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VICENTE J. BERMEJO, MIGUEL A. FERREIRA, DANIEL WOLFENZON, RAFAEL ZAMBRANA

Windfall Gains and Entrepreneurial Activity: Evidence from the Spanish Christmas Lottery*

Vicente J. Bermejo[†] Miguel A. Ferreira[‡] Daniel Wolfenzon[§]
Rafael Zambrana[¶]

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ABSTRACT

We estimate the effect of cash windfalls arising from the Spanish Christmas Lottery on entrepreneurship. This lottery provides a unique setting as prizes are geographically concentrated and distributed among thousands of households. We find that lottery prizes lead to higher firm creation, startup job creation, and self-employment. The entrepreneurial response is more pronounced in regions with poorer access to finance. Firms created in winning provinces are larger, more profitable, and more likely to survive longer. Incumbent firms in winning provinces do not benefit but increase wages, suggesting a local labor market tightening. Our results suggests that regional cash windfalls can have long-lasting effects on business activity.

JEL classification: D14, G30, L26

Keywords: Entrepreneurship, Firm Creation, Job Creation, Cash Windfall, Economic Conditions, Disposable Income, Aggregate Effects, Financial Constraints

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[†]ESADE Business School, Ramon Llull University. Email: vicente.bermejo@esade.edu.

[‡]Nova School of Business and Economics, CEPR, ECGI. Email: miguel.ferreira@novasbe.pt.

[§]Columbia University, NBER. Email: dw2382@gsb.columbia.edu.

[¶]University of Notre Dame. Email: rzambra2@nd.edu.

1 Introduction

Entrepreneurship is a fundamental force for economic prosperity and job creation (Haltiwanger et al., 2013), which is a prime concern for many governments. Understanding how entrepreneurial activity responds to changes in economic outcomes is critical when evaluating economic policies. There is a large body of research suggesting that economic conditions can play an important role in the entry and exit dynamics of businesses.¹ Yet, the causal impact of economic conditions on entrepreneurial and business activity is not well established empirically.

Establishing causality from economic conditions to entrepreneurial activity is challenging because many of the drivers that affect economic outcomes can also influence entrepreneurship. In addition, the literature focus on studying the entrepreneurial response to increasing local demand (Adelino et al., 2017; Bernstein et al., 2022) or to relaxing financial constraints (Hurst and Lusardi, 2004; Adelino et al., 2015; Schmalz et al., 2017), but little is known about the aggregate effect of regional wealth shocks. Most of the literature focus on uncovering drivers of entrepreneurship by analyzing specific changes to individual wealth or changes in local demand derived from sector-specific shocks. However, general equilibrium effects are likely at play if a large number of individuals in a region experience an increase in wealth.² This paper overcomes these challenges by using aggregate shocks to economic conditions provided by a unique randomized natural experiment: the Spanish Christmas Lottery. We use regional variation in lottery prizes to investigate the equilibrium effect of exogenous cash windfalls on firm creation, job creation, and self-employment, as well as the response of incumbent firms.

Several features of the Spanish Christmas Lottery make it suitable for this study. First, winners are geographically concentrated as each ticket number is typically sold by one

¹Using a panel of 22 OECD (Organisation for Economic Co-operation and Development) countries, Koellinger and Thurik (2012) show that economic conditions have important implications for the rate of entrepreneurial activity in a country. Lee and Mukoyama (2015) examine the patterns of firm entry and exit over the business cycle and find that entry rates differ significantly during booms and recessions. Clementi and Palazzo (2016) show that the number of entrants increases following a positive productivity shock.

²Egger et al. (2019) show that one-time cash transfers to households have large positive spillover on non-recipient households and firms. These findings suggest that comparing outcomes for treatment and control groups may understate the true overall impacts of cash transfers by ignoring general equilibrium effects.

lottery outlet, and most prizes are collected in the province where tickets are sold. This concentration generates significant variation in lottery prizes across the 50 provinces in Spain. Second, the lottery prize is distributed among several thousand people sharing the same ticket number.³ Third, the lottery prize has an economically significant impact. The winning province (the province that receives the maximum prize per capita each year) experiences an average monetary shock (i.e., a cash windfall) equivalent to 5.65% of its gross domestic product (GDP). Fourth, the lottery is played every year, on the same day, regardless of economic conditions. Lastly, lottery players are likely to be ordinary citizens because the lottery is a social event; about 75% of the Spanish population participates. This mitigates the concern that the effect we measure is driven by the behavior of gamblers, which might differ from that of an average individual. Overall, the Spanish Christmas Lottery provides a unique setting to study how improvements in economic conditions affecting an entire community impact local business activity.

The key assumption in our empirical strategy is that, *conditional* on expenditures on lottery tickets by province, the winning province is randomly assigned. It is important to condition on lottery expenditures as, unconditionally, the probability of winning could be correlated with entrepreneurship. This correlation could arise if the conditions that prompt individuals to buy lottery tickets are the same as those that encourage entrepreneurship (e.g., low-risk aversion). In that case, residents of more entrepreneurial provinces would buy more tickets and, thus, would be more likely to win. Indeed, we show that a province's probability of winning the lottery is a function of observables, such as provincial inflation, unemployment, or GDP per capita. After we control for lottery expenditures, however, no macroeconomic variable has any explanatory power to predict the lottery prize. Thus, conditional on lottery expenditures, the lottery setting provides random exogenous variation in the economic conditions.

We find that lottery prizes have a positive and significant effect on entrepreneurial activity.

³On average, there are between 1,600 and 16,000 holders of the winning number; 1,600 is the lower bound on the number of people receiving lottery prizes in a province. Moreover, according to survey data, 87% of people participate through a syndicate, and people share their ticket price with relatives (64%), friends (33%), or co-workers (28%).

The number of new firms and jobs created by startups increases significantly in winning provinces in the 1994-2016 period. The dynamics of the effect of the lottery prize on the rate of firm creation is similar in both winning and non-winning provinces in the years before the lottery award, mitigating concerns of preexisting differential trends. After the lottery award, however, the rate of firm creation increases significantly more in winning provinces than in non-winning provinces. In addition, we find that lottery prizes spur self-employment.

Next, we investigate the characteristics of firms that are created as a result of the lottery. To do so, we use a novel and detailed firm-level data that covers financial information on over 2.5 million public and private Spanish companies during our sample period. We find that firms created in winning provinces are of higher quality relative to firms created in non-winning provinces. These firms are likely to survive longer; they are significantly larger as proxied by assets and number of employees; they pay higher wages; and they have higher profitability. We conclude that the marginal entrepreneur, who responds to the cash windfall, is of high quality and growth potential. Our evidence suggest that cash windfalls can have long-lasting effects on business activity.

We also analyze the effect of the lottery on incumbent firms in winning provinces. While we do not find any significant effect on firm size and profitability, we find that incumbent firms in winning provinces pay higher salaries, suggesting a local labor market tightening.

The effect of lottery prizes on entrepreneurship captures the combined effect of multiple mechanisms. For example, the lottery shock can encourage firm creation by reducing entrepreneurs' financing constraints, lead to more entrepreneurship by increasing local demand, or affect individuals' risk aversion. Importantly, our estimate also captures general equilibrium effects that result from the large cash windfall, such as those originating from a tight labor market resulting from improved economic conditions.

We discuss whether any of these potential mechanisms are at play. We analyze how access to credit interacts with entrepreneurs' ability to pursue investment opportunities using the number of bank loans and the number of bank branches per capita as proxies of access to credit at the province level. Consistent with the view that financial constraints can restrict

firm entry and post-entry growth, we find a larger impact of the lottery on provinces with poorer access to credit. We find consistent results when we use the exogenous variation in the supply of credit across provinces driven by banks bailed out by the Spanish government during the Great Recession (2007-2011).

We do not find evidence supporting the view that higher local demand or reduced risk aversion drive the increase in entrepreneurship. We find that the lottery effect is similar both in industries that rely heavily on local demand (i.e., non-tradable industries) and in industries that do not rely as much on local demand (i.e., tradable industries). The potential reason local demand is not driving the increase in firm creation may be due to consumption patterns and the extent to which lottery winners consume goods and services produced in their province of residence.⁴ Our evidence also does not support alternative mechanisms such as reduced risk aversion. We show that startups in winning provinces are not riskier as their survival rate is higher than their counterparts in non-winning provinces. In addition, if our results were mainly driven by reduced risk aversion, we would not expect startups to be of higher quality. However, we find that firms created in winning provinces are larger and more profitable. We conclude that entrepreneurs face financial constraints that hamper firm creation and post-entry growth.

Importantly, we find evidence consistent with general equilibrium effects mediating the impact of the lottery shock on entrepreneurship. We show that employment in startups and wages increase following the lottery prize. This effect should dampen the effect of the lottery on firm entry, as potential entrants would find it more difficult and costly to hire workers. Consistent with this view, we find that the impact of the cash windfalls is smaller in regions with a tighter labor market prior to the lottery award.

To generalize the magnitude of our aggregate effect beyond the lottery setting, we estimate the effect of *disposable income* on entrepreneurship. We address the endogeneity of disposable income by instrumenting it using the lottery prize (per capita) in each province. The exclusion

⁴Bagues and Esteve-Volart (2016) do not find an increase in prices in provinces awarded with the Spanish Christmas Lottery. They argue that the low impact of lottery prizes on local demand is due to the fact that the majority of goods and services in Spain are imported from other regions.

restriction is that the lottery prize (controlling for lottery expenditures and macroeconomic variables at the province level) does not affect entrepreneurship by channels other than local disposable income. Admittedly, lottery winners might feel “lucky” in a way that people who worked to earn the same income might not, which might encourage entrepreneurship. This channel, however, is mitigated by the fact that individual lottery prizes in our setting are significantly smaller than in other lotteries.

We estimate that every euro of lottery prize from a ticket sold by an outlet in the province leads to an increase in household disposable income of 83 cents. This confirms that most prizes are collected by households in the province where the tickets are sold. The second-stage regression indicates that a one-interquartile-range increase in disposable income per capita (€3,760) leads to an increase of 271 new firms per province and year. This effect represents about 13% of the average number of new firms created in a province every year. The same shock to disposable income leads to an increase in job creation by newly created firms of 16%, which represents about one thousand new jobs per province and year.

Our study is closely related to the literature that studies the relation between entrepreneurial wealth and firm creation and the quality of these new firms. There is substantial evidence showing a strong positive correlation between personal wealth and the propensity to start a business (Evans and Jovanovic, 1989; Evans and Leighton, 1989; Holtz-Eakin et al., 1994). Yet, Hurst and Lusardi (2004) report a positive relationship between wealth and business entry only for individuals at the top of the wealth distribution. This suggests that differences in wealth may be proxying for differences in ability or preferences, rather than liquidity. Holtz-Eakin et al. (1994) find that firms started due to a large inheritance are more likely to survive, a finding they interpret as evidence of financial constraints.

