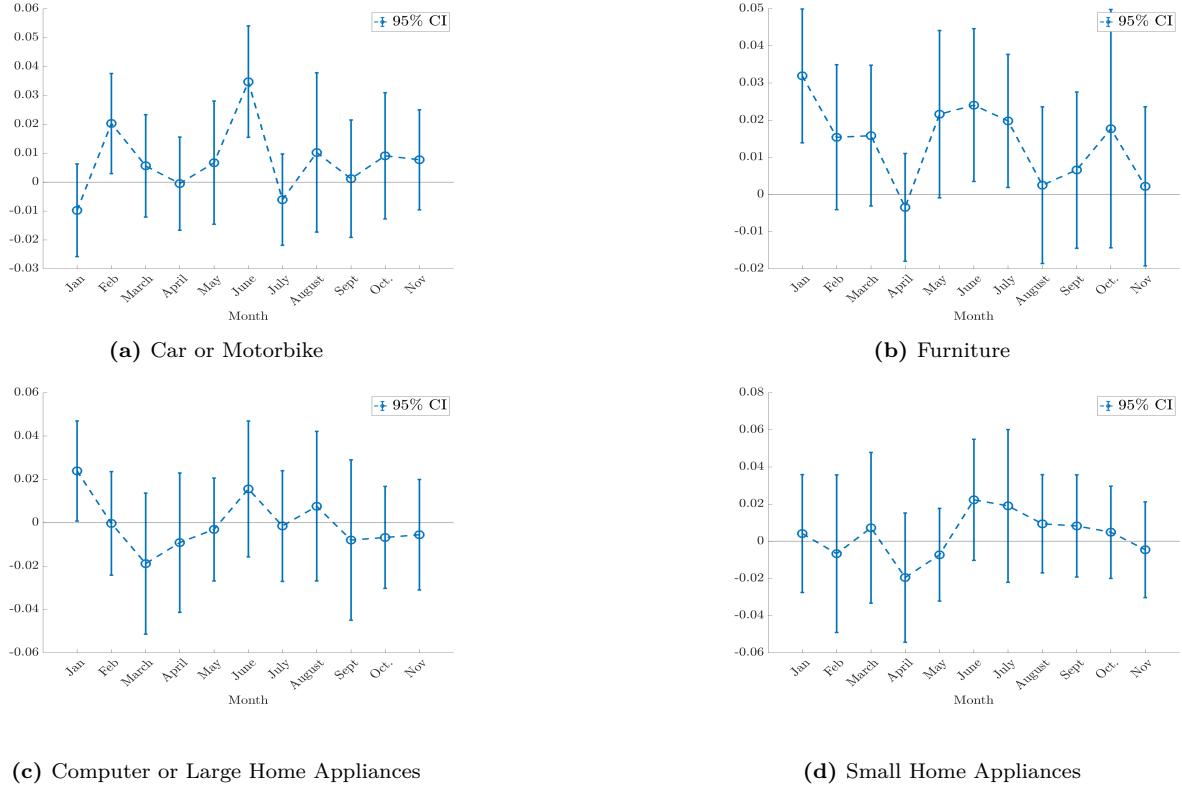


Figure 4: Effects of Christmas Lottery on realized household durable consumption by item

These figures plot the marginal effects associated to the β_s 's coefficients and their 95% CI from estimating Equation (3) using a probit model. The dependent variable DCcar (a), DCfurn (b), DCLargeApp (c), DCsmallApp (d) in the past six months. Standard errors are robust and clustered at the province level

4.2 The Joint Response of Sentiment and Consumption

So far, we have shown that lottery wins spur sentiment and consumption expenditures. However, we have not connected the responses of these two variables. We now study the joint responses on the intention to consume durable goods together with the responses on consumers' expectation. To be more specific, we use the FDC question in the survey to create a categorical variable that summarizes the joint response of the surveyed individuals' economic expectations and future durable consumption plans responses as follows: for each individual, we construct a categorical variable that takes values 1/2/3 if households respond that their economic expectations and future durable consumption is both lower/same/higher. We create three different categorical

variables where we consider the joint responses to questions about intended durable consumption and economic expectations related to a) household income, b) employment prospects, and c) the Spanish economy. As in the previous Section, we use an ordered probit to compute the joint responses of confidence and future durable consumption.

Table 4 collects the results of these regressions. The dependent variable in column (1) takes values 1/2/3 if households give jointly negative/neutral/positive answers in the questions relating to their future household income and intended durable consumption. Similarly, column (2) presents estimates for the index relating future employment prospects and intended durable consumption, and finally column (3) relates expectations about the Spanish economy with answers about future durable consumption.

Table 4: Survey evidence on the effects of Spanish Christmas Lottery on consumer sentiment and future consumption

	(1)	(2)	(3)
	Future Durable & Consumption Household Income	Future Durable& Consumption Employment Prospects	Future Durable & Consumption Spanish Economy
Lottery Prize Dummy	0.152*** (0.044)	0.141** (0.057)	0.140*** (0.051)
Lottery Expenditures	16.978*** (3.584)	0.863 (4.066)	4.526 (3.897)
Month × Province Dummies	Yes	Yes	Yes
Individual Characteristics	Yes	Yes	Yes
Observations	70571	43471	47609
Pseudo R^2	0.054	0.050	0.048

Columns (1)-(6) provide results from an ordered probit. Dependent variable in column (1) and (4) takes values 1 to 3 if households respond in ascending order to Q1F and FDC jointly. Dependent variable in column (2) and (5) takes values 1 to 3 if households respond in ascending order to Q2F and FDC jointly. Dependent variable in column (3) and (6) takes values 1 to 3 if households if households respond in ascending order to Q3F and FDC jointly. *Lottery Prize Dummy* takes value 1 if awarded Christmas lottery tickets were distributed in that province. *Lottery Expenditures* are expressed in 1000 euros per capita. *Recession dummy* takes value 1 if unemployment rate in Spain is higher than 20%. Robust standard errors clustered by province in parentheses. The sample includes information from consumer confidence monthly surveys conducted by the Spanish Center for Sociological Research (CIS) between April 2013 and January 2020. Significance * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The estimates of Table 4 suggest that individuals tend to give positive answers to both questions about their expectations and their consumption plans after a lottery win, indicating that sentiment responses are related to the demand of durables at the individual level. [Gillitzer and Prasad \(2018\)](#) use US data to document a similar causal effect running from sentiment to consumption. The identification approach of [Gillitzer and Prasad \(2018\)](#) uses voting intention as an instrument for economic sentiment. They show that supporters of the winning party after US elections report higher spending intentions than supporters of the losing party. The evidence presented in Table 4 is indicative of the positive relation between sentiment and intended durable consumption but does not establish that it is changes in sentiment that cause the positive consumption responses. In what follows we will show that lottery wins affect consumption only through sentiment and not through economic fundamentals and we will use lottery wins as an instrument to identify the causal effect of sentiment innovations on consumption on Spanish

data.

