Entrepreneurship and Regional Windfall Gains: Evidence from the Spanish Christmas Lottery

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Abstract

We study the effect of disposable income on entrepreneurial activity. We identify the effect using the randomized assignment of monetary prizes provided by the Spanish Christmas Lottery. The lottery has a large economic impact on a local community and winners tend to be geographically concentrated as tickets are typically sold by one outlet. We find higher firm creation and self-employment in winning provinces. This increase is also present in firms that are less dependent on local demand, and it is more pronounced in regions with lower access to finance. Conditional on entry, firms created in winning provinces are larger, create more value-added, rely more on equity, and are more likely to survive. Our results suggest that economic conditions and financial constraints are important drivers of entrepreneurial activity.

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1 Introduction

Promoting an entrepreneurial society is a priority shared by many governments worldwide as new firms are key to economic growth and job creation (Ayyagari, Demirguc-Kunt, and Maksimovic (2011), Haltiwanger, Jarmin, and Miranda (2013)). There are a variety of tools to encourage entrepreneurship including tax breaks to new businesses, reduction in red tape to set up new firms, and subsidized lending to start-ups and small business. Since these policies are costly for governments, evaluating their effectiveness in spurring entrepreneurial activity is critical.

At the same time, common policy tools to spur economic activity by increasing disposable income such as tax rebates and reductions in personal income taxes can encourage business creation. First, new businesses might spring up to satisfy the increased demand. Individuals take advantage of new investment opportunities created by changing economic conditions by creating new businesses (Kirzner (1997)). Second, in a frictionless capital market, personal wealth should affect neither the decision to start a business nor the scale of the business. However, in the presence of frictions, entrepreneurship would be related to wealth and collateral value (Evans and Jovanovic (1989)). In this setting, skilled entrepreneurs would be prevented from starting a new business due to lack of financial resources. By relaxing financial constraints, an increase in income could lead to higher levels of entrepreneurship. To date, there is no paper that measures the *overall* impact of disposable income on entrepreneurship. This paper tries to fill this gap.

Yet, it is challenging to measure the effect of disposable income on firm creation. Many variables that affect disposable income (e.g., business confidence) might also affect entrepreneurial activity. In this paper, we use exogenous variation in disposable income arising from the prizes paid by the Spanish Christmas Lottery. This lottery is more of a social event than a gamblers' lottery, in which about 75% of the population participates. Its economic impact is very large – Spaniards spend 2.7 bilion euros on the Christmas Lottery (the average individual spends 57 euros), which represents about 0.3% of the Spanish GDP (as of 2015). In addition, the Christmas Lottery does not award one big prize to a few

individuals, but rather to several thousand individuals sharing the same ticket number. Since each number is mostly sold by one lottery outlet, winners tend to be geographically concentrated. Using National Accounts statistics, Bagues and Esteve-Volart (2016) show that prizes are collected during the same year and in the province where the tickets were sold. They show that each euro of lottery prize implies an increase in households' disposable income of 88 cents in the province and year in which prizes are collected. Moreover, the impact of the lottery prizes (in our analysis, we consider the top three lottery prizes) is likely to be economically significant – the winning provinces (i.e., the province awarded with the maximum prize per capita in each year) receive an average income shock equivalent to 3.5% of their GDP.

Using the lottery has several advantages over more traditional settings such as tax rebates or changes in personal income taxes. First, the lottery is played every year, whereas tax policy changes are infrequent. Second, the lottery is played every year, irrespectively of economic conditions, whereas it is likely that tax policy changes are enacted conditional on actual and expected economic conditions. Finally, the lottery allows us to use a cross-sectional variation as, naturally, not all regions are affected, while finding this source of cross-sectional variation in tax changes is more difficult.

We present evidence suggesting our lottery prizes instrument for disposable income is likely to be valid. A concern is that the conditions that lead people to buy lottery tickets (e.g., economic conditions) are the same that encourage entrepreneurship. We show that no macroeconomic variable has any power predicting the winning province when we control for total expenditures in the lottery at the province level. Thus, it seems that the lottery provides a truly exogenous variation in disposable income after controlling for total lottery expenditures.

Our first set of results are from reduced form regressions. We find that the regional windfall gains due to the lottery have a significant effect on entrepreneurial activity. The number of new businesses significantly increases in winning provinces. The effect is economically sizable: the growth rate of the number of firms (i.e., net entry rate) in winning provinces increases by

almost 1 percentage point compared to non-winning provinces in a given year. Considering that the average net entry rate is 6% in our sample period, the effect of the income shock represents more than 16% of the average. We also investigate how the income shock affects separately the entry rate and exit rate of winning provinces. We find a positive and significant effect in entry rates and an insignificant effect in exit rates.

Next, we show the effect of disposable income on entrepreneurship using instrumental variables methods in which disposable income is instrumented by the size of the lottery prize (per capita) each province receives. Our first stage confirms results in Bagues and Esteve-Volart (2016) that one euro of lottery prize translates to 88 cents of disposable income. The second stage regression implies that a 1,000 euros increase in disposable income increases the rate of firm creation by 0.37%.

We analyze how the income shock affects the dynamics of firm creation over time. The rate of firm creation increases at about the same rate in winning and non-winning provinces in the years before the lottery prize, mitigating concerns of preexisting differential trends. After the lottery award, the rate of firm creation increases significantly more in winning provinces than in non-winning provinces. This differential effect disappears three years after the lottery prizes are awarded.

We show that our results are not driven by certain industries. The effect on firm creation is positive and significant for businesses operating in industries that depend more on local demand (i.e., non-tradable industries). This finding suggests that regional windfall gains can have a substantial economic benefit for local economies through a multiplier effect on spending. However, the effect on firm creation is also positive and significant in tradable and manufacturing industries with a similar magnitude to that in non-tradable industries. Tradable and manufacturing industries do not rely as much on local demand as non-tradable industries. In addition, we study how access to finance interacts with the entrepreneurs' ability to pursue investment opportunities using the number of banks loans and number of bank branches (per capita) by province as a measure of local access to finance. We find that the effect is more pronounced in regions with lower access to finance. These findings are

consistent with financial constraints impairing firm creation. We conclude that both local demand and financial constraints are important drivers of entrepreneurial activity.

We examine what is the legal type and capital requirements of new firms created after the lottery prizes are awarded. We find that the effect in limited liability companies is larger than in public liability companies. We also find a stronger effect on firms in industries that require less initial capital. These results suggest that small firms, which are more likely to be financially constrained, are those that benefit the most from the income shock. Our findings are also consistent with the notion that banks are often reluctant to finance start-ups because of high uncertainty, information asymmetry, and agency costs (Beck, Demirgüç-Kunt, and Maksimovic (2005)).

We study whether conditional on entry, variation in lottery prizes affect firm outcomes at creation and up to five years after creation. We find that firms created as a response to the income shock are significantly larger (as proxied by assets, number of employees, and sales) and create more value-added. These results are consistent with Sedláček and Sterk (2017) who find that firm quality and growth are influenced by economic conditions at the time of entry. We also find that firms that depend less on local demand use more equity at the time of the creation and are not significantly different in size.

We also examine the survival of firms created after the lottery prizes are awarded. We find that firms created in winning provinces have higher survival rates than firms created in non-winning provinces. This is still the case even when we eliminate from the sample the firms that depend more on local demand (firms in the non-tradable and construction sectors). Since these firms that depend less on local demand also have higher survival rates, we conclude that individuals are not just taking advantage of good economic conditions. This result supports the hypothesis that financial constraints restrict skilled individuals to turn ideas into a successful business.

Finally, we study the effect of the income shock generated by the lottery on self-employment. We find a positive and significant increase in the growth of self-employed individuals as a response to the income shock. In particular, there is a positive and

significant increase on entrepreneurs that are males, Spanish nationals, and younger. Moreover, the growth of self-employment is especially significant in the services sector, and among individuals that hire at least one worker.

Our study contributes to three strands of the literature. First, our paper contributes to the literature on the link between economic activity and firm creation. Several studies show the role of firm creation in the amplification and propagation of exogenous economic shocks (Bilbiie, Ghironi, and Melitz (2012), Koellinger and Thurik (2012), Clementi and Palazzo (2016), Sedláček and Sterk (2017)). Adelino, Ma, and Robinson (2017) show that new firms are the main driver of job creation following changes in investment opportunities driven by local demand (i.e., non-tradable sector), and Decker, McCollum, and Upton (2017) find that start-ups are responsible for most job creation in response to economic expansions due to shale oil and gas discoveries. Bernstein, Colonnelli, Malacrino, and McQuade (2018) show that firms creation response to an increase in local demand is mainly driven by young and skilled individuals. Our paper contributes to this literature by exploiting the random income shock generated by the Christmas Lottery in order to deal with the endogeneity of economic conditions. We provide causal evidence that local economic opportunities due to an increase in local demand spur entrepreneurial activity.

Second, we contribute to a growing literature that uses lottery data as an exogenous (unearned) income shock to study a number of individual decisions. This literature focuses on the effects of lottery prizes on labor supply (Imbens, Rubin, and Sacerdote (2001), Cesarini, Lindqvist, Notowidigdo, and Ostling (2017)), individual bankruptcy (Hankins, Hoekstra, and Skiba (2011)), and consumption (Kuhn, Kooreman, Soetevent, and Kapteyn (2011)). In addition, Bagues and Esteve-Volart (2016) use the Spanish Christmas Lottery to study the effect of economic conditions on election outcomes. A caveat of lottery studies is that the results may not be the typical response to other forms of unearned income. However, two key aspects of the Christmas Lottery differ from other lotteries – it is a social event and an income shock to several thousand households in the same geographic area. Thus, the Spanish Christmas Lottery provides a unique setting to study how improvements in the economic

conditions of an entire community affect entrepreneurial activity.

Finally, we contribute to the literature on financial constraints and entrepreneurship. The relation between entrepreneurial wealth and firm creation has received considerable attention in the literature but the precise economic mechanisms underlying the role of wealth in firm creation are not well understood. There is substantial evidence showing a strong positive correlation between wealth and the propensity to start a business (Evans and Jovanovic (1989), Evans and Leighton (1989), Holtz-Eakin, Joulfaian, and Rosen (1994)). In addition, Adelino, Schoar, and Severino (2015) and Schmalz, Sraer, and Thesmar (2017) show that financial constraints restrict firm creation and growth using variation in house prices as shocks to the value of real estate collateral. The collateral channel for entrepreneurship requires that individuals borrow. However, Hurst and Lusardi (2004) report that the relation between wealth and business entry is mostly flat using inheritances as an instrument for wealth. Only for individuals at the very top of the wealth distribution is there a positive relationship between wealth and business entry. They also find that both past and future inheritances predict current business creation, which indicates that liquidity constraints are not a major impediment to business entry. Our paper adds to this literature by using windfall gains (the randomized assignments of monetary prizes provided by a syndicated lottery) as shocks to individual income and wealth.

2 Christmas Lottery

The Spanish Christmas Lottery (*Lotería del Gordo*) is a national lottery game that has been held since 1812. Nowadays, this lottery is held every year on December 22 and is considered the biggest lottery game worldwide. Compared with the more than 500 other lotteries held every year in Spain, the Christmas lottery represents one-fifth of total lottery sales. About 75% of the population participate in the Christmas lottery, 80% of the participants are between 25 and 44 years old with a college degree, and around 70% of them are newcomers, people who only play the Christmas lottery. The amount of money spent is similar across individuals,

with 70% of individuals spending less than 60 euros and only about 8.5% spending more than 150 euros.

The tickets have five-digit numbers. There were 66,000 numbers played until 2004, 85,000 between 2005 and 2010, and 100,000 since 2011. Each number is typically sold by one lottery outlet, and the numbers that are allocated to each outlet are randomly assigned. Each number is divided into 165 series, and each of these series consists of 10 fractions that can be also divided into smaller shares. The price of a fraction is 20 euros, so the cost of buying a whole number is 33,000 euros since 2011. People tend to buy one fraction (20 euros) but they can also buy a share of 5 and 2 euros. Thus, depending on the number of shares sold, there might be between 1,650 and 16,500 ticket holders for each number.