Other papers in the literature use shocks to wealth that affect only a few individuals (Bellon et al., 2021; Andersen and Nielsen, 2012; Cespedes et al., 2021). Bellon et al. (2021) find that cash windfalls from shale oil and natural gas extraction in the United States increase business formation, but do not affect transitions to self-employment. While this paper convincingly

isolates a channel by which wealth affects entrepreneurship, their magnitudes cannot be easily aggregated due to the existence of the general equilibrium effects we document. However, in our setup, we measure the magnitude of the overall effect of a large shock to wealth, including general equilibrium effects. This may explain why our self-employment effects are different. We find that cash windfalls impact both business creation and the decision to become a self-employed worker. One potential explanation is that the large shock that we study reduces unemployment and, as a result, employees are more likely to leave their formal jobs and enter self-employment, confident that it will be easier to return to the labor market in the future if they decide to do so. Wealth shocks to a small number of individuals are, however, unlikely to generate a meaningful reduction in local unemployment.

Using a natural experiment in Denmark, [Andersen and Nielsen \(2012\)](#) show that businesses that started following a large inheritance exhibit poorer performance, which is consistent with the hypothesis that the marginal entrepreneur is of low quality. Using a sample of lottery retailers, [Cespedes et al. \(2021\)](#) find a positive impact of cash windfalls on business creation. Our study differs in that the Spanish Christmas Lottery players are more representative of the average citizen than individuals who receive a large inheritance or small business owners.

In addition, [Adelino et al. \(2015\)](#) and [Schmalz et al. \(2017\)](#) show that financial constraints impair firm creation using variation in housing prices as shocks to the value of real estate collateral. Our study differs as the lottery is a shock to *liquid* wealth. Thus, the response to our shock is expected to be different as it does not require a financial intermediary to lend to the entrepreneur against the increased value of her housing collateral. In addition, our estimates capture general equilibrium effects.

We also contribute to the literature on the link between economic activity and entrepreneurship. [Bilbiie et al. \(2012\)](#) and [Koellinger and Thurik \(2012\)](#) show the role of firm creation in the amplification and propagation of exogenous economic shocks, and [Sedláček and Sterk \(2017\)](#) find that economic conditions at the time of entry influence firm growth and quality. Other studies analyze the impact of increased economic activity on entrepreneurship ([Adelino et al., 2017](#); [Bernstein et al., 2022](#)). Our paper contributes to this

literature by providing causal estimates on the aggregate effect of local cash windfalls on new firm and incumbent firm outcomes.

More broadly, our setting shares similarities to that of place-based economic policies in which cash transfers are targeted toward geographic areas, rather than toward particular individuals (Busso et al., 2013; Kline and Moretti, 2014; Criscuolo et al., 2019). In this paper, we exploit exogenous cash transfers, rather than using the actual policies that usually depend on current or expected economic conditions. We use a clean counterfactual to show the potential effect that place-based monetary transfers can have on fostering entrepreneurship.

Lastly, we contribute to a growing literature that uses lottery data as an exogenous wealth shock in order to study a number of individual decisions. This literature focuses on the effects of lottery prizes on self-employment (Lindh and Ohlsson, 1996); labor supply (Imbens et al., 2001; Cesarini et al., 2017); individual bankruptcy (Hankins et al., 2011), and consumption (Kuhn et al., 2011). One caveat about lottery settings is that the results may not be representative of the response to other forms of unearned cash shocks, as lottery participants are typically different from the average individual. Two key aspects of the Spanish Christmas Lottery differentiate it from other lotteries: about 75% of the Spanish population participates, and lottery awards generate a wealth shock to several thousand households in the same geographic area. Bagues and Esteve-Volart (2016) study the effect of the Spanish Christmas Lottery on political elections at the province level. This lottery provides a unique setting to study how cash windfalls promote entrepreneurship.

2 Empirical setting and data

In this section we describe the Spanish Christmas Lottery and the data used in our tests, and provide summary statistics for our variables of interest.

2.1 Christmas Lottery

The Spanish Christmas Lottery (*Lotería del Gordo*) is a national lottery game that has been held since 1812. The lottery takes place every year on December 22, and is the biggest lottery worldwide. Compared with more than 500 other lotteries held every year in Spain, the Christmas Lottery represents one-fifth of total lottery sales. About 75% of the Spanish population participates, and about 70% of the participants play no other lottery. The amount of money spent is similar across individuals; 70% of individuals spend less than €60, and only about 9% spend more than €150.

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 allocated to each outlet are randomly assigned.⁵ Each number is divided into 160 series, and each of these series is in turn divided into 10 fractions. These 1,600 fractions are the official *tickets* sold in lottery outlets at a cost of €20 each. Official tickets are commonly further split into shares. Unregulated associations divide the €20 tickets further into €5 and €2 *shares* to resell to the public or members of the associations. Thus, depending on the number of *shares* sold, there could be between 1,600 and 16,000 holders of each number.

The money allocated for prizes is 70% of the money collected. The remaining 30% is distributed as commissions for sales outlets, for internal revenue, and to cover administrative costs. Winners of the first prize get €20,000 per euro played; winners of the second prize get €6,250 per euro; and winners of the third prize get €2,500.⁶

⁵The main reason why each number tends to be sold only by one lottery outlet is that people belonging to the same community like to share the same number. In this way, the distribution is easier and winners more visible.

⁶Prizes were €10,000, €4,800, and €2,400 per euro played between 1986 and 2004, and €15,000, €5,000, and €2,500 between 2005 and 2011. All lottery prizes were tax-exempt until 2013, when a 20% tax was imposed on prizes of more than €2,500. See [Bagues and Esteve-Volart \(2016\)](#) for more details about the Spanish Christmas Lottery.

2.2 Data

We obtain data on expenditures and monetary prizes of the Christmas Lottery from *Sociedad Estatal Loterías y Apuestas del Estado*. Our sample covers the period from 1994 through 2016. For each of the 50 provinces in Spain, we observe the total number of tickets sold, lottery expenditures, and the amount awarded to tickets sold in the province. We have information on the top three prizes, which account for about three-quarters of the total prizes. Our information is for prizes received by tickets sold in the province, and not prizes received by province residents. However, we will show that most prizes are collected in the province where the tickets are sold using National Accounts statistics.

We collect data on total number of firms and firm creation aggregated at the province level from the *Spanish Central Mercantile Register*. These data come from the Spanish Central Directory of Enterprises (*Directorio Central de Empresas*, DIRCE), which is compiled by the Spanish National Statistics Office (*Instituto Nacional de Estadística*, INE). DIRCE provides information since 1995 on the entire population of firms in Spain. To capture entrepreneurial activity not observable on these databases that include only formal firms, we use data on self-employment from the Ministry of Labor and Social Security.

We obtain information on macroeconomic variables at the province level for the period 1994-2016. The data on disposable income, gross domestic product (GDP), consumer price index (CPI), unemployment, and population are from INE.⁷ Data on house prices are from several sources.⁸ We use information on province area from Infolaso.

We obtain firm-level data from the Amadeus and Sabi databases. Amadeus is a commercial pan-European database provided by Bureau van Dijk. In Spain, Amadeus covers financial information on over 2.5 million public and private companies. The database includes detailed firm-level characteristics, employment, and financial data. Amadeus also provides information on year of incorporation, industry (three-digit NACE code – the European standard of industry classification), and the postal code of firms' headquarters.

⁷Data on disposable income are available for the period 1995-2010.

⁸*ST Sociedad de Tasación* (the largest independent real estate valuation firm in Spain), and *Idealista* and *Fotocasa* (the two largest real estate web portals in Spain).

We also use 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 provides information not only on active firms, but also on firms that have ceased operations.⁹

2.3 Summary statistics

Table 1 presents summary statistics for the lottery, macroeconomic and entrepreneurship variables at the province level. Panel A summarizes lottery expenditures, number of winning tickets, and lottery prizes (top three) by province. The average yearly lottery expenditure per capita in a province is €58, representing about 0.28% of the provincial GDP. The average lottery prize is €21 per capita or about 0.18% of the provincial GDP.

Panel B of Table 1 presents summary statistics for the province with the maximum prize per capita in each year (winning province). Winning provinces spend €79 per capita on lottery tickets on average, which, not surprisingly, is above the average of €58 for all provinces. The average lottery prize per capita is €760, which represents 5.65% of provincial GDP. The number of *official* tickets awarded in winning provinces is about 1,530, which represents approximately one for every 550 people. This figure represents a lower bound for the number of people receiving lottery prizes in a region because the €20 tickets are usually split into smaller shares of €5 and €2, and most individuals tend to share tickets with relatives and friends.

Panel C presents provincial macroeconomic variables. The average province has GDP per capita of about €20,000, disposable income per capita of about €13,500, 2.4% inflation rate, 17% unemployment rate, and 870,000 inhabitants.

Panel D reports statistics for entrepreneurship variables at the province level. There is

⁹A recent paper by Kent and Martínez-Marquina (2021) study the effect of the lottery on economic outcomes at the municipal level. Following Bagues and Esteve-Volart (2016), we perform our analysis at the province level for several reasons. Spanish municipalities are too small (above 60% of them have a population of less than 1,000 inhabitants) and, thus, most macroeconomic data is only reliable at the province level. Another problem is that mobility within provinces in Spain is frequent. Even on a daily basis, people live in nearby municipalities, but work in the largest city of the province. Thus, prizes are likely collected in the province where tickets are sold (disposable income increases by 83 cents for every euro of lottery prize), but one cannot say the same for municipalities.

an average of about 25,000 firms per province with an average of 13 employees per firm. There is also an average of 2,137 startups per province a year, with about three employees on average. The average annual firm entry and exit rates at the province level are 8.7% and 4.2%, respectively.

Figure 1 shows the average lottery expenditure per capita (Panel A) and average prize per capita (Panel B) by province during our sample period. There is considerable variation across provinces, both in terms of provinces where the lottery is awarded and size of lottery prizes per capita. Our empirical setting exploits this variation.

Table IA.1 in the Internet Appendix reports summary statistics of the characteristics of new firms in their first five years of life. This table reports assets, employment, wages, and return on assets (ROA). By the fifth year, the average new firm has about €800,000 in assets, more than 5 employees, pays almost €125,000 in total wages, and has an ROA slightly above 0.6%.

3 Cash windfalls and entrepreneurship

We estimate the effect of lottery prizes awarded to many individuals clustered in a region on local entrepreneurial activity. We first discuss our empirical strategy and then present estimates of reduced-form regressions of the effect of lottery prizes on entrepreneurship and job creation by startups.

3.1 Empirical strategy

In this section, we discuss the validity of our empirical strategy. While the winning ticket number is randomly assigned, the number of tickets bought in each province is not. Moreover, the decision to buy lottery tickets might be influenced by local economic conditions and characteristics of the population. This could be a concern if the conditions that lead people to buy lottery tickets are the same as those that foster entrepreneurship.

Table 2 shows that the award of the lottery prize is related to observable province

characteristics. We estimate ordinary least squares (OLS) regressions of the lottery prize per capita (*Lottery Prize*) on several macroeconomic variables at the province level. We show that the inflation rate, the unemployment rate, and GDP per capita have predictive power when we do not include the lottery expenditure per capita (*Lottery Expenditure*) in the regressions in columns (1), (3), and (5). While we can control for these macroeconomic variables, the concern is that other variables could also be correlated with the award of the lottery prize through the number of tickets bought.