4.3 Lottery Wins and Economic Fundamentals

The evidence we have presented so far points to a positive relationship between sentiment and consumption after a lottery shock. Yet, the incremental predictive power of sentiment could reflect changes in other fundamental determinants of consumption that we have not accounted for, rather than any independent causal effect of changes in sentiment on spending. The mechanism we put forward in our analysis works through sentiment. However, lottery wins involve monetary transfers for some households and they might relate to news about regional economic fundamentals. In what follows we establish that lottery wins are unrelated to individual and regional fundamentals and identify the causal effect of sentiment on individual consumption using lottery wins as an instrument for consumer confidence.

4.3.1 Disentangling Income vs Sentiment Effects from Lottery Wins

Given that lottery wins involve monetary transfers for some households living in the winning province, it is in principle very difficult to disentangle whether the effects we report come from sentiment or from income increases for the lucky inhabitants. As mentioned earlier, the probability of being a winner of any of the top Christmas lottery prizes in a winning province is 0.015%, which is very low, implying that the surveyed households are very unlikely to be lottery winners. Fortunately, we have a more direct way to examine whether this is the case in our sample. The Spanish survey of consumer confidence includes a question that allows us to investigate whether the positive change in economic sentiment is related to changes in individual income. The CIS asks survey participants the following question about the households' ability to pay bills: *Which of the following assertions describes best the economic situation of your household with respect to your ability to pay bills?*. The answers vary between 1 and 5 with items from 1 “Struggle to pay bills and have to take debt” to 5 “Get easily to the end of the month and manage to save a lot.” Lottery wins should affect the respondents' answers to this question. In particular, one should expect survey respondents to improve significantly their current ability to pay bills if they happen to be one of the lottery winners in the region. Table 5 presents results for the baseline specification (4) when the dependent variable is the question about households' ability to cover monthly bills. Lottery wins do not alter significantly the ability to pay bills of the surveyed households, suggesting that the results we present for changes in sentiments do not derive from changes in the wealth of these households. That is, the surge in sentiment does not seem related to increases in the wealth of the interviewed households.

Table 5: Survey evidence on the effects of Spanish Christmas Lottery on households' current ability to pay bills

	(1) Current ability to pay bills
Lottery Prize Dummy	-0.009 (0.038)
Lottery Expenditures	15.609*** (2.420)
Month × Province Dummies	Yes
Individual Characteristics	Yes
Observations	117244
Pseudo R^2	0.105

Columns (1) provide results from an ordered probit where the dependent variable is the ability-to-pay bills question. *Lottery Prize Dummy* takes value 1 if awarded Christmas lottery tickets were distributed in that province. *Lottery Expenditures* are expressed in 1000 euros per capita. Robust standard errors clustered by province in parentheses. The sample includes information from consumer confidence monthly surveys conducted by the Spanish Center for Sociological Research (CIS) between April 2013 and January 2020. Significance * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.3.2 News About Fundamentals

Another major concern regarding the exogeneity of lottery wins to economic fundamentals is the fact that, although lottery wins do not imply monetary transfers for the majority of agents living in the province, they can still bring news about changes in economic fundamentals at the regional level. This implies that our results on the effects of lottery shocks on economic sentiment do not operate through a simple increase in optimism but rather through news about improved regional economic fundamentals after the lottery win. The Spanish Christmas lottery is, after all, an event with a long tradition and agents in the winning provinces might expect an increase in the regional economic activity due to the increase in wealth of the winners, or precisely because they expect demand or supply conditions to improve. Obviously, this is a more difficult concern to tackle.

We start investigating this hypothesis by studying data on business confidence that are available at the quarterly frequency for different Spanish autonomous communities. Recall that we have performed our analysis so far using province-level monthly data. Luckily there are seven autonomous regions in Spain that have only one province (Asturias, Baleares, Cantabria, La Rioja, Madrid, Murcia and Navarra). We use these provinces to investigate how business confidence reacts to lottery wins. In the Online Appendix (see Figure 12), we show that consumer confidence about the current and future economic conditions increases in response to the lottery wins significantly at quarterly frequency for these seven provinces.

We next examine how the Harmonised Business Confidence Index from the Spanish Statistical Office (*Instituto Nacional de Estadística*) reacts for those provinces that also constitute an autonomous community. The Business Confidence Indicators survey collects the opinions of the managers of the establishments regarding the progress of their business for the past quarter and their expectations for the coming quarter. Figure 5 presents the responses of the Harmonised

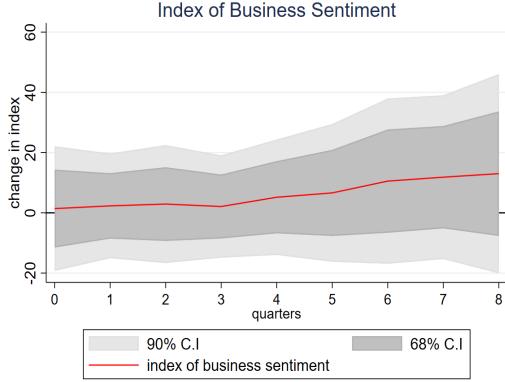


Figure 5: Effects of Christmas Lottery prizes on the Harmonised Business Confidence Index - Seven provinces

Impulse responses to Christmas Lottery prize in the linear LP model (1). Due to data availability, the sample period covered is 2013Q1-2019Q4 for the seven communities with a unique province. Standard errors are robust and clustered at the community level and response functions are smoothed by centered moving average.

Business Expectations Index in those communities to a lottery win. The responses of the business expectation index are flat, indicating that firms do not change their expectations after a lottery win. This could be because firms do not perceive a substantial increase in local economic fundamentals after a lottery win. It could also be due to the fact that businesses operate subject to the aggregate economic conditions in Spain and not with the local conditions and for that reason their sentiment is less local.

The unresponsiveness of business sentiment to lottery wins is indicative of the fact that lottery wins do not affect significantly regional economic fundamentals. However, we have another way to evaluate whether it is sentiment rather than economic fundamentals that drive our results. We argue that even if lottery wins represent good news about economic stimulus at the local level, households should not get optimistic about the state of the Spanish economy. Yet, in the observed survey responses at the individual level, the unconditional probability of getting positive responses about the future Spanish labor market and the Spanish economy is 37% and 35%, respectively, while the respective probability of getting positive answers for future personal finances that should be more affected by local conditions is 25% in winning provinces.