The amount of money assigned to prizes is 70% of the money collected (i.e., 2,320 million euros). The remaining 30% is distributed as commissions for the outlet, internal revenue, and to cover administration costs. For the top three prizes, the holders of the first prize get 20,000 euros per euro played, and the second and third prizes award winners with 6,250 euros and 2,500 euros, respectively. Given that the standard ticket costs 20 euros, a first prize winner will receive an income shock of 400,000 euros.[1]

We use information on the province where lottery tickets were sold. A concern is whether players may buy tickets outside of their residence or exchange tickets with people in their network who live in other provinces. Using National Accounts statistics, Bagues and Esteve-Volart (2016) show that prizes are collected during the same year and in the province where the tickets were sold. They show that each euro of lottery prize implies an increase in households' disposable income of 88 cents in the province and year in which prizes are collected. In addition, they find that lottery prizes are unrelated to changes in income in previous and future years.[2].

[1]These prizes were 10,000 euros, 4,800 euros, and 2,400 euros per euro played between 1986 and 2004; and 15,000, 5,000, and 2,500 between 2005 and 2011. All the lottery prizes were tax exempt until 2013, in which a 20% tax was imposed for prizes larger than 2,500 euros. See Bagues and Esteve-Volart (2016) for more details about the Christmas Lottery players' characteristics.

[2]The National Accounts statistics show that the lottery prizes have no effect on disposable income, other than the direct effect of lottery prizes

3 Data

3.1 Data Sources

We obtain firm-level data from the Amadeus and Sabi databases for the 1992-2015 period. Amadeus is a commercial pan-European database provided by Bureau van Dijk, containing financial information on over 2.5 million public and private companies in Spain. The database contains detailed firm-level characteristics and financial data. In addition, Amadeus also provides information on year of incorporation, industry (the three-digit NACE code—the European standard of industry classification) and the province where the firm is located (there are 50 provinces in Spain). The other source of information is the Sabi database, an enhanced version of Amadeus for Spain. Sabi is useful because it covers a larger fraction of new and small firms across all industries, and contains information not only on active firms but also on firms that have been already liquidated.[3]

We also obtain information on macroeconomic variables at the province level such as gross domestic product (GDP) per capita, house prices, consumer price index (CPI), unemployment rate, and population from 1992 to 2015. The data on GDP, CPI, unemployment, and population are from INE; and data on house prices are from several sources.[4] In addition, we obtain data on self-employed individuals and their characteristics from the Ministry of Labor and Social Security.

3.2 Summary Statistics

Table 1 presents summary statistics for the Christmas Lottery and macroeconomic variables at the province level. Panel A summarizes the lottery expenditure, number of tickets awarded and prizes by province. The average yearly expenditure per capita in a province is 57 euros.

[3]We perform robustness tests using data aggregated at the province level from the Spanish Central Directory of Enterprises (Directorio Central de Empresas, DIRCE). The data are compiled by the Spanish National Statistics Office (Instituto Nacional de Estadistica, INE) but do not provide firm-level data. DIRCE is the first official database on individual firms for the Spanish economy, which covers the entire population of existing firms.

[4]ST Sociedad de Tasación (the largest independent Real Estate Valuation firms in Spain), and Idealista and Fotocasa (the two largest real state portals in Spain).

On aggregate, this represents about 0.29% of the GDP of that province. While we observe the geographical distribution of the top three prizes, which account for about three-quarters of the total prizes, we cannot observe the remaining small prizes that are awarded by the lottery. Thus, we consider the top three lottery prizes in our analysis. The average lottery prize is 21 euros per capita or about 0.10% of the GDP at the province level. Given the random nature of the prizes, we can assume that their geographical distribution is proportional to the expenditure by province.

Figure 1 shows the average lottery expenditure per capita and prize per capita by province during our sample period. There is variation both in terms of the intensity of the treatment and the location of provinces in the treatment group across Spain. Our empirical setting exploits this variation. Apparently, there seems to be no correlation between the intensity of the treatment and the level of economic development of the provinces.

Panel B of Table 1 reports summary statistics for the provinces awarded with the maximum prize per capita in each year during our sample period. We proceed in this way to gauge the largest income effect on our sample. The average lottery prize received by a winning province is equivalent to about 3.5% of province-level GDP and about 750 euros per capita. The number of tickets awarded in winning provinces is about 1,500, approximately one for every 700 individuals. Because these fractions tend to be split into smaller shares (a fourth or a tenth), this figure should be considered as a lower bound of the number of individuals receiving lottery prizes. Panel C describes average macroeconomic characteristics of the provinces. The average province has GDP per capita of about 20,000 euros, 17% unemployment rate, 2.8% inflation rate, and 862,000 inhabitants.

Table 2 summarizes the average number of firms and new firms by sector across provinces. The table also reports the growth rate of the number of firms (net entry rate), the number of new firms over the number of existing firms (entry rate), and the number of firms liquidated over the number of existing firms (exit rate). On average, there are 15,736 firms per province, from which 1,039 are newly created firms.

Table 3 reports average characteristics of new firms. We report assets, number of

employees, sales, value-added (sales minus outside purchases of materials and services), wages, leverage (as proxied by the debt-to-assets ratio), and the probability of default (as proxied by Z-score). The average new firm has 499 thousand euros of assets, 7 employees, 132 thousand euros of value-added, total wages of 51 thousand euros, a debt-to-assets ratio of 0.52, and Z-Score of 2.5. Table A1 in the Internet Appendix reports summary statistics for self-employed individuals including gender, age, nationality, number of employees, pluriactivity, and sector.

4 Entrepreneurial Activity and the Christmas Lottery

This section presents our results. We first present the estimates of reduced-form regressions. We then present the estimates of instrumental variables regressions of the effect of disposable income on entrepreneurship. We also examine firm outcomes and survival.

4.1 Net Firm Entry

We examine the effect of the random income shock generated by the Christmas Lottery on entrepreneurship. Our baseline specification employs a difference-in-differences estimator that compares firm creation in provinces that receive the maximum lottery prize per capita (winning provinces, treatment group) relative to other provinces (non-winning provinces, control group) in each year.

The province-level (reduced form) specification we use is as follows:

$$\Delta Y_{j,t} = \beta Prize_{j,t-1} + \theta Expenditure_{j,t-1} + \gamma Z_{j,t-1} + \delta_j + \delta_t + \varepsilon_{j,t} \tag{1}$$

where $\Delta Y_{j,t}$ is the change in the number of firms in province j between year $t-1$ and year t divided by the number of firms in year $t-1$ or net entry rate (in percentage); $Prize_{j,t-1}$ is a dummy variable that takes a value of one if province j receives the maximum prize per capita in year $t-1$, and zero otherwise;[5] $Expenditure_{j,t-1}$ is the expenditure per capita in

[5]The lottery prize is awarded on December 22 of year $t-1$, but disbursed a few days later on January of

the lottery in year $t-1$ in province j; $Z_{j,t-1}$ includes GDP per capita growth, house prices growth, unemployment rate growth, inflation rate, and population growth;[6] δ_j is a province fixed effect and δ_t is a time fixed effect. The coefficient of interest β measures the average difference in net entry rate between winning provinces and non-winning provinces.

Table 4 shows the results. We find a positive and significant effect of the lottery prize on the net entry rate in winning provinces relative to non-winning provinces. The regression in column (1) controls for the lottery expenditure and time fixed effects. The coefficient of interest β is 0.69, which indicates that the net entry rate in winning provinces is 0.69 percentage points higher than in non-winning provinces. Results are robust to the inclusion of additional control variables (column (2)), province fixed effects (column (3)), and regressions weighted using population as weights (column (4)). In particular, column (3) includes province fixed effects, which controls for unobserved time-invariant province heterogeneity and therefore the estimator is solely driven by within-province variation. The estimate in column (3) indicates that the net entry rate increases about 1 percentage point more for winning provinces than non-winning provinces. Given that the average net entry rate is 6% in our sample period, the effect of the lottery prize represents about than 10% of the average. In column (5), results are also robust when we drop Madrid and Lleida from the sample, which are provinces with special characteristics.[7]

4.2 Firm Entry and Exit

The increase in the number of firms can occur because more firms are created or fewer firms are liquidated. In this section, we analyze the effect of the lottery prize on the entry rate and exit rate. We use the specification in equation (1) where the dependent variable is the entry rate or exit rate (in percentage). The entry rate (in percentage) is the number of firms

year t.

[6] All values are measured as of December and growth is measured as the change between year $t-1$ and year $t-2$.

[7] Madrid is the capital and biggest city in Spain and can exhibit unique features such as more lottery expenditure and economic activity. The province of Lleida includes a city called Sort that has a strong Christmas lottery tradition and spends a high amount in this lottery (around 3% of total sales).

created in year t divided by the number of firms in year $t-1$. The exit rate (in percentage) is the number of firms that exit in year t divided by the number of firms in year $t-1$.

Table 5 presents the estimates of the effect of the lottery prize on the entry rate and exit rate. Column (1) shows that the *Prize* coefficient is positive and significant in the entry rate regression. The results indicate that the entry rate increases by 0.67 percentage points in winning provinces relative to non-winning provinces. When we include province fixed effects in column (2), the estimate is even stronger at 0.86 percentage points. We do not find a significant effect of the lottery prize on the exit rate, although the coefficient is negative. This negative coefficient indicates that firm exit is lower in winning provinces.

Figure 2 shows the effect of the lottery prize on firm creation in winning provinces (treatment group) versus non-winning provinces (control group). We use the specification in equation (1) with four lags and four leads of the dummy variable *Prize*. The dependent variable is the logarithm of the number of new firms in province j in year t. The figure presents the estimated β coefficients and corresponding 95% confidence intervals. We find a significant increase in the number of new firms created in the two years after the lottery in winning provinces relative to non-winning provinces. In addition, we find that treatment and control groups follow parallel trends before the treatment, mitigating concerns about preexisting differential trends.

We perform robustness checks of our primary findings. Table A2 of the Internet Appendix shows that the net entry rate results are similar to those in Table 4 when we use the full population of firms (at the province level) provided by the Spanish National Statistics Office. Table A3 shows that we obtain consistent estimates to those in Table 5 when we use the logarithm of the number of new firms (entry) and the logarithm of the number of firms liquidated (exit) as dependent variables.

4.3 Alternative Explanatory Variables

Our main explanatory variable so far has been the *Prize* dummy variable, which takes the value of one in the province that receives the maximum prize per capita in a given year.

Alternatively, we consider continuous explanatory variables to measure the effect of the lottery prize on firm creation. We use the lottery prize in euros thousand per capita ($Prize\ pc$), the lottery prize in euros scaled by GDP ($Prize/GDP$), and the number of tickets awarded per capita ($Awarded\ Tickets\ pc$) as explanatory variables.

Table 6 presents the effect of an increase of these variables on the entry rate and net entry rate. Columns (1)-(3) show that the effect on the entry rate is positive and significant for the three explanatory variables. Column (1) indicates that if each individual in a province is awarded 1,000 euros, the entry rate increases by 0.23 percentage points. Since the average number of firms in a province is 15,736, the estimate implies that 36 new firms are created for each 1,000 euros of prize per capita (or one new firm for every 28 euros of prize per capita). Columns (4)-(6) show that the effect on the net entry rate is also positive and significant for the three explanatory variables. Column (4) indicates that the net entry rate increases by 0.06 percentage points for 186 euros in prize per capita. This estimate implies that 9 new firms are created (or one new firm for every 20 euros of prize per capita).

4.4 Instrumental Variables Estimates

The reduced form estimates presented so far are informative about the effect of lottery prizes on entrepreneurial activity. While interesting on their own right, the estimate of the effect of disposable income on new business start-ups can be generalized beyond the Spanish setup. To achieve this goal, we implement an instrumental variables (IV) approach using two-stage least squares (2SLS) regressions. In the first-stage regression, we instrument disposable income per capita (in euros thousand) in each province with the lottery prize per capita ($Prize\ pc$). In the second-stage regressions, the dependent variables are the entry rate and net entry rate.