Yet, since every ticket has the same probability of winning, conditional on lottery expenditures in a province, the winning province should be as good as randomly assigned. Indeed, when we control for *Lottery Expenditure*, inflation, unemployment rate, and GDP per capita are no longer significant in columns (2), (4), and (6). Column (7) shows that no other macroeconomic variable has any power predicting the lottery prize when we control for lottery expenditure at the province level. We conclude that the lottery prize seems to provide truly exogenous variation in economic conditions after controlling for lottery expenditure.

3.2 Results

We examine the effect of lottery prizes on local entrepreneurship. Our baseline specification exploits heterogeneity in lottery prizes and compares firm creation and job creation by startups across provinces. Given the large heterogeneity among Spanish provinces, we include province fixed effects to control for unobserved time-invariant province heterogeneity.

The province-level (reduced-form) regression is as follows:

$$Y_{j,t} = \beta \text{Lottery Prize}_{j,t-1} + \theta \text{Lottery Expenditure}_{j,t-1} + \gamma Z_{j,t-1} + \omega_t + \delta_j + \varepsilon_{j,t} \quad (1)$$

where $Y_{j,t}$ is the number of new firms in year t divided by the number of established firms in year $t - 1$ in province j in percentage (*Entry Rate*), or the logarithm of the number of

jobs created by startups in year t in province j (*Startup Job Creation*).¹⁰ $Lottery\ Prize_{j,t-1}$ is lottery prize per capita in province j in year $t - 1$; $Lottery\ Expenditure_{j,t-1}$ is lottery expenditure per capita in province j in year $t - 1$. The coefficient of interest β measures the effect on the entry rate of the lottery prize per capita. $Z_{j,t-1}$ includes the inflation rate (*Inflation Rate*), the unemployment rate (*Unemployment Rate*), the logarithm of the population (*Population*), the logarithm of GDP per capita (*GDP*), the logarithm of housing prices (*Housing Prices*), and the bank loans per capita (*Bank Loans*) in province j in year $t - 1$. ω_t is a time fixed effect. δ_j is a province fixed effect. Standard errors are clustered at the province level.

Table 3 shows the results for the entry rate of firms and startup job creation. We find a positive and significant effect of the lottery prize on the entry rate of firms and startup job creation. The regressions in columns (1) and (4) control for lottery expenditures and include province and time fixed effects. In columns (2) and (5) we show that results are robust to including several macroeconomic variables as controls. The estimate in column (2) indicates that the entry rate increases by about 0.23 percentage points for every €1,000 of lottery prize per capita. The estimate in column (5) shows that startup job creation increases by 3.3% for every €1,000 of lottery prize per capita. Columns (3) and (6) show that the results are robust to dropping Madrid and Lleida from the sample, as these two provinces have unique characteristics.¹¹

Figure 2 shows the evolution of firm creation (*Entry Rate*) from three years before the lottery award up to three years after. The estimates come from the regression in column (2) of Table 3, but including yearly leads and lags of the *Lottery Prize* variable. There is a significant increase in the number of new firms created after the lottery award in winning provinces versus non-winning provinces. Moreover, we do not find significant differential effects before the lottery awards, mitigating concerns about preexisting differential trends.

¹⁰The job creation by startups at the province level is estimated using aggregated firm-level data as administrative data do not include this information.

¹¹Madrid is the capital and the largest city in Spain, and exhibits unique features, such as high lottery expenditure and economic activity. The province of Lleida includes the small village of Sort, which has a strong Christmas Lottery tradition and attracts buyers from all over the country for reasons related to superstition (*sort* is the Catalan word for “luck”).

4 Firm outcomes

We next study whether a cash windfall to a province can have long-term effects on business activity using firm-level data. First, we analyze the effect of the lottery prize on the outcomes of newly created firms, conditional on entry. We study new firm survival and several new firm outcomes such as firm size, wages and profitability during their first five years of life. First, we estimate a regression of outcomes of firms created in year t :

$$Y_{i,s,j,t+n} = \beta_n \text{Lottery Prize}_{j,t-1} + \theta_n \text{Lottery Expenditure}_{j,t-1} + \gamma_n Z_{j,t-1} + \eta_{st} + \delta_{sj} + \varepsilon_{i,s,j,t+n} \quad (2)$$

where $Y_{i,s,j,t+n}$ is the logarithm of assets, logarithm of employment (number of employees), logarithm of wages, or return on assets (ROA) of firm i , in industry s , located in province j , in year $t+n$. $\text{Lottery Prize}_{j,t-1}$ is the lottery prize per capita in the province of incorporation of firm i in year $t-1$. All the other variables in equation (2) are defined as in equation (1). The regressions include time-industry fixed effects η_{st} and province-industry fixed effects δ_{sj} , which control for unobserved time-industry and province-industry heterogeneity.

Table 4 presents the estimates at firm creation (t), and one ($t+1$), two ($t+2$), three ($t+3$), and four years ($t+4$) after firm creation. Conditional on entry, we find positive and significant effects of the lottery prize on the size of new firms, as proxied by assets and employment. According to the estimates for firms during their first three years of life, firms created in provinces awarded with a lottery prize of €1,000 per capita have about 13% more assets and create about 5% more jobs. We also find that lottery prizes have a positive and significant effect on wages paid and the profitability (ROA) of new firms, which can be seen at firm creation and for up to five years after creation. We conclude that new firms created as a response to lottery awards are larger at creation, and remain larger and perform better in the long run.

We next examine the effect of the lottery prize on the probability that new firms will survive 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 ($t + 1$), three ($t + 3$), five ($t + 5$), eight ($t + 8$), or ten ($t + 10$) years. We estimate a linear probability model at the firm level.

Table 5 presents the estimates. We find that firms created in winning provinces are significantly more likely to survive for at least three, five, and eight years after firm creation. The estimates show that firms created in a province awarded with a lottery prize of €1,000 per capita have 3.5 percentage points and 0.7 percentage points higher probability of surviving for three and eight years, respectively. Given that the unconditional probability of surviving the first 8 years is about 10%, this estimate implies that firms created in winning province are 7% more likely to survive than other similar firms. Our findings thus suggest that cash windfalls can have long-lasting effects on business activity.

We also examine the effect of the lottery shock on the outcomes of incumbent firms. In particular, we analyze total assets, number of employees, average wages and return on assets of incumbent firms up to five years after the lottery prize. Table 6 reports the results. We find that incumbent firms do not benefit from the cash windfalls. Size and profitability of incumbent firms in winning provinces do not significantly increase, indicating that the main effects of the shock are captured by newly established firms. While we do not find an impact on wages in the year of the lottery award, incumbent firms increase wages in subsequent years, which may be driven by a tighter local labor market. We discuss this effect in subsection 5.3.

5 Potential mechanisms

The objective of this paper is to understand how lottery prizes awarded to many individuals clustered in a specific region affect entrepreneurship and business activity. By its very nature, changes in economic conditions are likely to affect entrepreneurship through several mechanisms. We start by considering a direct mechanism such as a relaxation of financial constraints. However, a large cash windfall is likely to affect local demand and have general equilibrium effects such as a tight labor market.

5.1 Financial constraints

In this subsection, we analyze whether a relaxation of financial constraints brought about by the lottery prizes is an important mechanism at play. We rely on the fact that there is significant heterogeneity in financial development and access to credit across provinces in Spain. If the relaxation of financial constraints mechanism is operative, we should observe the effect of the lottery to be larger in regions with lower financial development and poorer access to credit.¹²

In Table 7, we split the provinces according to the yearly median value of our measures of local access to credit: the number of bank loans per capita (*Bank Loans*), the number of branches per capita (*Bank Branches*), and the number of branches per square meter (*Bank Branches (per m²)*).¹³ We find that the estimates of the *Lottery Prize* coefficient are significantly higher in the samples with below-median values for *Bank Loans*, *Bank Branches*, and *Bank Branches (per m²)*. These results indicate that the lottery prize has a more pronounced effect on entrepreneurship in provinces with poorer access to credit, suggesting an important role of the financial constraints mechanism.

Next, we implement an additional test that corroborates that the financial constraints mechanism is driving our results. We use exogenous variation in the supply of credit across provinces driven by banks that were bailed out by the Spanish government during the Great Recession (2007-2011). Specifically, we use the list of weak banks from Bentolila et al. (2018), who show that these banks reduced credit supply even before their bailout in 2009. These weak banks are rural banks and their activity is focused in specific regions. To measure the provincial exposure to weak banks, we calculate the ratio of the number of branches of weak banks to GDP per capita in each province in 2006 (*Weak Banks*). *Crisis* is a dummy variable that takes a value of one for the period 2007-2011, and zero for the period 1995-2006. We interact the *Weak Banks* variable with the *Lottery Prize* variable and the *Crisis* dummy variable. Table IA.2 in the Internet Appendix shows that the estimates of the triple

¹²Prior studies examine differences in local financial development (King and Levine, 1993; Guiso et al., 2004) to explain differences in entrepreneurship across regions.

¹³Data on loans and bank branches are from the Bank of Spain.

interaction coefficient are positive and significant, which indicates that the effect of the lottery prize on firm entry is significantly larger during the Great Recession in provinces that had a higher exposure to weak banks. Overall, our results confirm that the effect of the lottery on firm entry is larger in regions with poorer access to credit.

We also split our sample into different levels of initial capital requirements. If financial constraints do not matter, we would expect that, regardless of the initial capital needs of starting a business, entrepreneurial activities would always respond to the cash windfall. Table IA.3 of the Internet Appendix shows the effect of the lottery awards on firm creation by dividing the sample into terciles according to initial capital needs. The initial capital needs are proxied by the average initial capital of newly created firms in each province and year. The average capital needs are €56,000 for the bottom tercile, €112,000 for the medium tercile, and €397,000 for the top tercile. The lottery prize has a stronger effect on firm entry in the sample of medium initial capital needs. Firms with lower initial capital needs (i.e., those that are less likely to be financially constrained) and firms with higher initial capital needs (i.e., those for which the lottery prize is not big enough) do not significantly benefit from the cash windfall.

5.2 Alternative mechanisms

We study whether an increase in local demand is an important mechanism in explaining our results; we analyze the heterogeneity of our main effect across industries. If the effect of the lottery on entrepreneurship is driven largely by a local demand shock, we will expect that the lottery prize has a larger effect on industries that rely more on local demand, such as non-tradable and construction industries.

We classify firms into non-tradable, tradable, and construction industries using the four-digit NAICS level following Mian and Sufi (2014). We use firm-level data to estimate the entry rate as the province-level data from DIRCE do not provide industry information. Table 8 presents the estimates of equation (1) by industry. In column (1) we show that our estimates using the provincial entry rate based on firm-level data are of similar magnitude to those in

Table 3. In column (2) we find that, when we exclude non-tradable and construction industries from the sample, the effect of the lottery prize on the entry rate is slightly reduced to 0.19, but it remains positive and significant. Column (3) shows that the effect is stronger at 0.34 in construction and non-tradable industries, and column (4) shows that the effect remains positive and significant at 0.23 in tradable industries. In column (5), we find that the lottery has a positive and significant effect on firm creation at 0.33 in manufacturing. Overall, our estimates for the *Lottery Prize* coefficient are of similar magnitude for industries that rely more on local demand and for those that rely less, suggesting that an increase in local demand is not driving our results.