To formalize better this argument, we next construct aggregate indices for the individual questions for the future personal finances Q1F, future employment outcomes given the labor market conditions in Spain, Q2F and the future of the Spanish economy, Q3F and investigate how sentiment about those different aspects moves on average after a lottery win. Figure 6 depicts the aggregate responses for each question to a lottery win. All indices react significantly to the lottery win on impact with the sentiment about the future Spanish economic conditions reacting strongly to the lottery wins. If the lottery win was a signal about changes in local demand one should expect rational respondents when asked about the Spanish macroeconomic conditions to be less optimistic. Instead, the data suggests that survey respondents change radically their sentiment about the future Spanish economy after a lottery win. Hence, the evidence reported

in Figure 6 weakens the hypothesis that agents become optimistic because they perceive changes in regional fundamentals after the lottery wins.

Table 6 presents the first stage F-statistics for the different sentiment questions on impact and the first month after the lottery wins and reconfirms these results. Sentiment about the Spanish economy is significantly more responsive to lottery news relative to sentiment about personal finances and employment prospects. For example, the standard F-statistic for Q3F equals 12.8 on impact and 50.9 one month after the lottery win, while the same statistics for questions Q1F and Q2F are significantly lower.

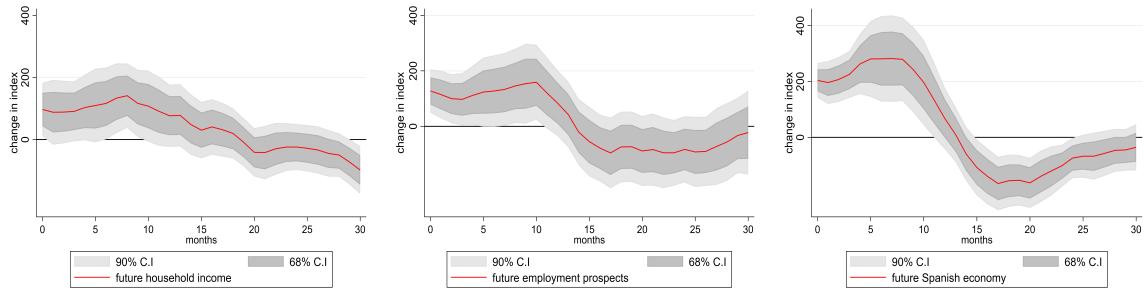


Figure 6: Effects of Christmas Lottery prizes on disaggregated consumer sentiment indices

Impulse responses to Christmas Lottery prizes in the linear LP model (1). To increase the representativeness of the indices at the regional level, we focus on data with at least 25 respondents in each province and, for each question, we use responses for two consecutive months. The sample period covered is 2011M11-2020M1. Standard errors are robust and clustered at the province level and response functions are smoothed by a centered moving average.

Table 6: First-stage F-statistics for the null hypothesis that the lottery awards has no explanatory power for consumer confidence.

horizon (months)	F-statistics		
	Question 1F	Question 2F	Question 3F
$h = 0$	1.9	4.9	12.8
$h = 1$	11.9	2.1	50.9

Our analysis so far suggests that the regional responses to lottery wins are driven by consumer sentiment. If they were driven by economic fundamentals, expectations of national economic conditions should rise by less in response to regional lottery winnings. One could argue, however, that the increased optimism about the prospects of the Spanish economy in the winning regions is driven by agents being unable to disentangle local from national demand shocks. To investigate this hypothesis, we exploit the presence of active secessionist movements in the provinces of Catalonia and the Basque Country and estimate the following regression:

$$c_{i,j,t,s} = \alpha + \beta \text{LotteryPrize}_{j,t,s} + \kappa \text{Nationalist}_j + \zeta (\text{Nationalist}_j \times \text{LotteryPrize}_{j,t,s}) + \delta \text{LotteryExp}_{j,t,s} + \gamma X_{i,j,t,s} + \sum_{s,j} \lambda_{s,j} D_{s,j} + \epsilon_{i,j,t,s} \quad (4)$$

where the variable Nationalist_j equals 1 for Catalan and Basque Country provinces and 0 for the

rest of Spanish regions. Political attitudes shape perceptions of national economic conditions (Duch, Palmer and Anderson, 2000; Evans and Andersen, 2006) and economic arguments have been playing a major role in the discourse of nationalist and secessionist movements (Muñoz and Tormos, 2015; Rodríguez-Pose and Sandall, 2008). Therefore, households living in Catalonia or the Basque Country should be able to disentangle news about regional from news about national fundamentals.

Table 7 presents the estimation results for this regression. Interestingly, households living in Catalonia and the Basque Country are more pessimistic on average with respect to the future of the Spanish economy. However, the sentimental effects of lottery winnings with respect to current and future national economic conditions are not significantly different from the rest of the Spanish regions.

Table 7: Survey evidence of the effects of Christmas Lottery prizes in province with active nationalist movements

	(1) Spanish Economy	(2) Future Spanish Economy
Lottery Prize Dummy	0.144*** (0.046)	0.118** (0.054)
Nationalist Provinces	-0.268 (0.233)	-1.048*** (0.221)
Lottery × Nationalist Provinces	-0.138 (0.110)	-0.039 (0.081)
Lottery Expenditures	-5.767* (3.265)	-15.075*** (2.982)
Month × Province Dummies	Yes	Yes
Individual Characteristics	Yes	Yes
Observations	114776	109441
Pseudo R^2	0.022	0.014

Columns (1)-(2) provide results from an ordered probit where the dependent variable is question Q3C and Q3F. *Lottery Prize Dummy* takes value 1 if awarded Christmas lottery tickets were distributed in that province. *Lottery Expenditures* are expressed in 1000 euros per capita. *Nationalist* takes value equal to 1 if households live in Catalonia or Basque Country and 0 if they live in any other Spanish province. Robust standard errors clustered by province in parentheses. The sample includes information from consumer confidence monthly surveys conducted by the Spanish Center for Sociological Research (CIS) between April 2013 and January 2020. Significance * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The evidence we have presented in this section illustrates that while lottery wins seem to be related to economic sentiment, they seem unrelated to changes in individual economic fundamentals or news about future regional fundamentals. With this evidence at hand, we next proceed to evaluate at the individual level the causal effect of changes in sentiment on individual consumption.