The exclusion restriction for this empirical strategy requires that the lottery prize impacts the rate of firm creation only through changes in disposable income. We present evidence suggesting that our instrument is likely to be valid. While the winning number is randomly chosen, the number of tickets bought in each province might not be. Moreover, the decision to buy lottery tickets might be influenced by local economic conditions. This would be a concern

if the conditions that lead people to buy lottery tickets (e.g., local economic conditions) are the same that encourage entrepreneurship. However, the probability of winning the lottery should be a function of *only* the number of tickets sold. Indeed, Table A4 shows that no macroeconomic variable has any power predicting the winning province when we control for total expenditures in the lottery at the province level. We conclude that the lottery provides a truly exogenous variation in income after controlling for total lottery expenditure.

Table 7 shows the estimates of the instrumental variables method. Column (1) shows the first-stage results in which we regress disposable income per capita on the lottery prize instrument ($Prize\ pc$). Importantly, the first stage regression includes the total expenditure on lottery tickets at the province level. We find that disposable income per capita increases by 88 cents for every dollar of lottery prize. The F-statistic of this first-stage regression is 273.95, well above the conventional threshold for weak instruments (Stock and Yogo (2005)). Columns (2) and (3) show the second-stage results. We find that a 1,000 euro increase in disposable income increases the entry rate by 0.39 percentage points and the net entry rate by 0.37 percentage points. The estimate in column (2) for the entry rate implies that 61 new firms are created for each 1,000 euros of prize per capita (or one new firm for every 16 euros).

4.5 Financial Constraints

We perform a series of tests of the hypothesis that financial constraints limit entrepreneurship. We analyze the effect of the lottery prize on firm entry in industries that depend more on local demand (i.e., non-tradable) and industries that depend less on local demand (i.e., tradable) following Mian and Sufi (2014). If the effect of the lottery prize on firm creation is solely a consequence of an increase in local demand, not an effect of financial constraints, the effect should be significantly reduced in tradable industries. In contrast, if financial constraints impair firm creation, we should also find an effect in tradable industries. To analyze this hypothesis, we use equation (1) and estimate the relation between the lottery and firm creation across different industries.

Table 8 shows that our estimates for the tradable sector are of similar magnitude to those

of the full sample. In column (1), we find that the effect of the lottery on the entry rate is still positive and significant at 0.70 percentage points when we exclude the construction sector. We exclude the construction and the non-tradable sectors in column (2) and also exclude the financial sector in column (3). The effect of the lottery on the entry rate is slightly reduced to 0.65 but it is still positive and significant. Column (4) shows that the effect is positive and significant at 0.72 in the non-tradable sector. Columns (5) and (6) focus on the tradable and manufacturing sectors respectively. We find the impact of the lottery on firm creation remains positive and significant in the tradable and manufacturing sectors at 0.66-0.69. Moreover, the magnitude of the effect is similar in the non-tradable and tradable sectors. We conclude that our results are not solely driven by firms in the non-tradable sector or in the construction sector. This finding is consistent with financial constraints playing an important role in firm creation.[8]

Next, we analyze the role of access to finance on the effect of the lottery prize on entrepreneurship. It could be that financing constraints create economically meaningful barriers preventing entrepreneurs to take advantage of investment opportunities. We use the number of banks loans and number of bank branches (per capita) by province as a measure of local access to finance. We use equation (1) and split the sample into provinces with low and high access to finance based on the median number of bank loans per capita by province, and the median number of bank branches per capita by province. Panel A of Table 9 shows that the *Prize* coefficients in the entry rate and net entry rate regressions are positive and significant for both samples, but the magnitude of the coefficients is significantly larger for the sample with below-median number of bank branches per capita. These results indicate that the effect of the lottery prize on entrepreneurship is larger in provinces with lower access to credit for new firms. This result suggests that financial constraints play an important role in shaping the effect of the lottery prize on entrepreneurship. Panel B shows similar results when we use the number of bank branches

[8]Table A5 of the Internet Appendix shows that we obtain similar estimates by sector when we use the net entry rate as the dependent variable.

per capita as a proxy for credit availability.[9]

We also analyze whether there is a significant impact of the exogenous income shock on macroeconomic indicators such as GDP per capita growth, house prices growth, unemployment rate growth, inflation rate, and population growth in the years after the lottery prize is awarded. Table A7 of the Internet Appendix presents the results. At the province level, we do not find any significant impact of the lottery on macroeconomic indicators with the exception of the inflation rate. These results are in line with Bagues and Esteve-Volart (2016). They claim that this is because provinces in Spain have a high openness ratio.[10] To better understand whether economic openness is important to explain the effects of the lottery on the local economy, we split our sample into low (first quartile) and high (fourth quartile) economic openness. We use the trade-to-GDP ratio (the sum of exports and imports divided by GDP) at the province level as a proxy for economic openness. Table A8 shows that the impact of the lottery prize on GDP growth is not significant in the years after the prize is awarded, but the coefficients in the provinces with a low openness ratio are larger than in the provinces with high openness ratio. There is a significant decrease in unemployment rate following the lottery prize in provinces with a low openness ratio, while the effect is insignificant in provinces with a high openness ratio. Overall, this is evidence that the local demand shock due to the income shock is not sizable enough to impact macroeconomic indicators. This evidence is consistent with the notion that local demand shocks do not drive all the results, and financial constraints also play a role in explaining the effect of windfall gains on entrepreneurship.

4.6 Capital Requirements

We now turn to study whether there are differences in the type of firms created after the lottery prize is awarded, based on the legal status and capital requirements. We estimate

[9] Alternatively, we use the number of bank loans per branch as a proxy for credit availability. The results reported in Table A6 of the Internet Appendix show that the effect of the lottery prize on firm creation is significantly stronger in the sample of provinces with a below-median number of bank loans per branch.

[10] According to Bagues and Esteve-Volart (2016), the openness ratio of the average Spanish province between 1995 and 2007 was equal to 168% (C-Intereg database).

equation (1) separately for different type of firms. The dependent variables are the entry rate and net entry rate.

To study the importance of financial constraints for firm creation, we use the variation in the amount of start-up capital needed to create a new firm (Hurst and Lusardi (2004), Adelino, Schoar, and Severino (2015)). The minimal feasible scale of businesses differs across firm types. Limited liability companies require little start-up capital, while a public limited company requires higher start-up capital, which is probably too high to be financed with lottery prizes.[11]

Table 10 shows the estimates by type of firms that are created after the lottery prize is awarded. We find that the lottery prize has a positive and significant effect in the entry rate and net entry rate for limited liability companies, i.e., when the start-up capital is lower. This result is consistent with the financial constraints hypothesis as smaller firms that require less capital to start are those that benefit the most from the lottery prize. The effect on the entry rate of public limited companies is also positive (significant at the 10% level) but much smaller in magnitude as the size of the lottery prize is not sufficiently large to meet the capital requirements of public limited companies.

Alternatively, we study the effect of the lottery on firm creation by splitting the sample according to initial capital requirements. The initial capital requirements are proxied by the average initial capital of new firms in each two-digit industry code. Table A9 of the Internet Appendix shows the estimates. We find a stronger effect of the lottery prize on firm growth in the sample of industries with lower initial capital requirements.

4.7 Firm Outcomes and Survival

In this section, we analyze the effect of the income shock on the outcomes of newly created firms, conditional on entry.

[11] In Spain, the minimum capital required to start a limited liability company is 3,000 euros, while it is 60,000 euros to start a public limited company.

We estimate the following regression of outcomes of firms created in year t:

$$Y_{i,j,t+n} = \beta_n Prize_{j,t-1} + \theta_n Expenditure_{j,t-1} + \gamma_n Z_{j,t-1} + \delta_j + \eta_t + \varepsilon_{i,j,t+n} \quad (2)$$

where $Y_{i,j,t+n}$ is the logarithm of assets, logarithm of number of employees, logarithm of sales, logarithm of value-added, leverage (as measured by the debt-to-assets ratio), or the probability of default (as proxied by the Z-score) of firm i located in province j in year $t+n$. [12] $Prize_{j,t-1}$ is a dummy variable that takes a value of one for new firms incorporated in provinces awarded with the maximum prize per capita in year $t-1$ (treated firms), and zero for new firms incorporated other provinces (control firms). Other variables in equation (2) are defined as in equation (1). By including province fixed effects δ_i, we control for unobserved province-level heterogeneity by performing a within-province analysis. Thus, we compare the characteristics of new firms created in the same province.

Panel A of Table 11 presents the estimates at firm creation (year t), and one (year $t+1$), two ($t+2$) and four ($t+4$) years after firm creation. We find significant effects of the lottery prize on the size of new firms as proxied by assets, the number of employees, and sales, conditional on entry. We also find that the lottery prize has a significant effect on value-added. The effects on the size and value-added of new firms can be observed at creation and up to four years after creation. In terms of capital structure, we find that firms created in winning provinces tend to rely more on equity and less on debt in the post-entry period (years $t+2$ and $t+4$). In addition, new firms seem to be less risky at creation but differences are statistically insignificant in the post-entry period.

Panel B of Table 11 presents the effect on new firms outcomes when we exclude firms that are more dependent on local demand (non-tradable and construction sectors) and thus we focus on the tradable sector. We find positive and significant effects of the lottery prize on the size of newly created firms (as proxied by number of employees and sales) and value-added. In addition, we find that firms created after the lottery prize is awarded rely more

[12] We measure the Z-score as 0.717 × Working Capital/Assets + 3.107 × EBIT/Assets + 0.42 × Equity/Assets + 0.998 × Revenues/Assets.

on equity, which indicates that firms that are not as dependent on local demand tend to use more equity capital as a financing source. Overall, the results suggest that the lottery prize helps to alleviate financial constraints and provide equity to start a business.

Table A10 of the Internet Appendix explores the effect of the lottery on the growth of assets, number of employees, sales, value-added, and wages over the first five years after firm creation (between year t and year $t+5$). We find that firms created in winning provinces exhibit higher wages growth than firms in non-winning provinces. When we exclude firms in the non-tradable and construction sectors, we find that new firms also exhibit higher growth in the number of employees and sales. These results show that firms created in sectors that do not rely on local demand are of better quality.

We next examine the effect of the lottery prize on the probability that a newly created firm survives for at least a given number of years. We estimate the regression in equation (2) where the dependent variable is a dummy variable that takes a value of one if the firm survives at least one $(t+1)$, two $(t+2)$, three $(t+3)$ or five years $(t+5)$ after firm creation (t). We estimate a linear probability model at the firm level.

Table 12 presents the estimates. We find that firms created in winning provinces versus non-winning provinces have a significantly higher probability of surviving for at least two, three or five years. In addition, when we exclude firms that are more dependent on local demand, we still find that firms created in winning provinces have a higher probability of surviving for at least three or five years. We conclude that firms created due to the income shock are of better quality as they are more likely to survive longer. The effect on firm survival is driven both by both an increase in aggregate demand and a relaxation of financial constraints associated with the lottery windfall gains.

4.8 Self-Employment

In this section, we focus on the effect of the lottery on self-employment using data from the Ministry of Labour and Social Security. Individuals might start a business after the lottery prize is awarded because they receive the income shock themselves (or any individual in

their network) or the income shock generates new investment opportunities. We estimate the regression in equation (1) where the dependent variable is the growth rate of the number of self-employed workers between year t and year $t-1$. Table 13 presents the results. We find a positive and significant effect of the income shock on self-employment in winning provinces relative to non-winning provinces. Results are robust across specifications. In particular, the coefficient of interest in column (1) is 0.528, which indicates that the growth rate of self-employed individuals in winning provinces is 0.528 percentage points higher than in non-winning provinces. Given that the average number of self-employed individuals by province is 41,075, this corresponds to an increase of about 220 self-employed individuals.[13]

We also analyze the effect of the lottery prize according to the characteristics of self-employed individuals. The dependent variable is the growth rate of the number of self-employed individuals by gender, nationality, age, number of employees hired, activity, and sector. Table A12 of the Internet Appendix shows that the effect of the lottery prize is stronger for self-employed workers that are male, Spanish nationals, and younger. In addition, we find that the effect is more pronounced for individuals that hire other employees and operate in the services or manufacturing sectors.