To further explore the local demand mechanism, we also investigate the effect of the lottery on exit rates of incumbent firms. Table IA.4 in the Internet Appendix analyzes whether the lottery prizes affect the decision to close an established business. We estimate equation (1) using the exit rate at the province level as dependent variable. We argue that if lottery prizes significantly increase local demand and investment opportunities, we will expect incumbent firms to benefit from it. However, we find that incumbent firms in winning provinces do not display a reduction on the probability of closing their businesses. These findings are consistent with the firm-level results in Table 6, which shows that incumbent firms do not benefit from the lottery shock. We conclude that cash windfalls mostly impact firm creation, which suggests that local demand is not important to explain our results.¹⁴

To shed more light on the importance of local demand, in Table IA.6 of the Internet Appendix we repeat the new firm outcomes analysis of Table 4, but exclude firms in the non-tradable sector (the most affected by local demand shocks). The results are similar when we exclude the non-tradable sector, which indicates that the local demand channel is not driving our results.

The increase in wealth derived by lottery awards could affect individuals' risk aversion and this could, in turn, impact their willingness to start a business. A large literature examining

¹⁴In Table IA.5 of the Internet Appendix we analyze the effect of exit rates across different industries. If the local demand mechanism is driving our results, we expect a significant reduction on firm exit in the non-tradable sector. However, we find that the effect of the lottery prize on the exit rate is not statistically significant and of similar magnitude in the tradable and non-tradable sectors.

how households react to changes in wealth finds individual portfolio risk aversion to be either constant or slightly decreasing (Calvet et al., 2007; Brunnermeier and Nagel, 2008; Chiappori and Paiella, 2011). However, Hurst and Lusardi (2004) show that only households in the top distribution of wealth display a higher propensity to take on risk. This reduction in risk aversion is more likely in standard lotteries, which typically provide big prizes to a few individuals. However, the Spanish Christmas Lottery is different as it is not a gamblers' lottery (75% of the population participates) and it provides many smaller prizes to individuals clustered in a region.

Our evidence also does not support the risk aversion mechanism for several reasons. Lower risk aversion may lead individuals to engage in risky entrepreneurial activity (Cramer et al., 2002). We show that startups in winning provinces are not riskier as their survival rate is higher than that of startups in non-winning provinces. Moreover, if our results were mainly driven by reduced risk aversion, we would not expect new firms to be of higher quality. However, we find that firms created in winning provinces are larger and more profitable. This does not support an alternative mechanism in which individuals that feel lucky would be driving firm entry.

5.3 General equilibrium effects

The improvement in economic conditions that we study is large relative to the size of the local economy. Indeed, the winning province experiences an average cash windfall that is equivalent to 5.65% of its gross domestic product (GDP). For this reason, general equilibrium effects are likely to be at play.

Bagues and Esteve-Volart (2016) analyze how individuals in a province react to winning the Spanish Christmas Lottery. This analysis is important in our setting to understand the aggregate potential linkages between lottery prizes, entrepreneurship and labor market responses. First, they do not find any significant effect on GDP, prices and population, which supports our conclusion that the effect on local demand is feeble and does not seem to drive our effects on entrepreneurship and business activity. Second, they do not find any significant

effect on bank lending, which suggests that the effect of the lottery on entrepreneurship is not operating through an increase in credit supply. Third, they do not find an effect on aggregate labor participation, but find a significant decrease in unemployment after the lottery awards.¹⁵ This effect in unemployment would contribute to a tighter labor market in winning provinces. Indeed, in Section 4 we find that new and incumbent firms significantly increase wages in provinces awarded with the lottery.

Labor market tightness will in turn affect the rate of firm creation, as firms would find more difficult and expensive to hire workers. To test this hypothesis, in Table 9 we analyze whether the effect of the lottery prizes on entrepreneurship depends on the provincial employment rate and provincial GDP growth in each year. The idea is that the dampening effect on entrepreneurship of a tighter labor market will be higher if the employment rate is already high at the time of the lottery shock. We split our sample into regions that are below and above the median of the employment rate and estimate the model in equation (1) in these subsamples. Table 9 presents the results. Consistent with this view, columns (1) and (2) show that the lottery prize has a positive and statistically significant impact on entrepreneurship only when the employment rate in the winning province is below the median. Similarly, columns (3) and (4) show that the effect of the lottery prize is only positive and significant in provinces with below-median GDP growth.

Our results are robust to using alternative measures of economic activity at the national level. Our setting allows us to estimate the effect of cash windfalls on firm entry along different stages of the business cycle. Table IA.7 in the Internet Appendix shows the results. We find that the effect of the lottery prize on entrepreneurship is more pronounced during recessions, and when business and consumer confidence is low.

¹⁵This result on labor participation is consistent with our results of an increase in job creation in startups in Table 3. While lottery winners are known to decrease their labor supply (Imbens et al., 2001; Cesarini et al., 2017), the increase in firm entry and job creation in startups that we find nets out the effect on aggregate labor participation.

6 Self-employment

We extend our analysis to examine the effect of lottery prizes on self-employment. Self-employed individuals do not incorporate their business, so their activity is not captured by our measure of firm creation. For this reason, data on self-employment serves as an independent test of our main results in Table 3. Moreover, the data on self-employed individuals includes information on the sector these businesses belong to. This allows us to analyze the heterogeneous effect of cash windfalls on self-employment across sectors and sheds some additional light on potential mechanisms that drive our effects.

We estimate the regression in equation (1) using as the dependent variable the growth rate of the number of self-employed individuals (net entry rate) between year t and year $t - 1$. Table 10 presents the results. Columns (1) and (2) show that the lottery shock has a positive and significant effect on self-employment. This result is in contrast to that in [Bellon et al. \(2021\)](#), who find that individual cash windfalls (from shale oil and natural gas extraction) increase business formation but do not affect transitions to self-employment. The difference in results could be explained by the magnitude of the cash windfall. It is unlikely that cash windfalls that affect a small number of people such as that in [Bellon et al. \(2021\)](#) have an effect on the local labor market. In contrast, we find that a large cash windfall that affect a large number of people increases employment. This increase might make it easier for people to transition to self-employment as they expect it will be easier to return to the labor market in case their business fails.

Columns (3)-(8) of Table 10 examine the effect of the lottery prize on self-employed individuals working in different sectors. We find a significant and positive effect on self-employment in the services sector, as well as in manufacturing, which is less sensitive to local demand. This result is consistent with the notion that the decision to become an entrepreneur following a wealth shock is not solely driven by a change in local demand.

7 Discussion

Our reduced-form estimates in Table 3 show that lottery prizes have a positive and significant effect on entrepreneurial activity. While such results are interesting in their own right, they cannot be generalized beyond the lottery setup. To provide a more general result, we estimate the aggregate effect of disposable income on firm entry and job creation by startups.

A potential concern is that an OLS regression of disposable income on entrepreneurial activity could deliver biased estimates, as many unobservable variables could drive both income and entrepreneurship at the province level. For this reason, we estimate instrumental variables (IV) models using the lottery prize as an instrument for disposable income. The exclusion restriction is that the lottery prize (controlling for lottery expenditures and macroeconomic variables at the province level) does not affect entrepreneurship by channels other than local disposable income. Admittedly, in addition to receiving the income from the lottery, lottery winners might feel “lucky” in a way that people who worked to earn the same income might not. This perception of being lucky might encourage entrepreneurship. This channel, however, is mitigated by the fact that lottery prizes in our setting (i.e., smaller prizes to many individuals) are not large relative to other lottery settings.

Table 11 shows results for our instrumental variables model. In the first-stage regression, we predict disposable income per capita (*Disposable Income*) in each province using the lottery prize per capita (*Lottery Prize*). Column (1) indicates that disposable income increases by 83 cents for every euro of lottery prize. Since the lottery prize variable measures the prizes awarded to tickets *sold* in the province, this result confirms that almost every euro of the prize is received by an individual in the province where the tickets are sold. The F -statistic of this first-stage regression is 166, well above the conventional threshold for weak instruments (Stock and Yogo, 2005).

For purposes of comparison, column (2) presents an OLS regression of the entry rate on disposable income per capita (without instrumenting disposable income with the lottery prize). The *Disposable Income* coefficient is positive and significant, indicating that a €1,000 increase in disposable income per capita increases firm entry by 0.34 percentage points.

Column (3) shows the second-stage results when disposable income per capita is instrumented with the lottery prize per capita. The effect of disposable income on firm creation is positive and similar to the OLS estimate. We find that a €1,000 increase in disposable income per capita increases the entry rate by 0.29 percentage points. Using the estimates in column (3), we find that a one-interquartile-range increase in disposable income (€3,760) increases firm entry by 1.1 percentage points (0.291×3.76). This effect represents an increase of 271 firms ($1.1\% \times 24,647$) per province per year, which is about 13% ($271/2,136$) of the average number of new firms created in a province each year.¹⁶

Column (4) shows the estimates of an OLS regression of jobs created by startups on disposable income. We find that the OLS estimate of the effect of disposable income on job creation is positive, but statistically insignificant. Column (5) presents the second-stage results, when disposable income per capita is instrumented with the lottery prize per capita. The effect of disposable income on job creation is positive and significant. The IV estimate is significantly higher than the OLS estimate. We find that a €1,000 increase in disposable income per capita increases startup job creation by 4.3%. This estimate implies that a one-interquartile-range increase in disposable income leads to an increase in startup job creation of 16% (0.043×3.76). Because new firms create about 2.8 jobs on average, this effect corresponds to 956 jobs ($0.16 \times 2.8 \times 2,136$) created by startups per province and year.

These estimates show the aggregate effect of changes in disposable income on firm entry. This overall effect is the result of the combination of several channels: financial constraints, local demand or risk aversion. Our evidence suggests that the financial constraints channel is the main channel driving our results.

8 Conclusion

This paper uses a unique randomized natural experiment – the Spanish Christmas Lottery – to study the causal effect of exogenous cash windfalls on entrepreneurial activity. We show

¹⁶As a comparison, [Schmalz et al. \(2017\)](#) find that a one-interquartile-range increase in house price growth leads to an increase of about 400 new firms per region per year in France.

that lottery winning provinces benefit from a positive effect on firm creation, self-employment, and job creation by startups. We provide evidence that better economic conditions have long-term effects on business activity. Newly created firms in winning provinces are larger, more profitable, and are more likely to survive longer. In contrast, we do not find any effects on firm size and profitability of incumbent firms. However, incumbent firms respond by increasing wages following the lottery award.