4.3.3 Instrumental Variable Regressions

We have already established that economic sentiment in the winning regions reacts positively to lottery wins and satisfies the exclusion restriction of having no direct effect on spending intentions. We now turn to examine the effects of consumer sentiment on durable consumption that work through the optimism boost stemming from the lottery winnings. To do so, we rely on an IV strategy where we use the lottery prize dummy variable as an instrument for changes

in consumer sentiment.

The last column of Table 8 reports the F-statistics of the first stage regression for each consumer sentiment question. The F-statistics are high and above 10 for all the questions considering confidence about future economic conditions, indicating that lottery wins are strong instruments for confidence.

Table 8: Effects of consumer sentiment on recent and intended durable purchases - 2SLS estimates

	(1)	(2)	(3)	(4)	(5)	(6)	
	Recent Durable Purchases	Recent Durable Purchases	Recent Durable Purchases	Intended Durable Purchases	Intended Durable Purchases	Intended Durable Purchases	F-stat
Future Household Income	0.396 (0.243)			0.420*** (0.157)			25.22
Future Employment Prospects		0.408 (0.258)			0.598* (0.323)		27.39
Future Spanish Economy			0.387 (0.295)			0.445** (0.226)	11.69
Month × Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes	
Individual Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	
Observations	112269	105463	108784	110294	103803	106943	

This table presents the 2SLS estimates when each of the consumer sentiment questions is instrumented using the set of Christmas Lottery dummies. The dependent variable in columns (1)-(3) is a dummy variable that takes value of 1 if the household has purchased any durable good in the past six months. The dependent variable in columns (4)-(6) is a categorical variable that takes values 1-3 if the household intends to decrease/maintain/increase her consumption of durable goods in the near future. Robust standard errors clustered at the province level in parentheses. The sample includes information from consumer confidence monthly surveys conducted by the Spanish Center for Sociological Research (CIS) between April 2013 and January 2020. Significance * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Columns (1) to (3) present the 2SLS estimates of the effects of consumer sentiment on any recent durable purchases and columns (4) to (6) the ones for intended durable purchases. Changes in sentiment instrumented by lottery wins have no significant effects on the recent durable consumption purchases. However, the shifts in sentiment about future economic conditions affect significantly spending intentions. In particular, concentrating to the question about the future of the Spanish economy, a change in confidence about the Spanish economy instrumented by lottery wins increases significantly intended durable purchases at the 90% confidence level. Hence, the results in Table 8 suggest beyond any doubt that innovations to consumer sentiment have a causal effect on intended consumption.

4.4 Heterogeneous Effects

How individuals react to exogenous variations in income can depend on their characteristics. For example, it might be that some individual traits make individuals more sentimental per se and more susceptible to changes in sentiment. We investigate this hypothesis by allowing for an interaction effect between the lottery prize dummy and individual characteristics and looking at whether these interaction effects matter in explaining consumers' sentiment dynamics in response to the lottery prize shocks.

The results of these regressions for the questions related to future economic conditions are collected in Tables 10 to 12 in the Online Appendix D.2. They suggest that lottery prizes have a

positive effect on individuals' confidence, whereas no evidence is found on heterogeneous effects of the lottery prizes on households' responses about future household income (see Table 10 in the Online Appendix D.2). Although the lottery prizes do not seem to affect asymmetrically the different individual groups for future income, when asked about their future employment prospects given the labor market conditions in Spain, households with older, richer, more educated, and employed members appear to be significantly less optimistic (see Table 11)). The lottery shocks consistently drive the increases in younger individuals' sentiment about their future employment and the sentiment of female contestants. When forming expectations about the future of the Spanish economy, (see Table 12 in the Online Appendix D.2), all individuals become more positive after a lottery win, but higher income and more educated households tend to be less optimistic about the future evolution of the Spanish economy.⁶

According to our results, young, less educated, and lower income groups are the groups that react more strongly to the lottery wins. A strong theme emerging from research investigating the relationship between social class and emotion is that lower-class individuals score more highly on measures of empathy and are more sentimental. A rationale for this behavior is the tendency for lower social class individuals to be more socially engaged and to have more interdependent social relationships. Kraus, Côté and Keltner (2010) provide results that support the latter hypothesis. In light of this evidence, it could be argued that individuals with such characteristics are more sensitive to positive news in their community, as observed in our empirical exercise.

The data also allows us to investigate whether the effects of lottery wins on household durable consumption depend on the socio-economic characteristics of the households. We can investigate this by examining both the responses of the different groups with respect to the question concerning purchases of durables in the last six months, DC, or the question concerning future consumption plans, FDC.

Figure 7 plots the estimated marginal effects of lottery shocks on household intended durable consumption for different demographic groups. Consistent with the sentiment responses, households that are not employed, that have low income, and have only a high school diploma change significantly their intended consumption responses after a lottery shock (see Panel 7a, Panel 7b and Panel 7d). When looking at different age groups, middle-aged households' intended consumption reacts significantly to the lottery win two and three months after the shock while very young and old individuals' intended consumption does not seem to be affected significantly by the shock.

⁶Lagerborg (2019) reports that female sentiment is also affected more significantly by shootings in US schools, while she observes that individuals with higher education and income become relatively more pessimistic as a result of these shootings. We definitely consider a very different shock type and our findings are not directly comparable to hers.