5 Conclusion

Entrepreneurship is a key driver of economic growth and job creation. In this paper, we exploit a randomized (unearned) income shock – the Spanish Christmas lottery – to identify the causal effect of disposable income on entrepreneurship. We focus on windfall gains as opposed to inheritances or house prices (which affect the value of real estate collateral) as a shock to wealth.

We show that winning provinces experience a positive differential effect on firm creation relative to non-winning provinces. We find that firm creation is more pronounced in small businesses and self-employment and is driven by firm entry, rather than a reduction in firm

[13]Table A11 of the Internet Appendix shows that we obtain similar estimates when we use the same alternative (continuous) explanatory variables than in Table 6.

exit. Firms created following the income shock are of better quality. Conditional on entry, firms created in winning provinces are larger, generate more value-added, rely more on equity, and are more likely to survive longer.

The driver of firm creation due to the income shock is not only aggregate demand. We find evidence of a differential effect on firm creation in the tradable sector, which is less dependent on local demand. In addition, we find that the lottery prize effect is stronger in provinces with lower access to finance. Our results suggest that the increase in entrepreneurial activity in response to income shocks is driven by both an increase in investment opportunities and a reduction in individual financial constraints.

The results also help to understand how public policy can impact entrepreneurship. Our results suggest that public policies such as tax rebates and reductions in personal income taxes can have an important role in promoting firm creation.

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Table 1: Summary Statistics of Lottery and Macroeconomic Variables

This table reports mean, standard deviation, 25th-percentile, median, 75th-percentile and number of observations for each variable by province. Panel A shows the Spanish Christmas Lottery variables. Panel B shows the Christmas Lottery variables for the province with the maximum prize per capita in each year. Panel C shows the macroeconomic variables. All monetary variables are in constant 2010 euros. The sample covers the period 1992-2015.

	Mean	Standard Deviation	25%	Median	75%	Obs.
Panel A: Lottery Variables						
Expenditure pc (euros)	56.82	27.92	40.01	52.65	67.74	1200
Expenditure/GDP (%)	0.29	0.11	0.22	0.28	0.35	1200
Prize pc (euros)	21.28	186.33	0.00	0.00	0.68	1200
Prize/GDP (%)	0.10	0.83	0.00	0.00	0.00	1200
Awarded tickets	91.30	346.89	0.00	0.00	10.00	1200
Awarded tickets pc	0.03	0.19	0.00	0.00	0.00	1200
Panel B: Lottery Variables in Provinces with Maximum Prize per capita						
Expenditure pc (euros)	76.49	41.39	46.72	63.17	94.58	24
Expenditure/GDP (%)	0.34	0.15	0.23	0.32	0.40	24
Prize pc (euros)	747.82	1093.59	183.77	361.68	644.96	24
Prize/GDP (%)	3.43	4.79	0.88	1.52	3.60	24
Awarded tickets	1489.54	835.21	1060.00	1375.00	1830.50	24
Awarded tickets pc	0.70	0.87	0.16	0.24	0.88	24
Panel C: Macroeconomic Variables						
GDP pc (euros thousand)	19.58	4.86	15.99	18.85	22.68	1200
Housing prices (euros/m2)	1205.37	579.80	751.95	1095.34	1528.41	1200
Inflation rate (%)	2.80	1.69	1.89	3.00	3.82	1200
Unemployment rate (%)	16.90	8.12	10.35	15.77	21.97	1200
Population (thousand)	861.59	1046.42	349.77	564.20	973.29	1200
Bank loans pc (euros thousand)	18.77	10.81	10.10	16.47	25.25	1200
Bank branches pc (thousand)	1.01	0.28	0.81	0.96	1.18	1200

Table 2: Summary Statistics of Entrepreneurship Variables

This table reports mean, standard deviation, 25th-percentile, median, 75th-percentile and number of observations for each variable by province. Panel A shows the total number of firms and the number of newly created firms. Panel B shows the net entry rate, entry rate, and exit rate. Panel C shows the total number and net entry rate of self-employed individuals. Industries are classified as tradable or non-tradable following the Mian and Sufi (2014) classification. The sample covers the period 1992-2015.

	Mean	Standard Deviation	25%	Median	75%	Obs.
Panel A: Number of Firms						
Number of Firms	15736	26505	3891	8031	16061	1200
Number of Firms - Non-Tradable	1871	2732	486	1050	2054	1200
Number of Firms - Tradable	1646	2502	507	938	1701	1200
New Firms	1039	1683	293	552	1074	1200
New Non-Tradable Firms	136	183	44	80	157	1200
New Tradable Firms	80	116	25	47	83	1200
Panel B: Entry Rate and Exit Rate						
Net Entry Rate - Total (%)	5.90	8.44	1.45	7.76	11.19	1150
Net Entry Rate - Non-Tradable (%)	6.55	9.01	1.75	7.37	12.40	1150
Net Entry Rate - Tradable (%)	3.66	7.43	0.29	4.35	8.07	1150
Entry Rate - Total (%)	8.59	5.11	3.63	8.42	11.53	1150
Entry Rate - Non-Tradable (%)	9.38	5.72	4.80	7.92	12.58	1150
Entry Rate - Tradable (%)	6.17	4.46	2.70	4.90	8.24	1150
Exit Rate - Total (%)	2.69	4.48	0.31	0.76	1.92	1150
Exit Rate - Non-Tradable (%)	2.84	4.79	0.21	0.71	2.14	1150
Exit Rate - Tradable (%)	2.51	4.30	0.14	0.65	2.12	1150
Panel C: Self-Employment						
Number of Self-Employed	41075	43387	18592	30158	44643	550
Net Entry Rate (%)	-1.29	2.66	-2.94	-1.44	0.65	550

Table 3: Summary Statistics of Firm Characteristics

This table reports the mean, standard deviation, 25th-percentile, median and 75th-percentile of firm characteristics. Firm characteristics are total assets, the number of employees, sales, value-added (total sales minus outside purchases of materials and services), wages (total cost of employees), leverage (debt-to-assets ratio) and the probability of default (Z-score) at firm creation. The sample includes all new firms created during the period 1992-2015.

	Mean	Standard Deviation	25%	Median	75%	Obs.
Assets (euros)	499462	2174231	19001	64308	205001	392682
Employees	7.12	215.70	2.00	3.00	5.00	184252
Sales (euros)	229646	703793	24587	70367	184502	168478
Value-Added (euros)	132285	400439	11836	34883	100058	237234
Wages (euros)	50630	125744	7237	19250	47049	249284
Leverage	0.52	0.68	0.00	0.48	0.75	71062
Z-score	2.54	9.47	1.00	1.55	3.05	173824

Table 4: The Effect of Lottery Prizes on Firm Creation

This table presents estimates of regressions of the growth rate of the number of firms between year $t-1$ and year t (net entry rate) at the province level. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prize per capita in year $t-1$, and zero otherwise. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)
Prize_{t-1}	0.687**	0.706**	0.955***	0.495**	0.836**
	(2.38)	(2.42)	(3.75)	(2.03)	(2.52)
Expenditure pc_{t-1}	-5.119	-4.304	2.027	-14.610*	-6.740*
	(-1.26)	(-1.13)	(0.32)	(-1.88)	(-2.01)
Δ GDP pc_{t-1}		0.017	0.031	0.010	0.013
		(0.70)	(1.40)	(0.27)	(0.48)
Δ Housing prices_{t-1}		0.017**	0.005	0.016	0.020**
		(2.19)	(0.62)	(1.40)	(2.48)
Δ CPI_{t-1}		-0.119	0.123	-0.487	-0.143
		(-0.46)	(0.63)	(-0.99)	(-0.53)
Δ $\text{Unemployment}_{t-1}$		-0.034	-0.051**	-0.050	-0.029
		(-1.57)	(-2.30)	(-1.59)	(-1.36)
Δ Population_{t-1}		0.190*	0.450***	0.182*	0.174*
		(1.91)	(4.85)	(1.90)	(1.71)
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Province fixed effects	No	No	Yes	No	No
Population weights	No	No	No	Yes	No
Sample	All	All	All	All	Ex. Madrid & Lleida
Observations	1150	1150	1150	1150	1104
Adjusted R^2	0.948	0.949	0.959	0.953	0.950

Table 5: The Effect of Lottery Prizes on Firm Entry and Exit

This table presents estimates of regressions of the entry rate and exit rate between year $t-1$ and year t at the province level. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prize per capita in year $t-1$, and zero otherwise. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% or 1% level, respectively.

	Entry Rate		Exit Rate	
	(1)	(2)	(3)	(4)
Prize_{t-1}	0.670**	0.861***	-0.036	-0.095
	(2.27)	(3.55)	(-0.24)	(-0.72)
Expenditure pc_{t-1}	-9.438***	-3.934	-5.134***	-5.961
	(-2.77)	(-0.66)	(-2.98)	(-1.36)
Δ GDP pc_{t-1}	0.005	0.013	-0.013	-0.018*
	(0.20)	(0.64)	(-1.36)	(-1.88)
Δ $\text{Housing prizes}_{t-1}$	0.013**	0.006	-0.004	0.001
	(2.05)	(0.87)	(-0.84)	(0.11)
Δ CPI_{t-1}	-0.191	0.067	-0.071	-0.056
	(-0.83)	(0.37)	(-1.23)	(-1.21)
Δ $\text{Unemployment}_{t-1}$	-0.054***	-0.065***	-0.020*	-0.014
	(-3.30)	(-3.80)	(-1.92)	(-1.40)
Δ Population_{t-1}	0.237**	0.288***	0.048	-0.162***
	(2.48)	(3.47)	(1.66)	(-3.23)
Time fixed effects	Yes	Yes	Yes	Yes
Province fixed effects	No	Yes	No	Yes
Observations	1150	1150	1150	1150
Adjusted R^2	0.897	0.920	0.957	0.962

Table 6: The Effect of Lottery Prizes on Firm Creation: Alternative Explanatory Variables

This table presents estimates of regressions of the entry rate and net entry rate between year $t-1$ and year t at the province level. *Prize* pc_{t-1} is the lottery prize per capita in each province (in euros thousand) in year $t-1$. $Prize/GDP_{t-1}$ is the lottery prize scaled by GDP in each province (in percentage) in year $t-1$. *Awarded tickets* pc_{t-1} is the number of winning tickets per capita in each province in year $t-1$. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	Entry Rate			Net Entry Rate		
	(1)	(2)	(3)	(4)	(5)	(6)
Prize pc_{t-1}	0.225**			0.325**		
	(2.17)			(2.56)		
Prize/GDP_{t-1}		0.056**			0.078**	
		(2.21)			(2.35)	
Awarded Tickets pc_{t-1}			0.316***			0.301
			(3.02)			(1.10)
Expenditure pc_{t-1}	-4.097	-4.066	-4.531	1.874	1.911	1.419
	(-0.66)	(-0.65)	(-0.74)	(0.29)	(0.29)	(0.23)
Δ GDP pc_{t-1}	0.011	0.011	0.012	0.029	0.029	0.029
	(0.56)	(0.57)	(0.59)	(1.32)	(1.32)	(1.34)
$\text{Housing prizes}_{t-1}$	0.006	0.006	0.006	0.006	0.006	0.006
	(0.89)	(0.89)	(0.90)	(0.63)	(0.63)	(0.64)
Δ CPI_{t-1}	0.078	0.078	0.075	0.135	0.135	0.133
	(0.43)	(0.43)	(0.42)	(0.69)	(0.69)	(0.68)
Δ $\text{Unemployment}_{t-1}$	-0.065***	-0.065***	-0.064***	-0.050**	-0.051**	-0.049**
	(-3.74)	(-3.76)	(-3.71)	(-2.28)	(-2.29)	(-2.25)
Δ Population_{t-1}	0.288***	0.289***	0.290***	0.450***	0.450***	0.452***
	(3.43)	(3.43)	(3.44)	(4.77)	(4.77)	(4.78)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1150	1150	1150	1150	1150	1150
Adjusted R^2	0.920	0.920	0.920	0.959	0.959	0.959