Our findings indicate that the financial constraints channel is important to explain the effect of cash windfalls on entrepreneurship, while the local demand and risk aversion channels do not seem to be driving our effect. In addition, we find evidence of a labor market tightening following the lottery prize. This result underscores the difficulty in aggregating estimates obtained using empirical strategies that partial out general equilibrium effects. In contrast, we use an exogenous shock that is large enough to generate general equilibrium effects and measure the overall impact of personal wealth on entrepreneurship.

More broadly, our study provides insights about the potential impact of place-based economic policies that target unconditional cash transfers toward geographic areas. Our findings suggest that these policies can effectively promote entrepreneurship and job creation, especially in regions with poorer access to credit.

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Table 1: Summary Statistics at the Province Level

This table reports mean, standard deviation, 25th-percentile, median, 75th-percentile and number of observations for each variable by province and year. Panel A shows the lottery variables in all provinces. Panel B shows the lottery variables for the province with the maximum prize per capita in each year. Panel C shows macroeconomic variables. Panel D shows entrepreneurship variables. All monetary variables are in constant 2010 euros. The sample covers the period 1994-2016.

	Mean	Standard Deviation	25th Percentile	Median	75th Percentile	Observations
Panel A: Lottery Variables						
Lottery Expenditure (€ per capita)	58.48	28.38	41.64	53.78	69.01	1150
Lottery Prize (€ per capita)	21.32	189.74	0.00	0.00	0.87	1150
Number of Winning Tickets	93.49	354.73	0.00	0.00	10.00	1150
Lottery Expenditure (% of GDP)	0.28	0.12	0.20	0.27	0.34	1150
Lottery Prize (% of GDP)	0.18	1.42	0.00	0.00	0.01	1150
Panel B: Lottery Variables in Province with Maximum Prize						
Lottery Expenditure (€ per capita)	78.58	41.01	47.10	63.33	94.72	23
Lottery Prize (€ per capita)	760.41	1117.30	143.97	354.40	655.06	23
Number of Winning Tickets	1531.74	843.33	1170.00	1457.00	1841.00	23
Lottery Expenditure (% of GDP)	0.33	0.16	0.22	0.31	0.40	23
Lottery Prize (% of GDP)	5.65	8.04	1.11	2.05	5.90	23
Panel C: Macroeconomic Variables						
Inflation Rate (%)	2.44	1.62	1.64	2.82	3.56	1150
Unemployment Rate (%)	16.63	8.05	10.19	15.53	21.78	1150
GDP (€ thousand per capita)	20.04	4.83	16.54	19.17	23.38	1150
Population (thousand)	870.98	1060.95	348.27	578.14	983.13	1150
Housing Prices (€ per square meter)	1249.59	579.58	794.24	1181.58	1551.12	1150
Bank Loans (€ thousand per capita)	19.80	10.57	11.59	18.09	25.83	1150
Disposable Income (€ thousand per capita)	13.46	2.68	11.55	12.98	15.31	850
Panel D: Entrepreneurship Variables						
Number of Firms	24787.64	41315.87	7283.00	13401.50	24951.00	1150
Number of New Firms	2136.66	3691.64	505.00	1054.00	2018.00	1150
Entry Rate (%)	8.70	4.34	5.14	8.04	10.89	1150
Exit Rate (%)	4.15	2.97	2.12	4.07	5.85	1150
Employment (average per firm)	13.26	7.53	8.60	11.28	15.47	1150
Startup Employment (average per firm)	2.78	0.59	2.40	2.67	3.08	1150

Table 2: Effect of Macroeconomic Variables on Lottery Prizes

This table presents estimates of regressions of the lottery prize (in thousands of euros per capita) at the province level (*Lottery Prize*). *Lottery Expenditure* is the lottery expenditure (in thousands of euros per capita). *Inflation Rate* is the growth of the CPI (consumer price index). *Unemployment Rate* is the unemployment rate. *Population* is the logarithm of the population (in thousands). *GDP* is the logarithm of GDP (in thousands of euros per capita). *Housing Price* is the logarithm of the housing price index (in euros per square meter). *Bank Loans* are bank loans (in thousands of euros per capita). The sample covers the period 1994-2016. 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)	(6)	(7)
Lottery Expenditure		1.001*** (2.72)		1.088** (2.43)		1.019** (2.46)	0.972** (2.50)
Inflation Rate	0.016** (2.18)	0.008 (1.30)					0.010 (1.36)
Unemployment Rate			-0.002** (-2.05)	0.001 (0.67)			0.002 (1.62)
Population							-0.014 (-1.61)
GDP					0.044** (2.21)	-0.001 (-0.07)	0.040 (1.23)
Housing Prices							-0.001 (-0.06)
Bank Loans							0.000 (0.07)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1150	1150	1150	1150	1150	1150	1150
Adjusted R^2	-0.005	0.013	-0.003	0.013	-0.004	0.013	0.012

Table 3: Effect of Lottery Prizes on Firm Entry and Startup Job Creation

This table presents estimates of regressions of the entry rate (new firms in year t divided by number of firms in year $t - 1$ in percentage) and startup job creation (logarithm of the number of jobs created by startups in year t) at the province level. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t - 1$. *Lottery Expenditure* is the lottery expenditure (in thousands of euros per capita) in year $t - 1$. *Inflation Rate* is the growth of the CPI (consumer price index) in year $t - 1$. *Unemployment Rate* is the unemployment rate in year $t - 1$. *Population* is the logarithm of the population (in thousands). *GDP* is the logarithm of GDP (in thousand of euros) per capita in year $t - 1$. *Housing Price* is the logarithm of the housing price index (in euros per square meter) in year $t - 1$. *Bank Loans* are bank loans (in thousands of euros per capita) in year $t - 1$. The sample covers the period 1994-2016. 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			Startup Job Creation (log)		
	(1)	(2)	(3)	(4)	(5)	(6)
Lottery Prize	0.230*** (3.55)	0.232*** (3.86)	0.260*** (3.95)	0.024** (2.04)	0.033** (2.15)	0.035** (2.22)
Lottery Expenditure	22.932** (2.49)	17.253*** (3.17)	23.587*** (3.19)	-1.329 (-0.99)	-0.514 (-0.47)	0.388 (0.16)
Inflation Rate		0.393* (1.98)	0.402* (1.99)		-0.032 (-0.65)	-0.038 (-0.79)
Unemployment Rate		-0.072** (-2.46)	-0.074** (-2.55)		-0.002 (-0.45)	-0.002 (-0.35)
Population		-5.869* (-1.88)	-5.884* (-1.82)		1.144** (2.10)	1.307** (2.19)
GDP		-3.558 (-1.49)	-3.525 (-1.42)		0.651 (1.50)	0.627 (1.41)
Housing Prices		-0.742 (-1.32)	-0.877 (-1.43)		-0.002 (-0.01)	0.054 (0.38)
Bank Loans		0.027 (0.83)	0.066 (1.46)		-0.013* (-1.72)	-0.021** (-2.03)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Sample	All	All	Excluding Madrid & Lleida	All	All	Excluding Madrid & Lleida
Observations	1150	1150	1104	1150	1150	1104
Adjusted R^2	0.883	0.891	0.889	0.935	0.936	0.932

Table 4: New Firm Outcomes

This table presents estimates of regressions of outcomes of new firms in their first five years of life (firms are created in year t) at the firm level. Firm outcomes are the logarithm of assets, the logarithm of the number of employees, the logarithm of wages and return on assets (ROA) in year t , year $t + 1$, year $t + 2$, year $t + 3$ and year $t + 4$. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t - 1$. All regressions include the lottery expenditure (in thousands of euros per capita) in year $t - 1$ (*Lottery Expenditure*) as a control (coefficient not shown). The sample covers the period 1994-2016. 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(Assets)				
	t	$t + 1$	$t + 2$	$t + 3$	$t + 4$
Lottery Prize	0.070 (0.94)	0.111** (2.22)	0.132*** (3.28)	0.113** (2.37)	0.121** (2.31)
Time \times Industry FE	Yes	Yes	Yes	Yes	Yes
Province \times Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	187162	187162	187162	187162	187162
Adjusted R^2	0.111	0.156	0.176	0.180	0.176
	log(Employment)				
	t	$t + 1$	$t + 2$	$t + 3$	$t + 4$
Lottery Prize	0.035* (1.96)	0.039* (1.75)	0.050** (2.04)	0.050** (2.11)	0.053** (2.24)
Time \times Industry FE	Yes	Yes	Yes	Yes	Yes
Province \times Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	187162	187162	187162	187162	187162
Adjusted R^2	0.089	0.117	0.119	0.121	0.125
	log(Wages)				
	t	$t + 1$	$t + 2$	$t + 3$	$t + 4$
Lottery Prize	0.073* (1.86)	0.056* (1.83)	0.056 (1.62)	0.071** (2.27)	0.078** (2.12)
Time \times Industry FE	Yes	Yes	Yes	Yes	Yes
Province \times Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	133376	133376	133376	133376	133376
Adjusted R^2	0.083	0.105	0.104	0.102	0.098
	Return on Assets				
	t	$t + 1$	$t + 2$	$t + 3$	$t + 4$
Lottery Prize	0.006 (0.60)	0.006 (1.36)	0.008** (2.01)	0.011** (2.61)	0.009* (1.75)
Time \times Industry FE	Yes	Yes	Yes	Yes	Yes
Province \times Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	139907	139907	139907	139907	139907
Adjusted R^2	0.025	0.022	0.026	0.027	0.028

Table 5: New Firm Survival

This table presents the estimates of linear probability model of the survival rate at the firm level. The dependent variable is a dummy variable that takes a value of one if a firm created in year t survives at least until year $t + 1$, $t + 3$, $t + 5$, $t + 8$ or $t + 10$. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t - 1$. All regressions include the lottery expenditure (in thousands of euros per capita) in year $t - 1$ (*Lottery Expenditure*) as a control (coefficient not shown). The sample covers the period 1994-2016. Robust t -statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	$t + 1$	$t + 3$	$t + 5$	$t + 8$	$t + 10$
Lottery Prize	0.011 (1.61)	0.035*** (3.48)	0.008** (2.13)	0.007** (2.07)	0.003 (0.91)
Time \times Industry FE	Yes	Yes	Yes	Yes	Yes
Province \times Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	237019	237019	237019	237019	237019
Adjusted R^2	0.034	0.054	0.005	0.006	0.009