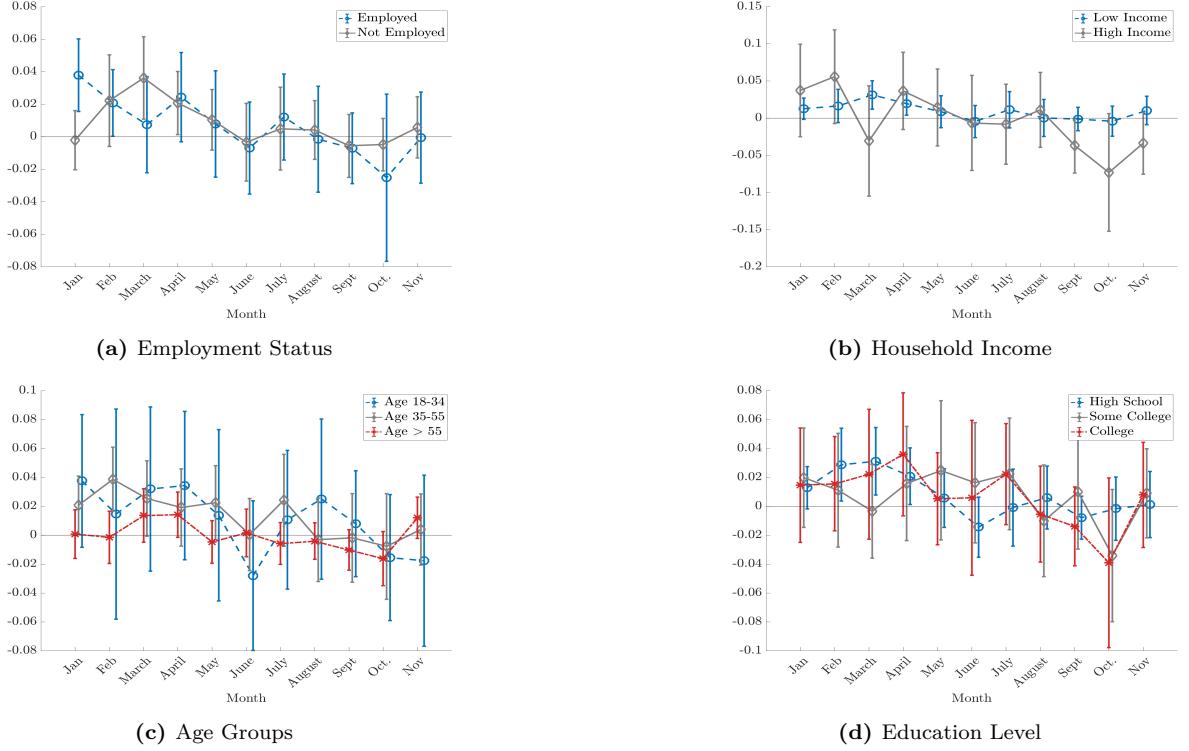


Figure 7: Heterogeneous effects of Christmas Lottery on intended household durable consumption

The figures plot the marginal effects associated to the β_s coefficients and their 95% CI from estimating Equation (3) using a ordered probit model. The dependent variable is a categorical variable that takes values 1-3 if the household plans to decrease/maintain/increase their durable consumption on year from now. Panel 7a restricts the sample to employed individuals (blue circled line) and unemployed or non-active individuals (gray diamond line). Panel 7b to households with monthly household income below or equal to 2700 euros (blue circled line) and above 2700 euros (gray diamond line). Panel 7c plots responses for individuals aged between 18-34 years old (blue circled line), aged between 35-55 years old (gray diamond line) and panel aged above 55 years old (red star line). Panel 7d plots responses for individuals with high school degree or lower (blue circled line), with some college degree (gray diamond line), and with college degree or higher (red star line). Standard errors are robust and clustered at the province level

4.5 Sentimental Effects of Lottery Wins in Expansions vs Recession Periods

We now explore how the effects of lottery shocks on consumer sentiment depend on the state of the economy. In particular, we study whether the effect of receiving random lottery wins on consumer confidence becomes stronger during recessions. To this end, we estimate our baseline specification in a subsample where the unemployment rate in Spain is higher than 20% and in another subsample where the unemployment rate in Spain is lower than that threshold.

Table 9 presents estimates of Equation 4 for the answers related to future household income, future employment given the economic situation of Spain, and future conditions in the Spanish economy when unemployment in Spain is high (columns (1)-(3)) and when it is low (columns (4)-(6)).

The positive effect of lottery wins on consumer confidence is significantly larger during periods of high unemployment. Households living in winning provinces become very confident about their future household income, employment prospects and the Spanish economy in times of high

unemployment. By contrast, there is almost no evidence suggesting that receiving lottery shocks in the region affects positively households' sentiment about their future income during periods of low unemployment.

Table 9: Survey evidence on the effects of the Spanish Christmas Lottery on consumer sentiment: high vs low unemployment rate periods

	(1)	(2)	(3)	(4)	(5)	(6)
	High unemployment rate			Low unemployment rate		
	Future Household Income	Future Employment Prospects	Future Spanish Economy	Future Household Income	Future Employment Prospects	Future Spanish Economy
Lottery Prize Dummy	0.177*** (0.041)	0.254*** (0.058)	0.242*** (0.063)	0.081 (0.073)	0.134* (0.080)	0.108 (0.077)
Lottery Expenditures	78.861*** (8.407)	90.559*** (9.935)	94.475*** (8.948)	-5.940 (6.370)	-58.883*** (14.027)	-61.964*** (14.036)
Month × Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Observations	46873	44438	46042	66078	61648	63399
Pseudo R^2	0.039	0.022	0.022	0.049	0.019	0.020

Columns (1)-(6) provide results from an ordered probit where the dependent variable is question Q1F-Q3F. *Lottery Prize Dummy* takes value 1 if awarded Christmas lottery tickets were distributed in that province. *Lottery Expenditures* are expressed in 1000 euros per capita. Robust standard errors clustered by province in parentheses. The sample includes information from consumer confidence monthly surveys conducted by the Spanish Center for Sociological Research (CIS) between April 2013 and January 2020

Results are similar when we look at aggregate sentiment indices. In Section E.1 of the Online appendix we show that when we distinguish between expansionary and recessionary periods, the responses of both ICC and ICE to lottery wins are strong and statistically significant the first few months after the win during recessions.

5 Regional Macroeconomic Effects of Lottery Wins

In the previous sections we have shown that lottery wins spur sentiment and durable consumption expenditures, we turn to investigate whether those sentimental effects propagate in the local economy. In this section, we analyze the dynamic effects of lottery shocks on the economy of the provinces that won the Christmas Lottery. Following the specification for aggregate sentiment indices, 1, we identify the causal effect of an exogenous lottery win at time t in province j on different regional macroeconomic outcomes at time $t + h$ in province j for the longest possible sample we have available, that is, 2005M5 - 2020M1. All variables in the aggregate regressions are detrended using a fourth order polynomial.⁷ Standard errors are robust and clustered at the province level.

⁷In the Online Appendix E.4 we show that results are similar if we use growth rates or use the HP filter to detrend the data, and if we use relative unemployment and CPI prices in the baseline specification. Given the discrepancy of the unemployment rate data, we also present results of the same set of regressions for the log of the total number of unemployed population instead of the unemployment rate in Online Appendix E.3. In accordance with our baseline, the number of unemployed significantly drops after six months and reaches its maximum 13 months after the lottery wins.

Figure 8 presents the dynamic responses of the province-level unemployment rate and CPI movements to a thousand euros of per capita lottery rewards (rewards are expressed in constant prices to take into account possible changes in inflation), together with their respective 68 and 90 percent confidence bands.