Table 7: The Effect of Lottery Prizes on Firm Creation: Instrumental Variables

This table presents estimates of the effect of disposable income on firm creation using instrumental variables methods. Disposable income is instrumented with the lottery prize. *Disposable Income* pc_t is the amount of disposable income per capita in each province (in euros thousand) in year t. *Prize* pc_{t-1} is the lottery prize per capita in each province (in euros thousand) in year $t-1$. Column (1) shows the first stage results of the regression of disposable income on *Prize* pc_{t-1}. Columns (2) and (3) show the second-stage results of the regressions of the entry rate and net entry rate between year $t-1$ and year t at the province level on the instrumented disposable income. The sample covers the period 1992-2010. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	First Stage	Second Stage	
	Disposable Income pc	Entry Rate	Net Entry Rate
	(1)	(2)	(3)
Prize pc_{t-1}	0.880***		
	(15.68)		
Disposable Income pc_{t-1}		0.387***	0.366***
		(3.70)	(4.01)
Expenditure pc_{t-1}	0.476	4.406	8.465
	(0.59)	(0.87)	(1.44)
Δ GDP pc_{t-1}	0.005***	0.009	0.007
	(3.52)	(0.43)	(0.37)
Housing $prizes_{t-1}$	0.001	0.043***	0.050***
	(0.58)	(2.78)	(3.46)
Δ CPI_{t-1}	0.025***	0.412**	0.436**
	(3.37)	(2.19)	(2.31)
Δ $Unemployment_{t-1}$	-0.001	-0.053***	-0.051***
	(-1.20)	(-3.40)	(-3.10)
Δ $Population_{t-1}$	-0.008	0.131*	0.141**
	(-1.24)	(1.96)	(2.17)
Time fixed effects	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes
Observations	850	850	850
Adjusted R^2	0.868	0.923	0.900

Table 8: The Effect of Lottery Prizes on Firm Creation by Sector

This table presents estimates of regressions of the entry rate between year $t-1$ and year t at the province level. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prize per capita in year $t-1$, and zero otherwise. Column (1) shows the results when we exclude firms in the construction sector. Column (2) excludes firms in both the construction and non-tradable sectors and column (3) also excludes financial firms. Column (4) includes firms in the non-tradable sector and column (5) includes firms in the tradable sector. Industries are classified as tradable or non-tradable following the Mian and Sufi (2014) classification. Column (6) includes manufacturing firms. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	Excluding Construction	Excluding Construction & Non-Tradable	Excluding Construction Non-Tradable & Financial	Non-Tradable	Tradable	Manufacturing
	(1)	(2)	(3)	(4)	(5)	(6)
Prize_{t-1}	0.701**	0.698**	0.654**	0.724**	0.694*	0.660**
	(2.40)	(2.14)	(2.04)	(2.04)	(1.87)	(2.22)
Expenditure pc_{t-1}	-7.233	-6.901	-6.756	-10.470	-0.613	0.101
	(-1.17)	(-1.11)	(-1.09)	(-1.41)	(-0.08)	(0.01)
Δ GDP pc_{t-1}	-0.006	-0.006	-0.006	-0.002	-0.023	-0.022
	(-0.28)	(-0.29)	(-0.27)	(-0.06)	(-0.88)	(-0.87)
Δ Housing prices_{t-1}	0.001	0.002	0.002	0.001	-0.003	-0.006
	(0.18)	(0.23)	(0.23)	(0.19)	(-0.47)	(-0.89)
Δ CPI_{t-1}	0.035	0.054	0.047	-0.017	-0.139	-0.224
	(0.20)	(0.31)	(0.27)	(-0.07)	(-0.72)	(-1.10)
Δ $\text{Unemployment}_{t-1}$	-0.051***	-0.050***	-0.049***	-0.055**	-0.031*	-0.028
	(-3.33)	(-3.06)	(-3.03)	(-2.21)	(-1.72)	(-1.35)
Δ Population_{t-1}	0.252***	0.225***	0.223***	0.364***	0.225**	0.264**
	(3.22)	(2.84)	(2.85)	(3.69)	(2.49)	(2.52)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1150	1150	1150	1150	1150	1150
Adjusted R^2	0.923	0.913	0.913	0.887	0.869	0.861

Table 9: The Effect of Lottery Prizes on Firm Creation: The Role of the Banking System

This table presents estimates of regressions of the entry rate and net entry rate between year $t-1$ and year t at the province level. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prize per capita in year $t-1$, and zero otherwise. In Panel A, the low and high groups consist of those provinces that are below and above the median of the distribution of the number of loans per capita. In Panel B, the low and high groups consist of those provinces that are below and above the median of the distribution of the number of bank branches per capita. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Bank Loans per capita

	Low		High	
	Entry Rate	Net Entry Rate	Entry Rate	Net Entry Rate
	(1)	(2)	(3)	(4)
Prize_{t-1}	1.255***	1.344***	0.414**	0.486**
	(3.88)	(3.60)	(2.37)	(2.16)
Expenditure pc_{t-1}	7.968	15.217	-9.355	-6.033
	(0.81)	(1.61)	(-1.48)	(-1.02)
Δ GDP pc_{t-1}	0.051	0.065*	0.002	0.027
	(1.69)	(1.83)	(0.08)	(0.90)
Δ Housing prizes_{t-1}	0.016**	0.021**	0.015	0.009
	(2.17)	(2.36)	(1.43)	(0.61)
Δ CPI_{t-1}	0.164	0.281	-0.182	-0.126
	(0.74)	(1.13)	(-0.67)	(-0.40)
Δ $\text{Unemployment}_{t-1}$	-0.037	-0.036	-0.073**	-0.041
	(-1.65)	(-1.23)	(-2.64)	(-1.22)
Δ Population_{t-1}	0.133	0.279*	0.162**	0.356***
	(0.88)	(1.77)	(2.35)	(3.14)
Time fixed effects	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes
Observations	575	575	575	575
Adjusted R^2	0.932	0.962	0.933	0.965

Panel B: Bank Branches per capita

	Low		High	
	Entry Rate	Net Entry Rate	Entry Rate	Net Entry Rate
	(1)	(2)	(3)	(4)
Prize_{t-1}	1.053*	1.148**	0.556***	0.756***
	(1.97)	(2.33)	(3.03)	(3.10)
Expenditure pc_{t-1}	-26.246	-18.558	-3.736	0.382
	(-0.70)	(-0.40)	(-0.70)	(0.06)
Δ GDP pc_{t-1}	0.023	0.042	-0.019	-0.007
	(0.92)	(1.58)	(-0.83)	(-0.29)
Δ Housing prizes_{t-1}	0.017	0.002	-0.002	0.001
	(1.44)	(0.11)	(-0.15)	(0.07)
Δ CPI_{t-1}	0.445**	0.550**	-0.268	-0.247
	(2.06)	(2.34)	(-0.99)	(-0.90)
Δ $\text{Unemployment}_{t-1}$	-0.068***	-0.042	-0.040	-0.026
	(-2.95)	(-1.41)	(-1.55)	(-0.81)
Δ Population_{t-1}	0.227*	0.482***	0.371**	0.455***
	(1.96)	(2.87)	(2.42)	(3.23)
Time fixed effects	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes
Observations	575	575	575	575
Adjusted R^2	0.929	0.964	0.923	0.962

Table 10: The Effect of Lottery Prizes on Firm Creation by Legal Status

This table presents estimates of regressions of the entry rate and net entry rate between year $t-1$ and year t at the province level. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prize per capita in year $t-1$, and zero otherwise. Columns (1) and (2) present estimates for the sample of limited liability companies and columns (3) and (4) present estimates for the sample of public limited companies. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	Limited Liability Companies		Public Limited Companies	
	Entry Rate	Net Entry Rate	Entry Rate	Net Entry Rate
	(1)	(2)	(3)	(4)
Prize_{t-1}	0.835***	0.970***	0.224*	-0.014
	(3.09)	(3.20)	(1.80)	(-0.05)
Expenditure pc_{t-1}	-9.154	-2.995	4.299*	7.213*
	(-1.50)	(-0.46)	(1.69)	(1.79)
Δ GDP pc_{t-1}	0.028	0.045	-0.001	0.013
	(1.10)	(1.60)	(-0.13)	(1.05)
Δ Housing prizes_{t-1}	0.013	0.012	-0.003	-0.006
	(1.66)	(1.28)	(-1.31)	(-0.92)
Δ CPI_{t-1}	0.069	0.129	-0.044	-0.039
	(0.31)	(0.54)	(-0.67)	(-0.44)
Δ $\text{Unemployment}_{t-1}$	-0.068***	-0.050*	-0.016	-0.024
	(-3.22)	(-1.90)	(-1.66)	(-1.49)
Δ Population_{t-1}	0.293***	0.466***	0.002	0.049
	(3.07)	(4.45)	(0.04)	(0.70)
Time fixed effects	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes
Observations	1150	1150	1150	1150
Adjusted R^2	0.931	0.959	0.749	0.939

Table 11: The Effect of Lottery Prizes on Firm Outcomes

This table presents estimates of regressions of outcomes of firms created in year t at the firm level. Firm outcomes are the logarithm of assets, logarithm of employees, logarithm of sales, logarithm of value-added, logarithm of wages, leverage (debt-to-assets ratio), and Z-score in year t, year $t+1$, year $t+2$, and year $t+4$. $Prize_{t-1}$ is a dummy variable that takes a value of one for new firms incorporated in provinces that receive the maximum prize per capita in year $t-1$ (treated firms), and zero for new firms incorporated in other provinces (control firms). Panel A includes all firms in our sample. Panel B excludes firms in the non-tradable and construction sectors. Industries are classified as tradable or non-tradable following the Mian and Sufi (2014) classification. Regressions control for the total expenditure in the Christmas Lottery per capita and a set of macroeconomic variables (coefficients not shown). All regressions include province and time fixed effects. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: Sample of All Firms

			log(Assets)	
	Year t	Year $t+1$	Year $t+2$	Year $t+4$
Prize_{t-1}	0.068*	0.055**	0.054**	0.076***
	(1.76)	(2.14)	(2.44)	(2.84)
Observations	392682	319760	239806	167055
			log(Employees)	
	Year t	Year $t+1$	Year $t+2$	Year $t+4$
Prize_{t-1}	0.042**	0.031	0.022	0.074***
	(2.56)	(1.49)	(1.07)	(3.31)
Observations	184252	144653	107705	70100
			log(Sales)	
	Year t	Year $t+1$	Year $t+2$	Year $t+4$
Prize_{t-1}	0.041**	0.093***	0.069	0.156***
	(2.30)	(3.68)	(1.60)	(3.57)
Observations	168478	145044	112501	75442
			log(Value-Added)	
	Year t	Year $t+1$	Year $t+2$	Year $t+3$
Prize_{t-1}	0.060***	0.063***	0.064**	0.118***
	(3.46)	(4.48)	(2.52)	(3.27)
Observations	130231	110419	86078	57532
			log(Wages)	
	Year t	Year $t+1$	Year $t+2$	Year $t+4$
Prize_{t-1}	0.019	0.020	-0.013	0.071***
	(1.20)	(0.70)	(-0.58)	(3.38)
Observations	249284	202570	152426	100338
			Leverage	
	Year t	Year $t+1$	Year $t+2$	Year $t+4$
Prize_{t-1}	0.036	0.013	-0.034*	-0.074**
	(1.63)	(1.38)	(-1.97)	(-2.22)
Observations	71062	57344	44949	32420
			Z-score	
	Year t	Year $t+1$	Year $t+2$	Year $t+4$
Prize_{t-1}	-0.210**	-0.023	0.050	0.013
	(-2.44)	(-0.33)	(0.58)	(0.20)
Observations	173824	149972	116597	79096

Table 11 (continued)