Table 6: Incumbent Firm Outcomes

This table presents estimates of regressions of outcomes of incumbent firms at the firm level. Firm outcomes are the logarithm of assets, the logarithm of the number of employees, the logarithm of wages and return on assets (ROA) in year t , year $t + 1$, year $t + 2$, year $t + 3$ and year $t + 4$. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t - 1$. All regressions include the lottery expenditure (in thousands of euros per capita) in year $t - 1$ (*Lottery Expenditure*) as a control (coefficient not shown). The sample covers the period 1994-2016. 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(Assets)				
	t	$t + 1$	$t + 2$	$t + 3$	$t + 4$
Lottery Prize	-0.003 (-0.26)	0.005 (0.48)	0.006 (0.59)	0.008 (0.91)	0.010 (1.07)
Time \times Industry FE	Yes	Yes	Yes	Yes	Yes
Province \times Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	6565590	6565590	6565590	6565590	6565590
Adjusted R^2	0.165	0.171	0.174	0.174	0.173
	log(Employment)				
	t	$t + 1$	$t + 2$	$t + 3$	$t + 4$
Lottery Prize	-0.001 (-0.10)	0.002 (0.31)	0.008 (1.31)	0.008 (1.25)	0.005 (0.86)
Time \times Industry FE	Yes	Yes	Yes	Yes	Yes
Province \times Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	4361537	4361537	4361537	4361537	4361537
Adjusted R^2	0.153	0.162	0.168	0.173	0.176
	log(Wages)				
	t	$t + 1$	$t + 2$	$t + 3$	$t + 4$
Lottery Prize	0.000 (0.06)	0.009 (1.20)	0.016** (2.05)	0.017* (1.87)	0.018* (1.88)
Time \times Industry FE	Yes	Yes	Yes	Yes	Yes
Province \times Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	5535337	5535337	5535337	5535337	5535337
Adjusted R^2	0.138	0.147	0.154	0.160	0.163
	Return on Assets				
	t	$t + 1$	$t + 2$	$t + 3$	$t + 4$
Lottery Prize	0.000 (0.21)	0.002 (1.41)	-0.001 (-0.24)	-0.001 (-0.65)	-0.000 (-0.24)
Time \times Industry FE	Yes	Yes	Yes	Yes	Yes
Province \times Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	5598474	5598474	5598474	5598474	5598474
Adjusted R^2	0.040	0.045	0.048	0.048	0.046

Table 7: Access to Credit

This table presents estimates of regressions of the entry rate (new firms in year t divided by number of firms in year $t - 1$ in percentage) at the province level. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t - 1$. *Lottery Expenditure* is the lottery expenditure (in thousands of euros per capita) in year $t - 1$. *Inflation Rate* is the growth of the CPI (consumer price index) in year $t - 1$. *Unemployment Rate* is the unemployment rate in year $t - 1$. *Population* is the logarithm of the population (in thousands). *GDP* is the logarithm of GDP (in thousand of euros) per capita in year $t - 1$. *Housing Price* is the logarithm of the housing price index (in euros per square meter) in year $t - 1$. *Bank Loans* are bank loans (in thousands of euros per capita) in year $t - 1$. *Bank Branches* are the number of bank branches per capita in year $t - 1$. *Bank Branches (per m^2)* are the number of bank branches scaled by surface area in square meters in year $t - 1$. The low and high groups consist of provinces below and above the yearly median of the distribution of *Bank Loans*, *Bank Branches* and *Bank Branches (per m^2)*. The sample covers the period 1994-2016. Robust t -statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Bank Loans		Bank Branches		Bank Branches (per m^2)	
	Low (1)	High (2)	Low (3)	High (4)	Low (5)	High (6)
Lottery Prize	0.240*** (3.17)	-0.043 (-0.10)	0.986* (1.83)	0.158** (2.62)	0.208** (2.27)	-0.725 (-0.92)
Lottery Expenditure	30.331*** (4.28)	7.219 (1.58)	21.201 (0.73)	13.589* (1.70)	13.101* (1.91)	19.573 (0.59)
Inflation Rate	0.475** (2.43)	0.116 (0.35)	0.541** (2.65)	0.207 (0.80)	0.337* (1.75)	0.346 (0.90)
Unemployment Rate	-0.082** (-2.26)	-0.019 (-0.36)	-0.111*** (-3.18)	-0.059* (-1.88)	-0.030 (-1.51)	-0.076 (-1.42)
Population	-11.814*** (-2.15)	-6.336* (-1.79)	-15.683*** (-3.51)	2.219 (1.02)	-1.050 (-0.46)	-11.356** (-2.22)
GDP	-4.104* (-1.77)	-0.524 (-0.19)	-5.114* (-1.73)	1.544 (0.66)	-3.341 (-1.58)	-7.051 (-1.21)
Housing Prices	1.149 (1.04)	-1.033 (-0.74)	-0.810 (-0.98)	-0.314 (-0.43)	0.137 (0.17)	-0.769 (-0.58)
Bank Loans	-0.100 (-1.15)	-0.015 (-0.50)	0.042 (1.30)	0.016 (0.38)	-0.013 (-0.27)	0.064 (1.18)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	575	575	575	575	575	575
Adjusted R^2	0.911	0.905	0.919	0.886	0.908	0.893

Table 8: Tradable and Non-Tradable Industries

This table presents estimates of regressions of the entry rate (new firms in year t divided by number of firms in year $t - 1$ in percentage) at the province level. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t - 1$. *Lottery Expenditure* is the lottery expenditure (in thousands of euros per capita) in year $t - 1$. *Inflation Rate* is the growth of the CPI (consumer price index) in year $t - 1$. *Unemployment Rate* is the unemployment rate in year $t - 1$. *Population* is the logarithm of the population (in thousands). *GDP* is the logarithm of GDP (in thousand of euros) per capita in year $t - 1$. *Housing Price* is the logarithm of the housing price index (in euros per square meter) in year $t - 1$. *Bank Loans* are bank loans (in thousands of euros per capita) in year $t - 1$. The sample in column (1) includes all industries. The sample in column (2) excludes firms in construction (NACE 4110-4399) and non-tradable industries. The sample in column (3) includes firms in construction (NACE 4110-4399) and non-tradable industries. The sample in column (4) includes firms in tradable industries. The sample in column (5) includes firms in manufacturing industries (NACE 1011-3220). Firms are classified into tradable and non-tradable industries following the [Mian and Sufi \(2014\)](#) classification. The sample covers the period 1994-2016. 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 Industries (1)	Exclude Non-Tradable & Construction (2)	Non-Tradable & Construction (3)	Tradable (4)	Manufacturing (5)
Lottery Prize	0.253** (2.28)	0.194** (2.24)	0.337* (1.94)	0.226** (2.38)	0.331*** (3.89)
Lottery Expenditure	1.489 (0.31)	-4.089 (-0.87)	10.400 (1.27)	5.805 (0.96)	10.058 (1.42)
Inflation Rate	0.019 (0.13)	0.094 (0.64)	-0.148 (-0.66)	-0.137 (-0.88)	-0.263 (-1.44)
Unemployment Rate	-0.070*** (-2.97)	-0.036 (-1.67)	-0.121*** (-3.34)	-0.036 (-1.16)	-0.040 (-1.21)
Population	-0.538 (-0.23)	-2.135 (-1.00)	2.611 (0.93)	-1.295 (-0.44)	-0.247 (-0.08)
GDP	0.767 (0.35)	-1.716 (-0.85)	5.343* (1.69)	-1.243 (-0.46)	-0.458 (-0.16)
Housing Prices	-0.668 (-1.45)	-0.450 (-1.06)	-1.095* (-1.86)	-1.098** (-2.14)	-1.151* (-2.00)
Bank Loans	0.093*** (4.36)	0.076*** (3.89)	0.109*** (3.79)	0.123*** (4.69)	0.132*** (4.85)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	1150	1150	1150	1150	1150
Adjusted R^2	0.922	0.918	0.890	0.869	0.870

Table 9: Labor Market

This table presents estimates of regressions of the entry rate (new firms in year t divided by number of firms in year $t - 1$ in percentage) at the province level. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t - 1$. *Lottery Expenditure* is the lottery expenditure (in thousands of euros per capita) in year $t - 1$. *Inflation Rate* is the growth of the CPI (consumer price index) in year $t - 1$. *Unemployment Rate* is the unemployment rate in year $t - 1$. *Population* is the logarithm of the population (in thousands). *GDP* is the logarithm of GDP (in thousand of euros) per capita in year $t - 1$. *Housing Price* is the logarithm of the housing price index (in euros per square meter) in year $t - 1$. *Bank Loans* are bank loans (in thousands of euros per capita) in year $t - 1$. *Employment Rate* is the ratio of the employed to the working age population in year $t - 1$. The low and high groups consist of sample years below and above the yearly median *Employment Rate* and the yearly median GDP growth rate (*GDP Growth*). Robust t -statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Employment Rate		GDP Growth	
	Low (1)	High (2)	Low (3)	High (4)
Lottery Prize	0.332** (2.46)	0.012 (0.07)	0.517*** (4.42)	0.007 (0.09)
Lottery Expenditure	28.682*** (6.18)	3.783 (0.58)	22.665*** (2.95)	5.803 (1.17)
Inflation Rate	0.245 (1.26)	0.384 (0.99)	-0.058 (-0.20)	0.695*** (2.72)
Unemployment Rate	-0.036 (-1.63)	-0.026 (-0.46)	-0.112** (-2.30)	0.023 (0.72)
Population	1.385 (0.23)	-15.175*** (-4.25)	-4.645 (-1.44)	-9.676** (-2.26)
GDP	-1.971 (-0.93)	-5.769 (-1.40)	-6.450** (-2.04)	-4.851 (-1.50)
Housing Prices	-0.717 (-1.18)	-0.436 (-0.26)	-1.731* (-2.00)	-0.164 (-0.20)
Bank Loans	-0.096 (-1.60)	0.040 (0.82)	0.069 (1.67)	-0.042 (-1.24)
Time Fixed Effects	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes
Observations	573	569	550	600
Adjusted R^2	0.903	0.897	0.916	0.825

Table 10: Self-Employment

This table presents estimates of regressions of the growth rate of self-employed individuals between year $t - 1$ and year t (net entry rate) at the province level. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t - 1$. *Lottery Expenditure* is the lottery expenditure (in thousands of euros per capita) in year $t - 1$. *Inflation Rate* is the growth of the CPI (consumer price index) in year $t - 1$. *Unemployment Rate* is the unemployment rate in year $t - 1$. *Population* is the logarithm of the population (in thousands). *GDP* is the logarithm of GDP (in thousand of euros) per capita in year $t - 1$. *Housing Price* is the logarithm of the housing price index (in euros per square meter) in year $t - 1$. *Bank Loans* are bank loans (in thousands of euros per capita) in year $t - 1$. Columns (1) and (2) present estimates for the full sample of self-employed individuals. Columns (3) and (4) present estimates for self-employment in the agriculture sector. Columns (5) and (6) present estimates for self-employment in the manufacturing sector. Columns (7) and (8) present estimates for self-employment in the services sector. The sample covers the period 2004-2015. 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		Agriculture		Manufacturing		Services	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lottery Prize	0.330** (2.57)	0.263* (1.85)	0.087 (0.58)	-0.025 (-0.27)	0.748*** (4.92)	0.701*** (3.71)	0.490*** (3.39)	0.495*** (3.59)
Lottery Expenditure	19.947*** (4.34)	16.943*** (4.13)	10.753 (1.29)	15.818** (2.63)	14.172 (0.92)	23.462* (1.79)	14.469*** (4.17)	16.049*** (4.26)
Inflation Rate		0.176 (0.84)		0.957** (2.50)		0.601 (1.65)		0.024 (0.12)
Unemployment Rate		-0.011 (-0.48)		0.125** (2.61)		0.051 (1.32)		-0.047** (-2.13)
Population		-12.738*** (-4.75)		-6.051 (-0.98)		1.050 (0.21)		-3.322 (-1.36)
GDP		0.435 (0.16)		-0.999 (-0.29)		1.086 (0.23)		0.739 (0.37)
Housing Prices		-2.828*** (-4.56)		-3.859*** (-2.94)		-3.581*** (-3.26)		-1.741*** (-2.91)
Bank Loans		-0.089*** (-3.23)		-0.039 (-0.68)		-0.098* (-1.77)		-0.018 (-0.74)
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	0.773	0.791	0.571	0.589	0.555	0.574	0.701	0.711