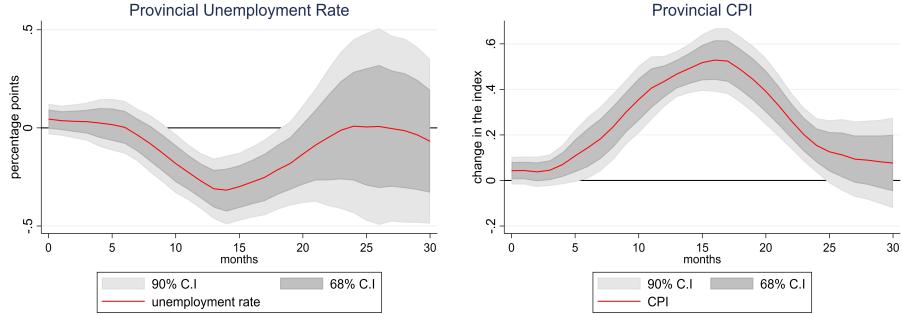


Figure 8: Effect of Christmas Lottery prizes on unemployment rate and CPI

Impulse responses to Christmas Lottery prizes. The left panel presents the responses in the linear LP model (1), while the right panel presents the responses in the state-dependent LP model, where the solid blue line are responses in high-unemployment state and the dotted red line are responses in low-unemployment state. Christmas Lottery prizes are net of taxes and measured in 1000 euros per capita. The sample period covered is 2005M5-2020M1. Standard errors are robust and clustered at the province level and response functions are smoothed by centered moving average.

Lottery prizes do not affect the unemployment rate on impact. It takes approximately half a year for the unemployment rate to react to the shock. The impulse response function (IRF) decreases significantly after 10 months reaching its maximum fall of -0.3 percentage points 14 months after the lottery win, while it continues to be below its mean for approximately two years. Provincial CPI prices also respond sluggishly, lifting significantly seven months after the initial shock and remaining above mean for almost two years after the winning. The maximum increase in the province CPI is around 0.54 units and its quite persistent. Hence, lottery shocks have a significant short-run effect on the real economy that dissipates two years after the initial impact. In the Online Appendix E.1 we show that the beneficial effect of the lottery win on unemployment is significantly larger and more persistent during the high-unemployment state, while CPI prices react similarly in the two states. Hence, lottery wins are more effective to lift the economy during recessions, generating moderate inflationary pressures in the local economy, while its effect on unemployment during expansions is short-lived.

The significant drop in the unemployment rate after lottery wins could be attributed to a fall in labor force participation induced by the positive wealth effect as a result of the lottery wins. Since the data for participation is not available at monthly frequency at the Spanish province-level, we use the total number of short and long-run contracts signed by workers registered as unemployed in the National Employment Agency as a close proxy to changes in vacancies. Figure 9 shows that both labor market tightness, i.e. the share of total contracts over unemployment, and the share of total contracts over working population increase after the lottery shock, providing

further evidence for the improvement in the labor market conditions⁸. In the Online Appendix E.6 we show that short-term contracts are the ones that increase significantly after a lottery shock. This is not surprising given the dual nature of the Spanish labor market (see [Dolado, Bentolila and Jimeno \(2020\)](#)).

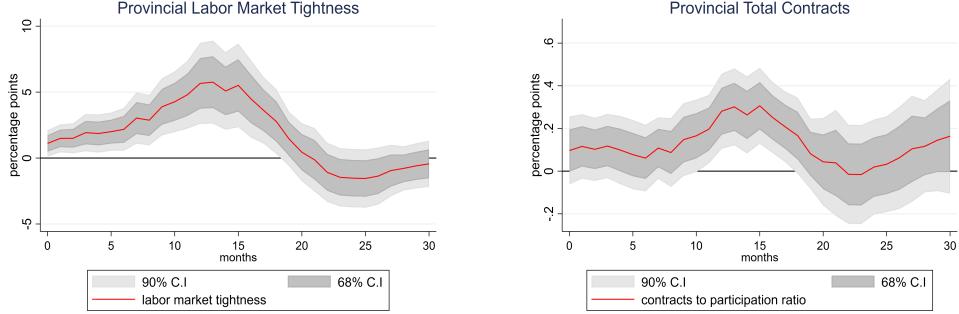


Figure 9: Effect of Christmas Lottery prizes on labor market tightness and labor contracts to participation ratio

Impulse responses to Christmas Lottery prizes. The left panel presents the responses of labor market tightness to lottery wins, while the right panel presents those of total provincial labor contracts. Christmas Lottery prizes are net of taxes and measured in 1000 euros per capita. The sample period covered is 2005M5-2020M1. Standard errors are robust and clustered at the province level and response functions are smoothed by a centered moving average.

Next, following [Bagues and Esteve-Volart \(2016\)](#) and [Kent and Martinez \(2020\)](#), we investigate the effects of lottery wins on house prices. [Bagues and Esteve-Volart \(2016\)](#) report an insignificant increase of house prices at all horizons, while [Kent and Martinez \(2020\)](#) document a significant increase in rural land values and home sales per capita two years after the shock.

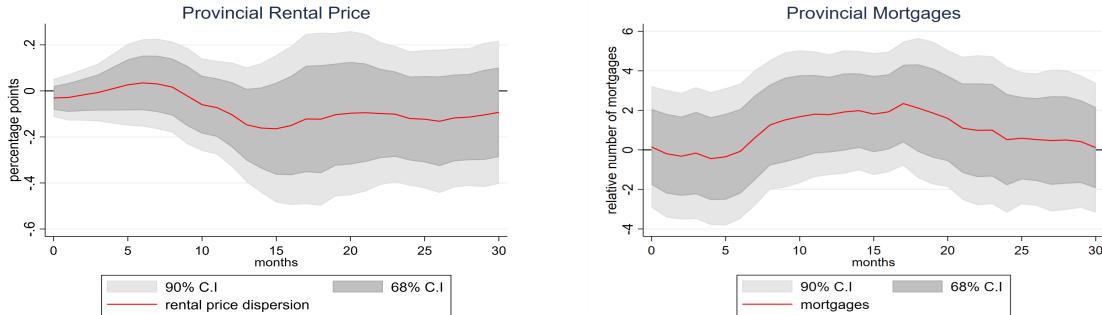


Figure 10: Effect of Christmas Lottery prizes on rental prices and number of mortgages

Impulse responses to Christmas Lottery prizes. The left panel presents the responses of provincial rental prices to lottery wins, while the right panel presents those of provincial mortgages defined as the ratio of the number of provincial mortgages to the average number of mortgages in Spain. The sample period covered is 2005M5-2020M1. Standard errors are robust and clustered at the province level and response functions are smoothed by centered moving average.