Panel B: Sample Excluding Firms in the Construction and Non-Tradable Sectors

			log(Assets)	
	Year t	Year $t+1$	Year $t+2$	Year $t+4$
Prize_{t-1}	-0.004	0.013	-0.004	-0.003
	(-0.09)	(0.46)	(-0.15)	(-0.14)
Observations	210822	170978	128661	88236
			log(Employees)	
	Year t	Year $t+1$	Year $t+2$	Year $t+4$
Prize_{t-1}	0.045*	0.025	0.020	0.050**
	(1.99)	(1.05)	(1.05)	(2.22)
Observations	99385	77654	57932	38036
			log(Sales)	
	Year t	Year $t+1$	Year $t+2$	Year $t+4$
Prize_{t-1}	0.058**	0.093***	0.093***	0.152***
	(2.42)	(4.27)	(3.34)	(4.39)
Observations	97013	83736	64524	42958
			log(Value-Added)	
	Year t	Year $t+1$	Year $t+2$	Year $t+4$
Prize_{t-1}	0.059*	0.036	0.091***	0.098***
	(1.95)	(1.18)	(3.87)	(2.69)
Observations	71901	60817	47239	31603
			log(Wages)	
	Year t	Year $t+1$	Year $t+2$	Year $t+4$
Prize_{t-1}	0.025	0.005	-0.020	0.023
	(1.28)	(0.23)	(-0.96)	(0.89)
Observations	136576	110717	83432	55266
			Leverage	
	Year t	Year $t+1$	Year $t+2$	Year $t+4$
Prize_{t-1}	-0.014*	-0.003	-0.089***	-0.159***
	(-1.82)	(-0.18)	(-2.85)	(-3.59)
Observations	37290	29990	23368	16165
			Z-score	
	Year t	Year $t+1$	Year $t+2$	Year $t+4$
Prize_{t-1}	-0.228	-0.126	0.015	0.073
	(-1.52)	(-0.66)	(0.14)	(0.84)
Observations	99046	85576	66101	44317

Table 12: The Effect of Lottery Prizes on Firm Survival

This table presents linear probability model estimates of the survival hazard defined as the probability that a firm created in year t survives at least 1, 2, 3 or 5 years at the firm level. $Prize_{t-1}$ is a dummy variable that takes a value of one for new firms incorporated in provinces that receive the maximum prize per capita in year $t-1$ (treated firms), and zero for new firms incorporated other provinces (control firms). Columns (1)-(4) include all firms in our sample. Columns (5)-(8) exclude firms in the non-tradable and construction sectors. Industries are classified as tradable or non-tradable following the Mian and Sufi (2014) classification. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	All Firms				Excluding Construction and Non-Tradable			
	Survives ≥ 1	Survives ≥ 2	Survives ≥ 3	Survives ≥ 5	Survives ≥ 1	Survives ≥ 2	Survives ≥ 3	Survives ≥ 5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Prize_{t-1}	-0.000	0.002*	0.006***	0.011***	-0.001	0.001	0.006***	0.011***
	(-0.26)	(1.98)	(3.73)	(3.75)	(-0.59)	(0.54)	(2.95)	(3.06)
Expenditure pc_{t-1}	-0.081**	-0.107	-0.197*	-0.530***	-0.080	-0.105	-0.287**	-0.676***
	(-2.07)	(-1.48)	(-1.92)	(-3.29)	(-1.35)	(-1.05)	(-2.47)	(-4.54)
Δ GDP pc_{t-1}	-0.000	0.000	0.000	0.000	-0.000	0.000	-0.000	-0.000
	(-1.05)	(1.03)	(0.28)	(0.15)	(-0.98)	(0.16)	(-0.29)	(-0.36)
Δ Housing prizes_{t-1}	0.000	-0.000	-0.000*	-0.000**	0.000	-0.000	-0.000*	-0.000
	(0.45)	(-1.02)	(-1.92)	(-2.44)	(1.02)	(-0.55)	(-1.76)	(-1.49)
Δ CPI_{t-1}	0.000	0.001**	0.002*	0.004**	0.000*	0.001**	0.001	0.005**
	(1.48)	(2.12)	(1.80)	(2.25)	(1.92)	(2.36)	(0.64)	(2.34)
Δ $\text{Unemployment}_{t-1}$	0.000	0.000	0.000	-0.000	-0.000	0.000	0.001	0.000
	(0.12)	(0.81)	(0.40)	(-0.74)	(-0.04)	(1.39)	(1.35)	(0.33)
Δ Population_{t-1}	-0.000	-0.000	-0.000	-0.002	0.000	-0.000	-0.001	-0.002
	(-0.06)	(-0.59)	(-0.14)	(-1.13)	(1.00)	(-0.74)	(-0.43)	(-0.93)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	279765	279765	279765	279765	157806	157806	157806	157806
Adjusted R^2	0.975	0.927	0.859	0.720	0.974	0.928	0.864	0.736

Table 13: The Effect of Lottery Prizes on Self-Employment

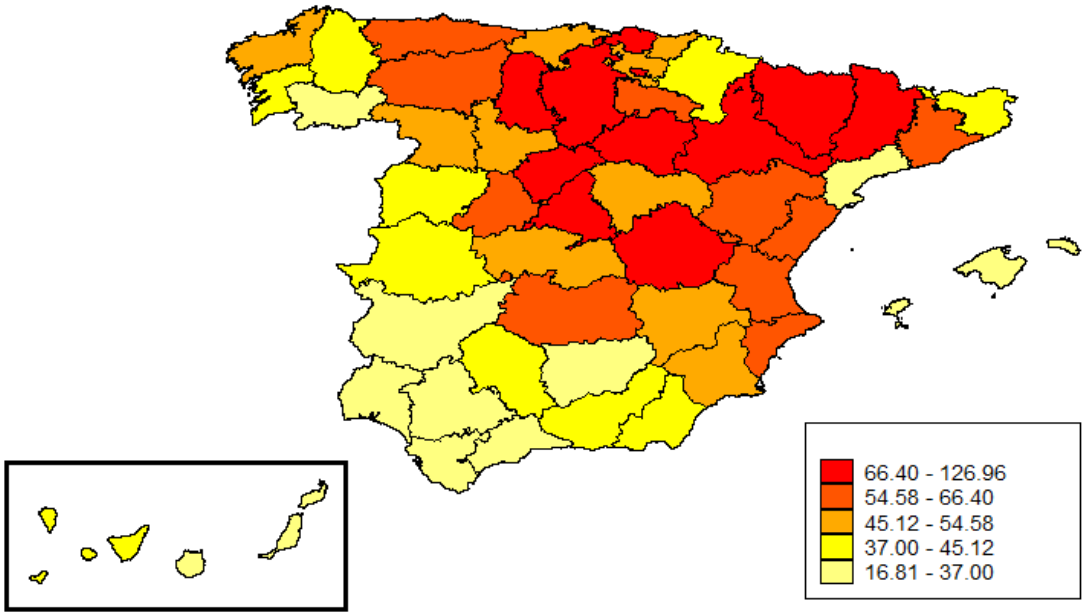
This table presents estimates of regressions of the growth rate of the number of self-employed individuals between year $t-1$ and year t (net entry rate) at the province level. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prize per capita in year $t-1$, and zero otherwise. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)
Prize_{t-1}	0.528*	0.533**	0.805**	0.520***	0.664***
	(2.00)	(2.11)	(2.16)	(3.28)	(2.98)
Expenditure pc_{t-1}	-14.207***	-13.184***	22.411***	-12.872**	-16.334***
	(-3.90)	(-4.33)	(4.45)	(-2.31)	(-3.55)
Δ GDP pc_{t-1}		-0.002	0.022	0.029	-0.002
		(-0.11)	(1.21)	(1.06)	(-0.12)
Δ Housing prizes_{t-1}		0.012***	0.020***	0.005	0.012***
		(2.89)	(4.69)	(0.74)	(3.12)
Δ CPI_{t-1}		-0.312	0.278	-0.073	-0.278
		(-1.31)	(1.18)	(-0.40)	(-1.17)
Δ $\text{Unemployment}_{t-1}$		-0.064*	-0.070**	-0.024	-0.068**
		(-2.01)	(-2.43)	(-0.53)	(-2.16)
Δ Population_{t-1}		0.320***	-0.254***	0.169	0.293**
		(2.76)	(-2.88)	(1.18)	(2.41)
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Province fixed effects	No	No	Yes	No	No
Population weights	No	No	No	Yes	No
Sample	All	All	All	All	Excl. Madrid & Lleida
Observations	550	550	550	550	528
Adjusted R^2	0.662	0.678	0.812	0.753	0.679

Figure 1: Lottery Expenditures and Prizes by Province

The map in Panel A shows the average Spanish Christmas Lottery expenditures per capita in euros in each province. The map in Panel B shows the average lottery prize (top three prizes) per capita in euros. The sample covers the period 1992-2015.

Panel A: Expenditures per capita (euros)



Panel B: Prizes per capita (euros)

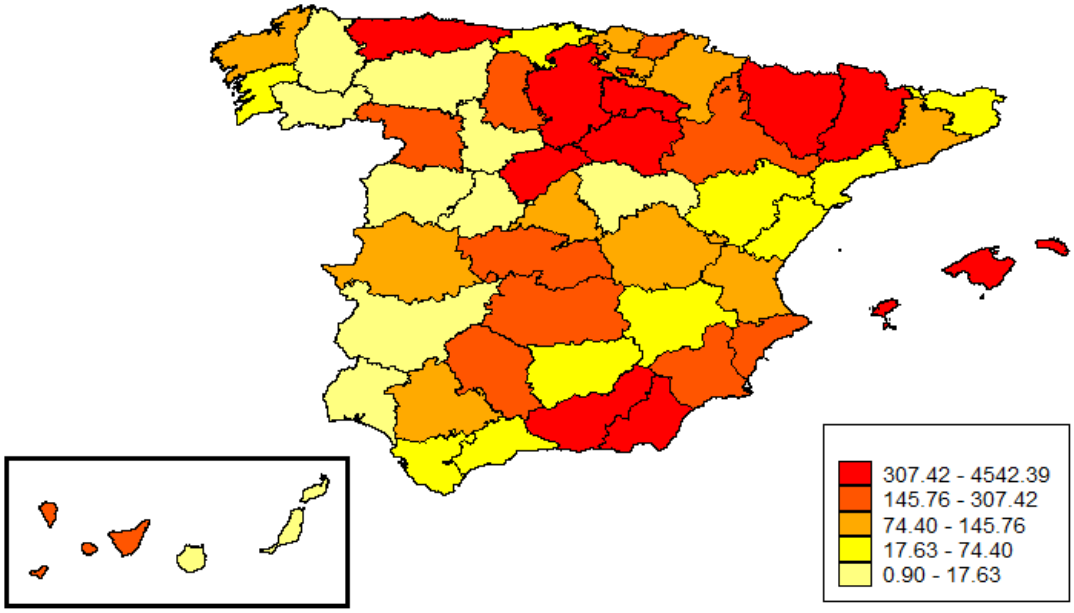
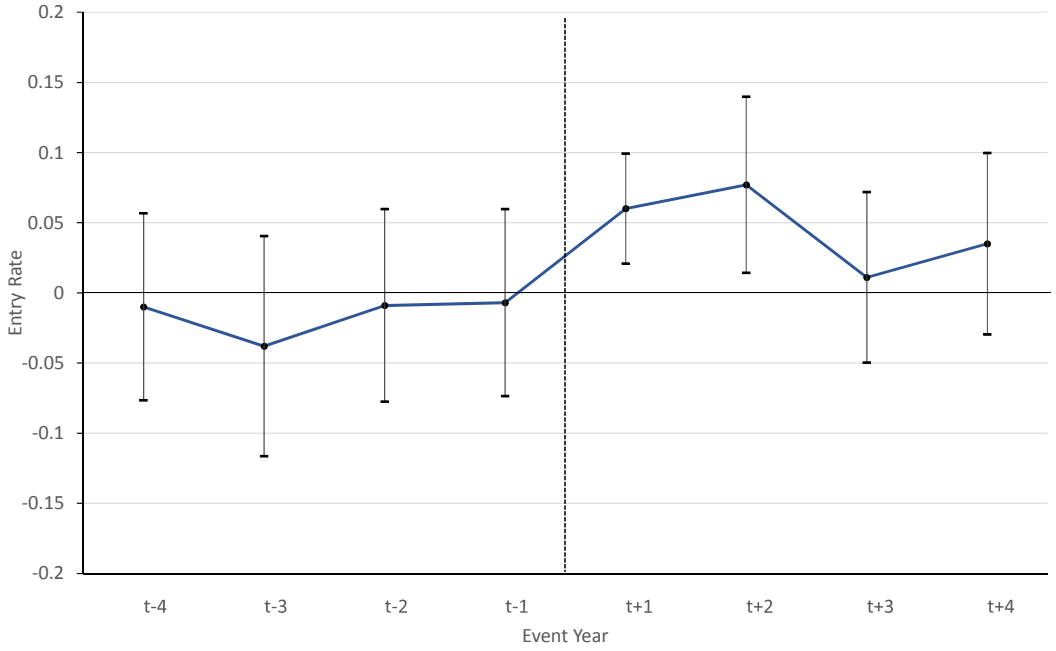


Figure 2: The Effect of Lottery Prizes on Firm Creation

This figure shows point estimates and 95% confidence intervals of the effect on the entry rate of winning provinces relative to non-winning provinces. The dependent variable is the logarithm of the number of new firms (entry) in each province. The main explanatory variable is $Prize_{j,t+n}$, defined as a dummy variable that takes a value of one if a given province receives the maximum prize per capita in year $t+n$, and zero otherwise. The regression includes four leads and lags of the $Prize_{j,t+n}$ variable. Regressions control for the total expenditure in the Christmas Lottery per capita and a set of macroeconomic variables. All regressions include province and time fixed effects. The sample covers the period 1992-2015. Robust t-statistics are clustered at the province level.