Table 11: Effect of Disposable Income on Firm Entry and Startup Job Creation

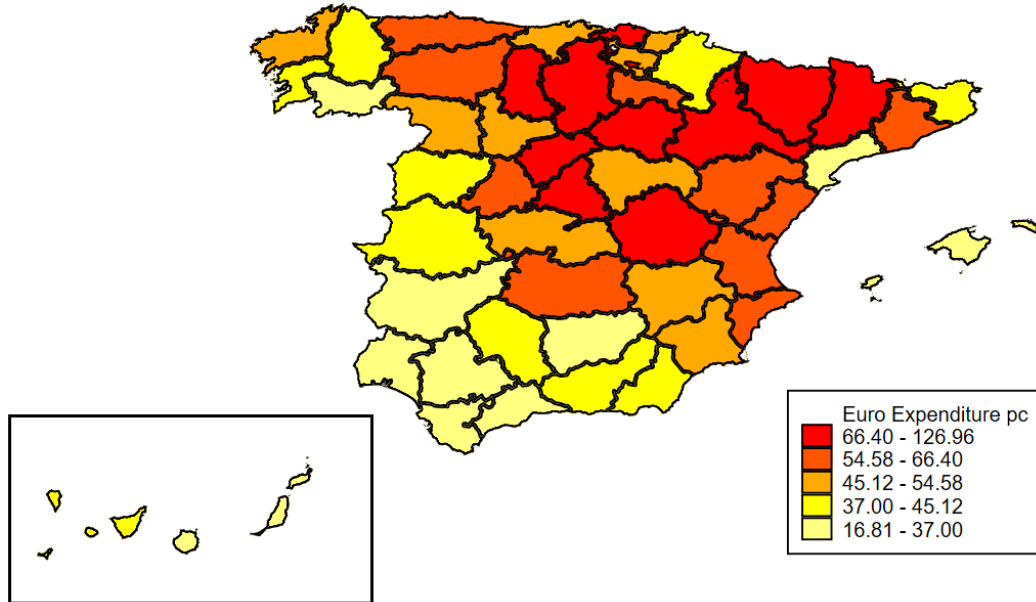
This table presents estimates of the effect of disposable income on the entry rate (new firms in year t divided by number of firms in year $t-1$ in percentage) and startup job creation (the logarithm of the number of jobs created in new firms in year t) at the province level using instrumental variables (IV) methods. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t-1$. *Disposable Income* is the disposable income (in thousands of euros per capita) in year $t-1$. *Lottery Expenditure* is the lottery expenditure (in thousands of euros per capita) in year $t-1$. *Inflation Rate* is the growth of the CPI (consumer price index) in year $t-1$. *Unemployment Rate* is the unemployment rate in year $t-1$. *Population* is the logarithm of the population (in thousands). *Housing Price* is the logarithm of the housing price index (in euros per square meter) in year $t-1$. *Bank Loans* are bank loans (in thousands of euros per capita) in year $t-1$. Column (1) shows the first-stage estimates of the regression of *Disposable Income* on *Lottery Prize* at the province level. Columns (2) and (4) show the results of OLS regressions of entry rate and startup job creation on *Disposable Income* at the province level. Columns (3) and (5) show the second-stage estimates of regression of entry rate and startup job creation on *Disposable Income* instrumented with *Lottery Prize* at the province level. The sample covers the period 1994-2010. 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	Entry Rate		Startup Job Creation	
	(1)	OLS (2)	IV (3)	OLS (4)	IV (5)
Lottery Prize	0.827*** (22.61)				
Disposable Income		0.336* (1.79)	0.291*** (3.01)	0.023 (1.11)	0.043** (2.30)
Lottery Expenditure	-1.880 (-0.70)	20.756*** (2.93)	20.638*** (2.82)	-0.259 (-0.38)	-0.206 (-0.30)
Inflation Rate	-0.095* (-1.68)	0.484** (2.43)	0.480** (2.29)	-0.010 (-0.27)	-0.008 (-0.22)
Unemployment Rate	-0.029** (-2.41)	-0.024 (-0.77)	-0.025 (-0.83)	-0.012*** (-3.33)	-0.012*** (-3.25)
Population	-6.276*** (-5.96)	-4.067 (-0.92)	-4.364 (-1.02)	1.078* (1.98)	1.210** (2.26)
Housing Prices	0.352 (0.90)	-1.092 (-0.75)	-1.077 (-0.74)	-0.115 (-0.79)	-0.122 (-0.82)
Bank Loans	0.052*** (3.20)	0.036 (0.74)	0.038 (0.81)	-0.012* (-1.72)	-0.013* (-1.93)
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	850	850	850	850	850
Adjusted R^2	0.969	0.869	0.847	0.958	0.814

Figure 1: Lottery Expenditures and Prizes by Province

Panel A shows the average lottery expenditure per capita in euros in each province. Panel B shows the average lottery prize (top three prizes) per capita in euros in each province. The sample covers the period 1994-2016.

Panel A: Lottery Expenditure per capita (€)



Panel B: Lottery Prize per capita (€)

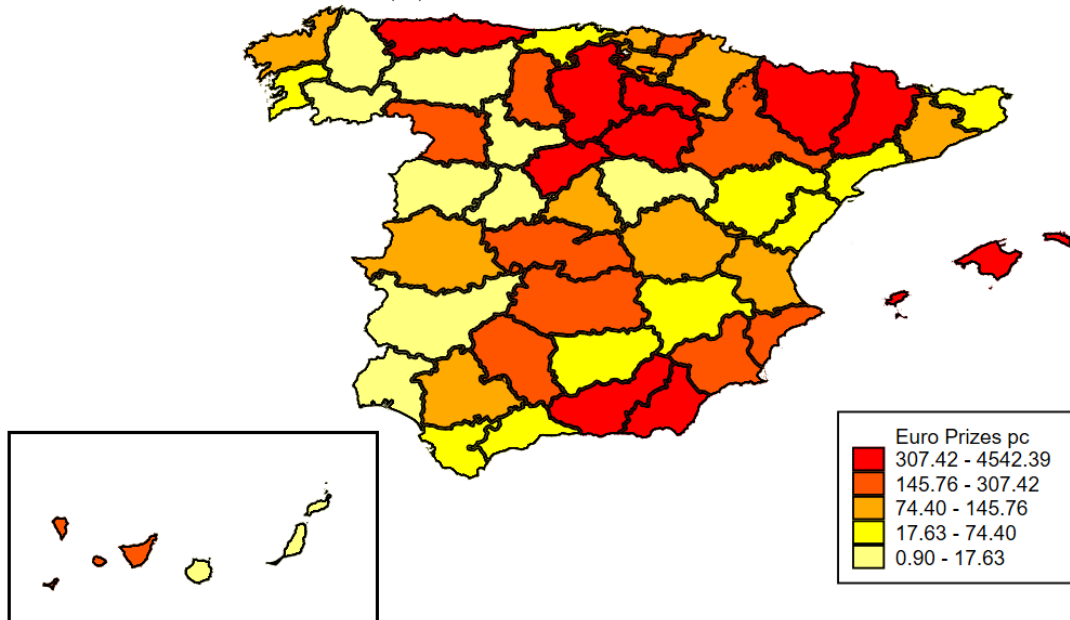
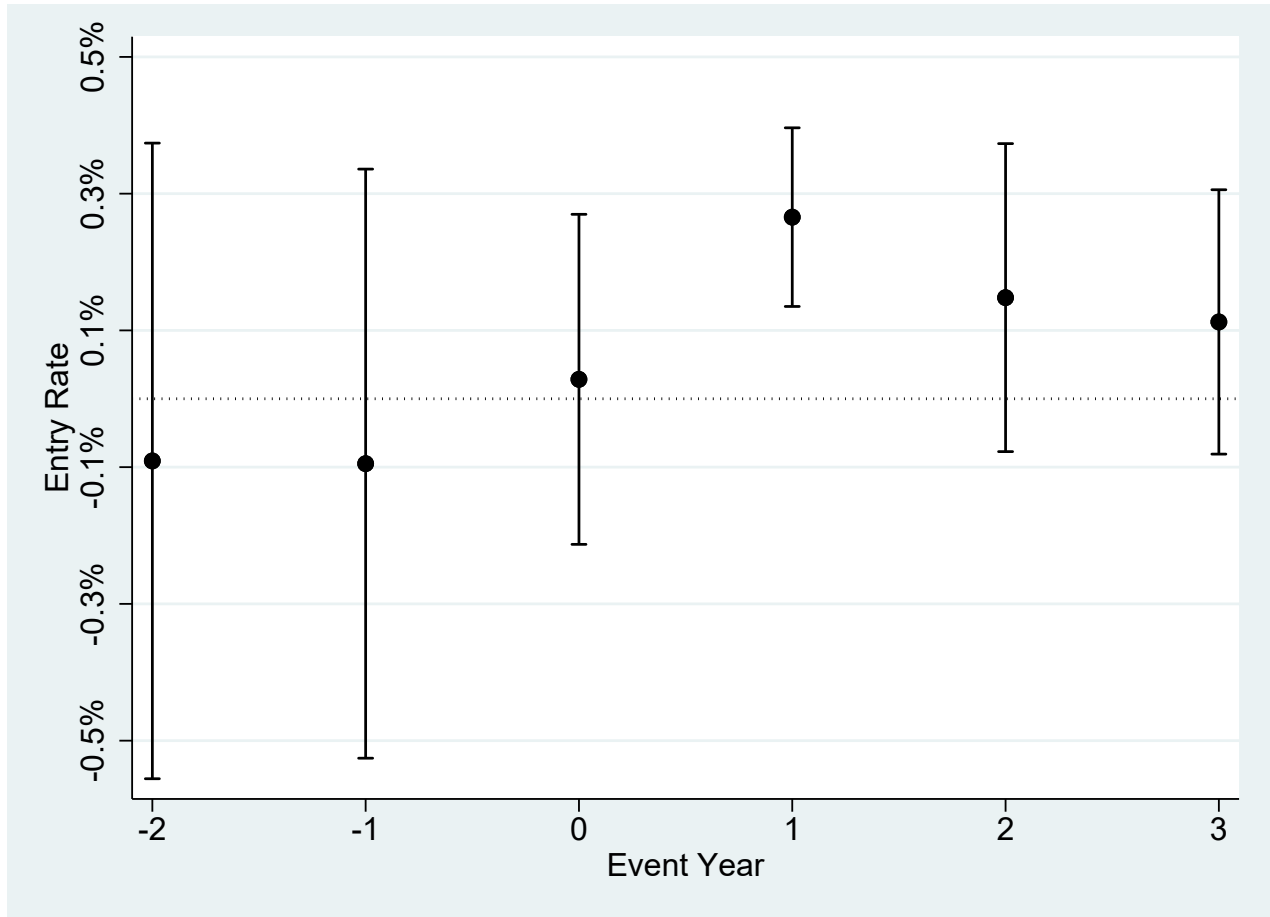


Figure 2: Dynamics of the Effect of Lottery Prizes on Firm Entry

This figure shows point estimates and 95% confidence intervals of the effect of the lottery prize on the entry rate from three years before the lottery award (December of event year 0) up to three years after. Entry rate is defined as total new firms created in a given period divided by number of existing firms in the previous year in percentage. The estimates come from the regression in column (2) of Table 3, but including yearly leads and lags of the *Lottery Prize* variable (in thousands of euros per capita).