Since we do not have readily available monthly data on house and rental prices at the province level we impute monthly rental prices by using the rental housing price index used to compute

⁸Labor market tightness during the full sample period is on average 49.3 percent with 30.2 s.d. The ratio of total contracts to labor force is on average 9.3 percent with 4.7 s.d.

monthly provincial CPI for all goods and services. We also have available monthly data on the number of mortgages constituted within a province from INE (*Insituto Nacional de Estadística*). Figure 10 displays the IRFs of the level of rental prices and the number of mortgages relative to the average number of mortgages in Spain to the lottery win. Contrary to Kent and Martinez (2020), we detect no effect of the shock on rental prices or mortgages at any short horizon.

Due to limited data availability, we were able to examine the responses of durable consumption to the lottery shocks at the individual level. Data on non-durable consumption at the regional level are not publicly available. To investigate how lottery wins affect non-durable consumption we have used two proxies for a specific type of non-durable consumption: retail sales and restaurants.

First, we have collected data from Google searches for restaurants in Google Trends since 2011 at the Spanish regional level and investigated using the same specification as in Equation (1) how the winning of the lottery affects searches for restaurants in the winning provinces. The underlying assumption behind this exercise is that people that intend to go to restaurants search more for restaurants online in the winning regions. Results are presented in Figure 11 where we plot the IRFs for the number of Google searches in the winning provinces relative to the total searches for restaurants in Spain. Restaurant searches increase by more than two percentage points on average on impact and significantly after the lottery rewards for seven months.

Next, the national statistical institute (INE) collects monthly data for the General Retail Trade Index at constant prices at the autonomous region level. We have investigated how this index changes after lottery wins for seven communities that have a unique province. The bottom panel of Figure 11 presents the estimated effect of lottery wins on the Retail Trade Index in those provinces.⁹ The retail trade index increases significantly after 17 months in the winning provinces.

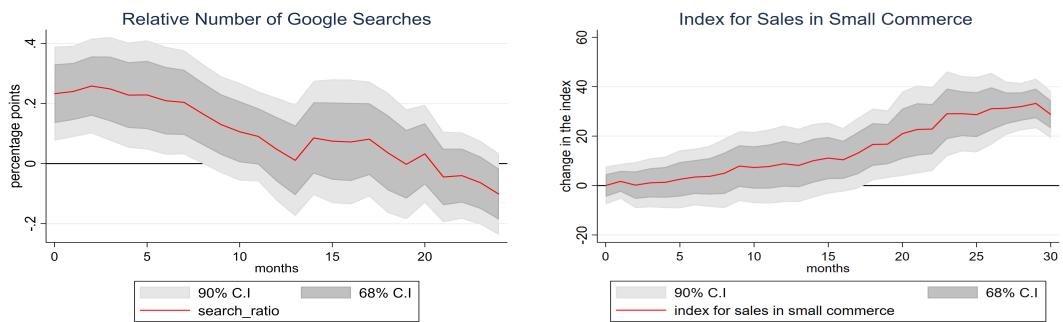


Figure 11: Effects of Christmas Lottery prizes on the relative number of Google searches for restaurants and retail sales

The left panel presents the responses in the linear LP model (1) for the number of google searches, while the right panel presents the response of the index for sales. The relative number of Google searches is defined as the ratio of the number of Google searches in each province to the total Google searches for restaurants in Spain for the sample period 2011M1-2020M1. The sample period for the retail trade index is 2005M5-2020M1 and the reported responses are based on seven communities with a unique province. Standard errors are robust and clustered at the province level and response functions are smoothed by a centered moving average.

⁹Details about those communities and their response to lottery wins are provided in the next section.

Our results in this section confirm partially and extend the results of previous studies that analyzed the macroeconomic effects of Christmas lottery wins in Spain. [Bagues and Esteve-Volart \(2016\)](#) using annual data have shown that lottery wins have a temporary marginally significant impact on unemployment and house prices. We report a more substantial drop in unemployment and no significant rise in house prices. Yet, we also find that labor demand and employment rise and that lottery wins also push upwards the provincial CPI level in the winning provinces, while they do not report any significant price effects. [Bermejo et al. \(2021\)](#) using also annual data report a higher firm creation in winning provinces and, in particular, during recessions. Although the macroeconomic results we present are compatible with theirs, since higher firm creation could drive the increase in job vacancies and the fall in unemployment we report, the mechanism we put forward is different. The sentimental responses to the lottery win indicate that a demand effect is clearly operative.

Finally, given the reaction of confidence to lottery wins and the reported F-statistics in Table 2 and given the analysis that suggests that lottery wins are independent of economic fundamentals, one could use lottery wins as an instrument for autonomous changes in sentiment at the aggregate level. Figure 12 presents the unemployment and provincial CPI responses for the sample period 2011M11-2020M1 to a confidence shock identified using lottery wins as an instrument for autonomous changes in ICE. Consistently with [Lagerborg, Pappa and Ravn \(2022\)](#), in response to confidence shocks identified through an IV that uses lottery wins as an instrument unemployment falls significantly on impact and CPI prices increase the first month after the shock¹⁰. Relative to the last authors, we investigate a positive shock to sentiment (lottery wins versus mass shootings) and find that results on unemployment are short-lived. Yet, our results should be taken with caution given the short sample size and are not directly comparable since the latter authors investigate the dynamics of sentiment shocks in the US economy.

¹⁰Notice that we have few data available at the aggregate level (9 years) and drop many of the provinces from the analysis because of the lack of enough respondents in some provinces to make the response of the aggregate sentiment index representative. As a result, the explanatory power of the IV regressions at the aggregate level is weak.

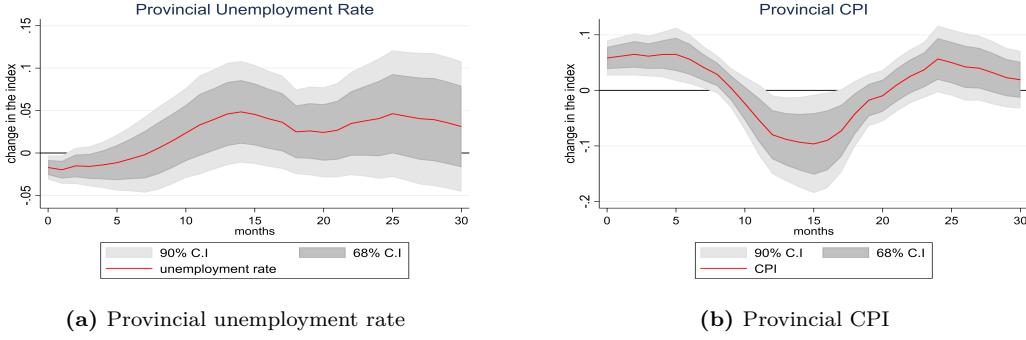


Figure 12: Effect of the Index of Consumer Expectation Instrumented by Lottery Rewards on the Provincial Unemployment Rate and CPI

Impulse responses to the Index of Consumer Expectation shocks instrumented by Lottery prizes. To increase the representativeness of the indices at the regional level, we focus on data with at least 25 respondents in each province and, for each question, we use responses for two consecutive months (see Online Appendix for details and robustness checks on the construction of the indices). Christmas Lottery prizes are net of taxes and measured in 1000 euros per capita. The sample period covered is 2011M11-2020M1. Standard errors are robust and clustered at the province level and response functions are smoothed by centered moving average.