Internet Appendix for "Entrepreneurship and Regional Windfall Gains: Evidence from the Spanish Christmas Lottery"

Vicente J. Bermejo, Miguel A. Ferreira, Daniel Wolfenzon and Rafael Zambrana

This Internet Appendix reports the results of robustness tests:

- Table A1: Summary Statistics of Self-Employment
- Table A2: The Effect of Lottery Prizes on Firm Creation: Full population
- Table A3: The Prediction of Lottery Prizes
- Table A4: The Effect of Lottery Prizes on Firm Entry and Exit
- Table A5: The Effect of Lottery Prizes on Firm Creation by Sector
- Table A6: The Effect of Lottery Prizes on Firm Creation: The Role of the Banking System
- Table A7: The Effect of Lottery Prizes on Firm Creation: Capital Requirements
- Table A8: The Effect of Lottery Prizes on the Local Economy
- Table A9: The Effect of Lottery Prizes on the Local Economy: Openness Ratio
- Table A10: The Effect of Lottery Prizes on Firm Growth
- Table A11: The Effect of Lottery Prizes on Self-Employment: Alternative Explanatory Variables
- Table A12: Lottery Prizes and Self-Employed Individuals Characteristics

Table A1: Summary Statistics of Self-Employment

This table reports mean, standard deviation, 25th-percentile, median and 75th-percentile of the characteristics of self-employed individuals by province. The sample covers the period 1992-2015.

	Mean	Standard Deviation	25%	Median	75%	Obs.
Total	41075	43387	18592	30158	44643	600
Male	27697	29707	12923	20369	29227	600
Female	13377	13928	5766	10065	14532	600
Age < 25	861	922	319	617	988	600
Age 25-39	12162	13782	4903	8603	13316	600
Age 40-54	18130	18617	8176	13633	19914	600
Age >54	9922	10335	4963	7509	11104	600
National	38366	39343	17967	29025	40599	600
Foreigner	2709	4635	479	956	2448	600
Employees=0	32974	35267	15327	24729	35479	600
Employees=1	8101	8298	3291	5439	9994	600
Pluriactivity=0	39184	41047	17664	28707	42841	600
Pluriactivity=1	1890	2409	824	1276	1963	600
Agriculture	5669	3838	3126	4803	6649	600
Manufacturing	2183	2609	936	1463	2461	600
Construction	5105	5870	2236	3358	5827	600
Service	28119	35401	10568	18756	31202	600

Table A2: The Effect of Lottery Prizes on Firm Creation: Full Population

This table presents estimates of regressions of the entry rate and net entry rate between year $t-1$ and t at the province level. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prize per capita in year t-1, and zero otherwise. $Prize\ pc_{t-1}$ is the lottery prize per capita in each province (in euros thousand) in year $t-1$. $Prize/GDP_{t-1}$ is the lottery prizes scaled by GDP in each province (in percentage) in year $t-1$. The sample includes the full population of firms provided by the Spanish National Statistics Institute in the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	Entry Rate			Net Entry Rate		
	(1)	(2)	(3)	(4)	(5)	(6)
Prize_{t-1}	0.942**			0.800**		
	(2.52)			(2.03)		
Prize pc_{t-1}		0.416***			0.348***	
		(4.40)			(3.78)	
Prize/GDP_{t-1}			0.097***			0.082***
			(3.63)			(2.92)
$\text{Expenditure pc}_{t-1}$	28.669**	28.579**	28.621**	25.527*	25.446*	25.484*
	(2.16)	(2.15)	(2.15)	(1.88)	(1.87)	(1.87)
Δ GDP pc_{t-1}	0.060*	0.058*	0.058*	0.067*	0.065*	0.065*
	(1.74)	(1.70)	(1.70)	(1.82)	(1.78)	(1.79)
$\text{Housing prizes}_{t-1}$	0.023**	0.023**	0.023**	0.019	0.019	0.019
	(2.08)	(2.08)	(2.09)	(1.67)	(1.67)	(1.67)
Δ CPI_{t-1}	0.755**	0.775**	0.776**	0.730*	0.746*	0.747*
	(2.04)	(2.09)	(2.10)	(1.78)	(1.83)	(1.83)
Δ $\text{Unemployment}_{t-1}$	-0.107***	-0.107***	-0.107***	-0.109***	-0.109***	-0.109***
	(-3.67)	(-3.66)	(-3.68)	(-3.79)	(-3.78)	(-3.79)
Δ Population_{t-1}	0.411***	0.411***	0.411***	0.432***	0.433***	0.433***
	(3.81)	(3.79)	(3.80)	(3.69)	(3.68)	(3.68)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1050	1050	1050	1050	1050	1050
Adjusted R^2	0.915	0.915	0.915	0.911	0.910	0.910

Table A3: The Effect of Lottery Prizes on Firm Entry and Exit

This table presents estimates of regressions of the logarithm of the number of new firms (entry) and number of firms liquidated (exit) in year t at the province level. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prizes per capita in year $t-1$, and zero otherwise. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	Log(Entry)		Log(Exit)	
	(1)	(2)	(3)	(4)
Prize_{t-1}	0.072^{***}	0.070^{***}	-0.040	-0.038
	(3.14)	(3.25)	(-0.55)	(-0.53)
Expenditure pc_{t-1}	-0.295	-0.553	-2.314	-2.583
	(-0.30)	(-0.55)	(-1.03)	(-1.14)
Δ GDP pc_{t-1}		0.001		0.002
		(0.43)		(0.62)
Δ Housing prizes_{t-1}		0.001		0.002
		(1.54)		(1.47)
Δ CPI_{t-1}		0.010		-0.009
		(0.73)		(-0.34)
Δ $\text{Unemployment}_{t-1}$		-0.004^{*}		-0.002
		(-1.85)		(-0.54)
Δ Population_{t-1}		0.022^{***}		0.013
		(2.89)		(0.71)
Time fixed effects	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes
Observations	1150	1150	1150	1150
Adjusted R^2	0.978	0.978	0.975	0.975

Table A4: Probability of Winning the Lottery

This table presents estimates of linear probability model of winning the lottery on several macroeconomic variables and lottery expenditure. The dependent variable is $Prize_t$, a dummy variable that takes a value of one if a given province has the maximum prize per capita in year t, and zero otherwise. The sample covers the 1992-2015 period. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)
Expenditure pc_{t-1}		0.629***
		(5.02)
Δ GDP pc_{t-1}	0.002	0.002
	(1.17)	(1.23)
Housing prizes_{t-1}	-0.000	-0.000
	(-0.64)	(-1.24)
Δ CPI_{t-1}	0.010	0.005
	(1.40)	(0.77)
Δ $\text{Unemployment}_{t-1}$	-0.002	-0.002
	(-1.36)	(-1.36)
Δ Population_{t-1}	0.001	0.003
	(0.26)	(0.77)
Time fixed effects	Yes	Yes
Observations	1200	1200
Adjusted R^2	0.003	0.016

Table A5: The Effect of Lottery Prizes on Firm Creation by Sector

This table presents estimates of regressions of the net entry rate between year $t-1$ and year t at the province level. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prize per capita in year $t-1$, and zero otherwise. Column (1) shows the results when we exclude firms in the construction sector. Column (2) excludes firms in both the construction and non-tradable sectors and column (3) also excludes financial firms. Column (4) includes firms in the non-tradable sector and column (5) includes firms in the tradable sector. Industries are classified as tradable or non-tradable following the Mian and Sufi (2014) classification. Column (6) includes manufacturing firms. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	Excluding Construction	Excluding Construction & Non-Tradable	Excluding Construction Non-Tradable & Financial	Non-Tradable	Tradable	Manufacturing
	(1)	(2)	(3)	(4)	(5)	(6)
Prize_{t-1}	0.784**	0.782**	0.727**	0.811**	0.650*	0.645*
	(2.49)	(2.24)	(2.11)	(2.32)	(1.91)	(1.81)
Expenditure pc_{t-1}	-0.259	0.343	0.699	-4.001	5.304	6.670
	(-0.05)	(0.06)	(0.13)	(-0.49)	(0.69)	(0.92)
Δ GDP pc_{t-1}	0.015	0.015	0.016	0.011	0.011	0.017
	(0.68)	(0.69)	(0.73)	(0.31)	(0.40)	(0.61)
Δ $\text{Housing prices}_{t-1}$	-0.001	-0.001	-0.001	-0.001	0.001	0.001
	(-0.18)	(-0.11)	(-0.14)	(-0.11)	(0.10)	(0.10)
Δ CPI_{t-1}	0.124	0.140	0.135	0.089	-0.133	-0.059
	(0.63)	(0.71)	(0.69)	(0.32)	(-0.60)	(-0.28)
Δ $\text{Unemployment}_{t-1}$	-0.034*	-0.033	-0.031	-0.038	-0.028	-0.024
	(-1.72)	(-1.50)	(-1.46)	(-1.46)	(-1.02)	(-0.94)
Δ Population_{t-1}	0.406***	0.370***	0.375***	0.539***	0.391***	0.347***
	(4.71)	(4.38)	(4.47)	(4.94)	(3.38)	(3.47)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1150	1150	1150	1150	1150	1150
Adjusted R^2	0.960	0.956	0.956	0.940	0.922	0.929

Table A6: The Effect of Lottery Prizes on Firm Creation: The Role of Banking System

This table presents estimates of regressions of the entry rate and net entry rate between year $t-1$ and year t at the province level. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prize per capita in year $t-1$, and zero otherwise. The low and high groups consist of those provinces that are below and above the median of the distribution of the number of loans per bank branch. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	Low		High	
	Entry Rate	Net Entry Rate	Entry Rate	Net Entry Rate
	(1)	(2)	(3)	(4)
Prize_{t-1}	0.742***	0.980***	0.148	0.201
	(3.03)	(3.49)	(0.68)	(0.82)
Expenditure pc_{t-1}	5.925	8.143	-71.689**	-69.839*
	(1.22)	(1.17)	(-2.43)	(-1.97)
Δ GDP pc_{t-1}	0.003	0.021	0.015	0.024
	(0.13)	(0.84)	(0.59)	(0.80)
Δ Housing prizes_{t-1}	-0.001	-0.003	0.041**	0.036*
	(-0.06)	(-0.24)	(2.35)	(2.00)
Δ CPI_{t-1}	0.034	0.077	0.376	0.439*
	(0.20)	(0.43)	(1.66)	(1.75)
Δ $\text{Unemployment}_{t-1}$	-0.024	-0.014	-0.086***	-0.072**
	(-1.06)	(-0.50)	(-3.26)	(-2.60)
Δ Population_{t-1}	0.363**	0.466***	0.140*	0.309**
	(2.47)	(3.68)	(1.89)	(2.43)
Time fixed effects	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes
Observations	575	575	575	575
Adjusted R^2	0.939	0.965	0.939	0.967