6 Robustness Exercises

In this section we examine the robustness of our results. For economy of space we present the outcomes of these exercises in the Online Appendix I.1-I.6.

We start by investigating whether including in the lottery prizes El Niño (The Kid) lottery affects our main results. El Niño is considered the second most popular lottery prize in Spain. The Niño lottery takes place every year on the 6th of January. The average lottery prize is around €9, which is lower than the average Christmas lottery prize per capita, €42. In the Online Appendix H we present summary statistics for this lottery. Given the proximity in time of these two lottery events, those provinces where the winning tickets are sold experience relatively large income shocks in a short time window between the end of each year and the beginning of the next one. It is precisely this proximity in time between these two lotteries, coupled with the common traits it shares with the Christmas lottery (syndicate game, popularity), that might cast some doubts on the results we present since the provinces we considered as the control group in our regressions might have been treated with monetary transfers coming from the El Niño lottery. For that reason, we have extended the original data of [Bagues and Esteve-Volart \(2016\)](#) and constructed a broader lottery rewards and expenditures per capita database that includes both the Christmas lottery data and the data from El Niño lottery. In the Online Appendix H we present results when repeating all the exercises presented above when replacing the original data for lotteries with the extended database. Our main results all survive besides the data extension.

Second, we examine the possible presence of spillover effects by replacing in the specification in Equation (1) data of the winning province with data of the autonomous community to which the province belongs. For example, instead of running regressions using Barcelona as the economic

unit, we instead replace this with data for Catalonia. Figure 19 in the Online Appendix I.1 plots the IRFs of the unemployment ratio at the community level for communities in which at least one of their provinces received the money windfalls (we exclude the seven communities with only one province). In accordance with the results of [Bagues and Esteve-Volart \(2016\)](#), the results do not support any significant spillover effects in neighboring provinces for the unemployment rate, while a moderate increase in CPI at the community level is observed.

We also aggregate data in quarters and show that results are robust (see Online Appendix I.2). If we do not account for the size of the reward and just define a dummy for provinces that have won the lottery, the effect on unemployment and consumer sentiments remains statistically significant (see Online Appendix I.3). One might worry that our results are driven by a few outliers that contaminate the effects of lottery prizes on consumption or sentiment and macroeconomic conditions. To alleviate such concerns, we have dropped all the rewards higher than 1000 euros per capita and repeated our analysis. The aggregate effect on unemployment and sentiment indices, albeit smaller, remains significant. We repeat a similar exercise also at the individual level in order to examine the sensitivity of our results with respect to the effects of the lottery shocks on durable consumption and confidence. Our results survive this robustness check as well and are presented in the Online Appendix I.4.

In our baseline individual-level analysis experiment, we used dummies for lottery prizes in regions where lottery wins per capita were higher than zero. The idea behind our specification is that large lottery wins affect significantly sentiment independently of the amount of money redistributed per capita from the lottery win. Notice that our hypothesis implies that the news about lottery wins in the region spurs sentiment independently of the magnitude of the money transfers actually received in the region. To confirm this intuition we repeat our analysis by regressing sentiment to total lottery awards when controlling for population and total lottery expenditures in the region. Results of these regressions are presented in Online Appendix D.1 and I.5. Our results are robust to this change¹¹.

An alternative explanation of our findings is that the lottery prizes do not spur sentiment but they rather represent a redistribution mechanism from rich to poor provinces in Spain. We examine this hypothesis both at the aggregate and the individual level analysis in the Online Appendix G. To examine whether our main results are driven by poorer provinces receiving huge transfers from rich regions we interact lottery rewards with a dummy variable for poorer provinces for the aggregate regressions and also by adding two extra variables to the baseline specification in Equation (4): a dummy variable that takes the value of 1 if the GDP per capita in province j at year t is lower than average GDP per capita across provinces for the whole sample

¹¹Given that our mechanism does not work through the money transfer but rather through the good news about large money drops in the region, it is not surprising that if we would run regressions where we would consider lottery rewards per capita as a continuous variable in the individual regressions, we would get small and insignificant coefficients. Those regressions would capture how much a marginal change in lottery awards per capita changes consumer sentiment. Instead, we are interested in studying how the fact that a province won the lottery affects consumer sentiment and not the amount of per capita lottery prize transfers per se.

($\text{Poor}_{j,s}$) and an interaction term between the lottery prize dummy and a poor dummy for the individual regressions. Both the analyses at the aggregate and the individual level suggest that the nature of the experiment we are considering talks more about changes in sentiment due to positive news and less about redistribution.

In a recent paper [Canova \(2020\)](#) highlights the problems that the application of cross-sectional methods involves when computing macroeconomic objects in spatial settings. He argues that when dynamic heterogeneity is present, it is best to estimate the effect of a policy change or shock in time, unit by unit, and then compute a cross-sectional average. Following his suggestion, we compute dynamic responses to lottery shocks unit by unit. Our results are robust to adopting the proposed methodology (see Online Appendix [I.6](#)).

7 Conclusions

We show that Spanish Christmas lottery wins stimulate economic activity in the winning regions and their propagation works through sentiment. Lottery winnings spur economic sentiment and induce significant demand effects that lead to a reduction in unemployment, a rise in job vacancies and moderate increases in CPI prices at the province level and that they are more expansionary during recessions. We uncover the sentimental propagation of lottery wins using individual survey data. Households living in provinces awarded by the lottery, although they do not directly receive wins and they do not perceive any change in the regional fundamentals, become more optimistic about the future economic conditions in Spain on impact and increase their intended consumption responses, while they increase their durable consumption expenditure (for cars and furniture) significantly six months after the lottery draw .

Our findings square well with the theory developed in [Pappa, Ravn and Sterk \(2023\)](#) on sentiment-driven cycles. They show that countercyclical earnings' risk induces sensitivity to expectational shocks including both news about future fundamentals, noise shocks, and stochastic sunspots. The evidence we report give further support to the presence of counter-cyclical earning risk especially for young, low educated, low income and unemployed individuals.

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