Table A7: The Effect of Lottery Prizes on the Local Economy

This table presents estimates of regressions of GDP per capita growth, housing prices growth, inflation rate, unemployment rate growth, and population growth in year t, year $t+1$, year $t+2$, and year $t+3$ relative to year $t-1$. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prize per capita, and zero otherwise. Regressions control for the total expenditure in the Christmas Lottery per capita. All regressions include time fixed effects and population weights. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

			Δ GDP pc	
	Year t	Year $t+1$	Year $t+2$	Year $t+3$
Prize_{t-1}	-0.101	-0.028	0.362	0.011
	(-0.98)	(-0.34)	(1.53)	(0.03)
Expenditure pc_{t-1}	2.477**	2.385**	4.470**	6.944**
	(2.15)	(2.09)	(2.04)	(2.05)
Observations	1150	1150	1100	1050
Adjusted R^2	0.681	0.680	0.750	0.780
			Δ Housing Prices	
	Year t	Year $t+1$	Year $t+2$	Year $t+3$
Prize_{t-1}	0.787	-0.560	-1.794	-3.716
	(0.92)	(-0.39)	(-1.05)	(-1.46)
Expenditure pc_{t-1}	0.174	-0.947	-4.502	-15.536
	(0.02)	(-0.05)	(-0.15)	(-0.37)
Observations	1150	1100	1050	1000
Adjusted R^2	0.670	0.726	0.749	0.759
			Δ CPI	
	Year t	Year $t+1$	Year $t+2$	Year $t+3$
Prize_{t-1}	0.097***	0.293***	0.357**	0.384
	(3.29)	(3.61)	(2.09)	(1.36)
Expenditure pc_{t-1}	1.938	4.169	6.886*	10.298*
	(1.62)	(1.65)	(1.78)	(1.98)
Observations	1150	1100	1050	1000
Adjusted R^2	0.950	0.951	0.942	0.924
			Δ Unemployment	
	Year t	Year $t+1$	Year $t+2$	Year $t+3$
Prize_{t-1}	-0.168	-0.260	-0.608	-0.227
	(-0.40)	(-1.42)	(-1.49)	(-0.84)
Expenditure pc_{t-1}	0.897	0.933	0.298	-1.701
	(0.77)	(0.79)	(0.13)	(-0.49)
Observations	1150	1150	1100	1050
Adjusted R^2	0.632	0.631	0.771	0.813
			Δ Population	
	Year t	Year $t+1$	Year $t+2$	Year $t+3$
Prize_{t-1}	0.164	0.427*	0.672*	0.932**
	(1.30)	(2.00)	(1.98)	(2.41)
Expenditure pc_{t-1}	-0.647	-1.570	-2.677	-4.265
	(-0.17)	(-0.20)	(-0.22)	(-0.25)
Observations	1150	1100	1050	1000
Adjusted R^2	0.550	0.525	0.495	0.459

Table A8: The Effect of Lottery Prizes on the Local Economy: Openness Ratio

This table presents estimates of regressions of GDP per capita growth and unemployment rate growth in year t, year $t+1$, year $t+2$, and year $t+3$ relative to year $t-1$. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prize per capita, and zero otherwise. The low group consists of those provinces that are in the bottom tercile of the trade-to-GDP ratio. The high group consists of those provinces that are in the top tercile of the trade-to-GDP ratio. Regressions control for the total expenditure in the Christmas Lottery per capita. All regressions include time fixed effects and population weights. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: Δ GDP pc

	Low				High			
	Year t	Year $t+1$	Year $t+2$	Year $t+3$	Year t	Year $t+1$	Year $t+2$	Year $t+3$
Prize$_{t-1}$	0.028	0.277	0.610	1.002*	-0.281	0.055	0.105	0.043
	(0.45)	(0.84)	(1.10)	(1.87)	(-1.66)	(0.86)	(0.98)	(0.24)
Expenditure pc$_{t-1}$	1.369	1.359	2.455	4.822*	3.545***	2.286	5.031**	6.297**
	(1.66)	(1.58)	(1.42)	(1.80)	(3.18)	(1.69)	(2.27)	(2.11)
Observations	357	340	323	306	336	320	304	288
Adjusted R^2	0.628	0.596	0.711	0.765	0.739	0.767	0.833	0.857

Panel B: Δ Unemployment

	Low				High			
	Year t	Year $t+1$	Year $t+2$	Year $t+3$	Year t	Year $t+1$	Year $t+2$	Year $t+3$
Prize$_{t-1}$	0.991	-2.795*	-3.525**	-2.987	-0.066	-0.225	-0.401	-0.194
	(0.39)	(-1.94)	(-2.57)	(-1.61)	(-0.17)	(-0.32)	(-0.92)	(-0.26)
Expenditure pc$_{t-1}$	-1.656	-1.899	-4.364	-7.033	-3.173	-1.587	-2.292	-1.262
	(-0.34)	(-0.59)	(-0.45)	(-0.65)	(-0.97)	(-0.48)	(-0.45)	(-0.16)
Observations	357	340	323	306	336	320	304	288
Adjusted R^2	0.596	0.577	0.750	0.790	0.711	0.706	0.837	0.873

Table A9: The Effect of Lottery Prizes on Firm Creation: Capital Requirements

This table presents estimates of regressions of the entry rate and net entry rate between year $t-1$ and year t. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prize per capita in year $t-1$, and zero otherwise. The low and high groups consist of those provinces that are below and above the median of the distribution of initial capital requirements. The initial capital requirements are the average initial capital of all newly created firm in each two-digit industry code. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	Low		High	
	Entry Rate	Net Entry Rate	Entry Rate	Net Entry Rate
	(1)	(2)	(3)	(4)
Prize_{t-1}	0.456**	0.591***	0.223*	0.230**
	(2.19)	(3.56)	(1.92)	(2.55)
Expenditure pc_{t-1}	-7.643***	-3.112	-0.982	-1.093
	(-3.44)	(-0.60)	(-0.66)	(-0.40)
Δ GDP pc_{t-1}	-0.017	-0.009	0.022**	0.020**
	(-1.07)	(-0.72)	(2.58)	(2.49)
Δ Housing prizes_{t-1}	0.002	-0.004	0.010***	0.010***
	(0.55)	(-1.02)	(2.96)	(2.91)
Δ CPI_{t-1}	-0.187	-0.079	0.010	0.130
	(-1.23)	(-0.69)	(0.10)	(1.37)
Δ $\text{Unemployment}_{t-1}$	-0.022*	-0.031**	-0.027***	-0.028***
	(-1.79)	(-2.38)	(-3.18)	(-3.43)
Δ Population_{t-1}	0.024	0.188***	0.191***	0.072**
	(0.37)	(3.19)	(4.41)	(2.64)
Time fixed effects	Yes	Yes	Yes	Yes
Province fixed effects	No	Yes	No	Yes
Observations	1150	1150	1150	1150
Adjusted R^2	0.884	0.915	0.834	0.875

Table A10: The Effect of Lottery Prizes on Firm Growth

This table presents estimates of regressions of outcomes of firms created in year t at the firm level. Firm outcomes are assets growth, employees growth, sales growth, value-added growth, and wages growth between year t and year $t+5$. $Prize_{t-1}$ is a dummy variable that takes a value of one for new firms incorporated in provinces that receive the maximum prize per capita in year $t-1$ (treated firms), and zero for new firms incorporated other provinces (control firms). Panel A includes all firms in our sample. Panel B excludes firms in the non-tradable and construction sectors. Industries are classified as tradable or non-tradable following the Mian and Sufi (2014) classification. Regressions control for the total expenditure in the Christmas Lottery per capita and a set of macroeconomic variables (coefficients not shown). All regressions include province and time fixed effects. The sample covers the period 1992-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: Sample of All Firms

	Asset Growth	Employees Growth	Sales Growth	Value-Added Growth	Wages Growth
Prize_{t-1}	1.911	0.320	0.596	0.150	0.364***
	(0.86)	(1.52)	(1.16)	(0.54)	(2.84)
Observations	167055	70100	75442	95489	100338
Adjusted R^2	0.003	0.003	0.004	0.013	0.005

Panel B: Sample Excluding Firms in the Construction and Non-Tradable Sectors

	Asset Growth	Employees Growth	Sales Growth	Value-Added Growth	Wages Growth
Prize_{t-1}	1.953	0.692**	1.276*	0.449	0.664***
	(0.44)	(2.09)	(1.76)	(0.85)	(3.19)
Observations	88236	38036	42958	52913	55266
Adjusted R^2	0.003	0.003	0.004	0.014	0.004

Table A11: The Effect of Lottery Prizes on Self-Employment: Alternative Explanatory Variables

This table presents estimates of regressions of the growth rate of the number of self-employed individuals between year $t-1$ and year t (net entry rate) at the province level. *Prize* pc_{t-1} is the lottery prize per capita in each province (in euros thousand) in year $t-1$. *Prize*/*GDP*$_{t-1}$ is the lottery prizes scaled by GDP in each province (in percentage) in year $t-1$. *Awarded tickets* pc_{t-1} is the number of winning tickets (in thousands) per capita in each province in year $t-1$. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)
Prize pc_{t-1}	0.335***		
	(3.71)		
Prize/GDP_{t-1}		0.077***	
		(3.37)	
Awarded Tickets pc_{t-1}			0.434
			(1.65)
Expenditure pc_{t-1}	22.154***	22.103***	20.817***
	(4.32)	(4.31)	(4.16)
Δ GDP pc_{t-1}	0.023	0.023	0.024
	(1.25)	(1.25)	(1.34)
Housing prizes_{t-1}	0.020***	0.021***	0.021***
	(4.72)	(4.72)	(4.68)
Δ CPI_{t-1}	0.302	0.302	0.288
	(1.27)	(1.27)	(1.21)
Δ $\text{Unemployment}_{t-1}$	-0.073**	-0.073**	-0.070**
	(-2.46)	(-2.46)	(-2.42)
Δ Population_{t-1}	-0.249***	-0.249***	-0.247***
	(-2.78)	(-2.78)	(-2.77)
Time fixed effects	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes
Observations	550	550	550
Adjusted R^2	0.811	0.811	0.812

Table A12: Lottery Prizes and Self-Employed Individuals Characteristics

This table presents estimates of regressions of the net entry rate of self-employed individuals between year $t-1$ and year t by gender, nationality, age, activity, and sector at the province level. $Prize_{t-1}$ is a dummy variable that takes a value of one if a given province receives the maximum prize per capita in year $t-1$, and zero otherwise. Regressions control for the total expenditure in the Christmas Lottery per capita and a set of macroeconomic variables (coefficients not shown). All regressions include province and time fixed effects. The sample covers the period 2005-2015. Robust t-statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% or 1% level, respectively.

Panel A: Individual Characteristics

	Gender		Nationality		Age			
	Male	Female	National	Foreigner	<25	25-39	40-54	>54
Prize_{t-1}	0.992**	0.423	0.790**	1.810	1.639	0.741	0.648	0.901**
	(2.23)	(1.21)	(2.50)	(0.45)	(0.46)	(1.66)	(1.61)	(2.31)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	550	550	550	550	550	550	550	550
Adjusted R^2	0.780	0.819	0.836	0.581	0.668	0.803	0.733	0.762

Panel B: Business Characteristics

	Employees		Activity		Sector			
	Employees=0	Employees=1	Pluriactivity=0	Pluriactivity=1	Agriculture	Manufacturing	Construction	Services
Prize_{t-1}	0.310	4.199**	0.811**	1.196	0.517	1.373***	1.673	0.962***
	(0.95)	(2.50)	(2.16)	(1.14)	(0.98)	(4.09)	(1.35)	(3.27)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	550	550	550	550	550	550	550	550
Adjusted R^2	0.614	0.564	0.794	0.748	0.636	0.615	0.774	0.749