Appendix for

“Windfall Gains and Entrepreneurial Activity: Evidence from the Spanish Christmas Lottery”

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

In this Appendix we provide additional statistics and robustness tests for the analyses in the article. Specifically:

- Table [IA.1](#): Summary Statistics for New Firm Outcomes
- Table [IA.2](#): Credit Supply
- Table [IA.3](#): Initial Capital Requirements
- Table [IA.4](#): Effect of Lottery Prizes on Firm Exit
- Table [IA.5](#): Effect of Lottery Prizes on Firm Exit by Industry
- Table [IA.6](#): New Firm Outcomes: Excluding Non-Tradable Industries
- Table [IA.7](#): Business Cycle

Table IA.1: Summary Statistics of New Firm Outcomes

This table reports the mean, standard deviation, 25th-percentile, median and 75th-percentile of outcomes of new firms in their first five years of life (firms are created in year t) at the firm level. Firm outcomes are assets, employment, wages, and return on assets (ROA). The sample covers the period 1994-2016.

	t				
	Mean	Standard Deviation	25th Percentile	Median	75th Percentile
Assets (€ thousand)	294.181	1108.377	24.487	67.494	178.356
Employment	2.591	2.088	1.000	2.000	3.000
Wages (€ thousand)	35.798	50.780	8.000	19.867	44.367
Return on Assets (%)	-10.444	48.357	-12.311	-0.244	6.010
	$t + 1$				
	Mean	Standard Deviation	25th Percentile	Median	75th Percentile
Assets (€ thousand)	496.828	1522.953	46.323	117.076	309.554
Employment	4.178	5.536	1.000	2.000	5.000
Wages (€ thousand)	84.085	125.160	20.517	45.617	96.225
Return on Assets (%)	-4.616	44.204	-5.838	2.317	10.623
	$t + 2$				
	Mean	Standard Deviation	25th Percentile	Median	75th Percentile
Assets (€ thousand)	623.209	1724.194	61.376	153.843	409.310
Employment	4.885	6.472	1.000	3.000	6.000
Wages (€ thousand)	103.063	149.471	25.000	55.000	116.052
Return on Assets (%)	-0.919	36.653	-2.533	3.412	11.095
	$t + 3$				
	Mean	Standard Deviation	25th Percentile	Median	75th Percentile
Assets (€ thousand)	713.575	1857.594	72.317	182.383	487.272
Employment	5.308	6.994	1.000	3.000	6.000
Wages (€ thousand)	114.379	163.095	27.273	60.131	128.041
Return on Assets (%)	0.256	32.974	-1.551	3.635	10.738
	$t + 4$				
	Mean	Standard Deviation	25th Percentile	Median	75th Percentile
Assets (€ thousand)	782.913	1946.649	81.335	206.000	554.000
Employment	5.608	7.342	1.000	3.000	6.000
Wages (€ thousand)	123.577	173.833	29.280	64.791	138.350
Return on Assets (%)	0.608	30.679	-1.220	3.600	10.105

Table IA.2: Credit Supply

This table presents estimates of regressions of the entry rate (new firms in year t divided by number of firms in year $t - 1$ in percentage) at the province level. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t - 1$. *Weak Banks* is the ratio of the number of weak bank branches to GDP per capita in the province in 2006. *Crisis* is a dummy variable variable that takes the value one for the period 2007-2011, and zero for the period 1995-2006. *Lottery Expenditure* is the lottery expenditure (in thousands of euros per capita) in year $t - 1$. *Inflation Rate* is the growth of the CPI (consumer price index) in year $t - 1$. *Unemployment Rate* is the unemployment rate in year $t - 1$. *Population* is the logarithm of the population (in thousands). *GDP* is the logarithm of GDP (in thousand of euros) per capita in year $t - 1$. *Housing Price* is the logarithm of the housing price index (in euros per square meter) in year $t - 1$. *Bank Loans* are bank loans (in thousands of euros per capita) 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)
Lottery Prize \times Weak Banks \times Crisis	0.419*** (2.97)	0.272** (2.26)
Weak Banks \times Crisis	-0.044** (-2.42)	-0.052*** (-3.27)
Lottery Prize \times Weak Banks	-0.050 (-0.86)	-0.062 (-0.97)
Lottery Prize \times Crisis	-0.410 (-1.26)	-0.535 (-1.52)
Lottery Prize	0.487 (1.54)	0.582* (1.70)
Lottery Expenditure	19.141* (1.87)	14.750** (2.49)
Inflation Rate		0.433** (2.17)
Unemployment Rate		-0.062 (-1.68)
Population		-8.218* (-1.96)
GDP		-4.877 (-1.56)
Housing Prices		-0.890 (-0.68)
Bank Loans		0.094* (1.96)
Time fixed effects	Yes	Yes
Province fixed effects	Yes	Yes
Observations	850	850
Adjusted R^2	0.874	0.883

Table IA.3: Initial Capital Requirements

This table presents estimates of regressions of the entry rate (new firms in year t divided by number of firms in year $t - 1$ in percentage) at the province level. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t - 1$. *Lottery Expenditure* is the lottery expenditure (in thousands of euros per capita) in year $t - 1$. *Inflation Rate* is the growth of the CPI (consumer price index) in year $t - 1$. *Unemployment Rate* is the unemployment rate in year $t - 1$. *Population* is the logarithm of the population (in thousands). *GDP* is the logarithm of GDP (in thousand of euros) per capita in year $t - 1$. *Housing Price* is the logarithm of the housing price index (in euros per square meter) in year $t - 1$. *Bank Loans* are bank loans (in thousands of euros per capita) in year $t - 1$. The low, medium, and high groups consist of provinces in the lowest, medium, and highest tercile in terms of initial capital requirements. Initial capital requirements in the average capital used by newly established firms in a given province and year. The sample covers the period 1994-2016. 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 (1)	Medium (2)	High (3)
Lottery Prize	0.235 (0.32)	0.381** (2.31)	-0.041 (-0.27)
Lottery Expenditure	15.737 (1.17)	6.578 (1.30)	18.761* (1.78)
Inflation Rate	0.016 (0.07)	0.186 (0.59)	0.579 (1.11)
Unemployment Rate	-0.022 (-0.71)	-0.087** (-2.14)	-0.017 (-0.37)
Population	-2.909 (-1.21)	-10.703** (-2.03)	-8.524* (-1.91)
GDP	-3.012 (-1.57)	-6.874 (-1.46)	-6.751* (-1.70)
Housing Prices	-1.242 (-1.40)	-0.007 (-0.01)	-0.715 (-0.85)
Bank Loans	-0.053 (-0.69)	0.063 (1.23)	0.042 (0.80)
Time Fixed Effects	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes
Observations	357	357	336
Adjusted R^2	0.908	0.902	0.905

Table IA.4: Effect of Lottery Prizes on Firm Exit

This table presents estimates of regressions of the exit rate (liquidated firms in year t divided by number of firms in year $t-1$ in percentage) at the province level. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t-1$. *Lottery Expenditure* is the lottery expenditure (in thousands of euros per capita) in year $t-1$. *Inflation Rate* is the growth of the CPI (consumer price index) in year $t-1$. *Unemployment Rate* is the unemployment rate in year $t-1$. *Population* is the logarithm of the population (in thousands). *GDP* is the logarithm of GDP (in thousand of euros) per capita in year $t-1$. *Housing Price* is the logarithm of the housing price index (in euros per square meter) in year $t-1$. *Bank Loans* are bank loans (in thousands of euros per capita) in year $t-1$. The sample covers the period 1994-2016. 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)
Lottery Prize	-0.031 (-0.18)	-0.006 (-0.03)
Lottery Expenditure	2.461 (0.39)	-4.381 (-1.32)
Inflation Rate		-0.052 (-0.20)
Unemployment Rate		-0.068*** (-3.14)
Population		-3.324* (-1.74)
GDP		-3.215** (-2.06)
Housing Prices		1.214** (2.51)
Bank Loans		-0.023 (-0.90)
Time Fixed Effects	Yes	Yes
Province Fixed Effects	Yes	Yes
Observations	1150	1150
Adjusted R^2	0.553	0.560

Table IA.5: Effect of Lottery Prizes on Firm Exit by Industry

This table presents estimates of regressions of the exit rate (liquidated firms in year t divided by number of firms in year $t - 1$ in percentage) at the province level. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t - 1$. *Lottery Expenditure* is the lottery expenditure (in thousands of euros per capita) in year $t - 1$. *Inflation Rate* is the growth of the CPI (consumer price index) in year $t - 1$. *Unemployment Rate* is the unemployment rate in year $t - 1$. *Population* is the logarithm of the population (in thousands). *GDP* is the logarithm of GDP (in thousand of euros) per capita in year $t - 1$. *Housing Price* is the logarithm of the housing price index (in euros per square meter) in year $t - 1$. *Bank Loans* are bank loans (in thousands of euros per capita) in year $t - 1$. The sample in column (1) includes all industries. The sample in column (2) excludes firms in construction (NACE 4110-4399) and non-tradable industries. The sample in column (3) includes firms in construction (NACE 4110-4399) and non-tradable industries. The sample in column (4) includes firms in tradable industries. The sample in column (5) includes firms in manufacturing industries (NACE 1011-3220). Firms are classified into tradable and non-tradable industries following the [Mian and Sufi \(2014\)](#) classification. The sample covers the period 1994-2016. 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 Industries (1)	Exclude Non-Tradable & Construction (2)	Non-Tradable & Construction (3)	Tradable (4)	Manufacturing (5)
Lottery Prize	-0.106 (-1.24)	0.083 (0.96)	-0.098 (-1.14)	-0.097 (-0.91)	-0.109 (-1.07)
Lottery Expenditure	-0.917 (-0.64)	1.049 (0.43)	-1.234 (-0.64)	-0.948 (-0.55)	-0.167 (-0.08)
Inflation Rate	-0.010 (-0.54)	0.005 (0.18)	-0.005 (-0.20)	-0.028 (-1.12)	-0.019 (-0.84)
Unemployment Rate	0.004 (0.74)	0.005 (0.43)	0.000 (0.04)	0.017** (2.20)	0.012 (1.59)
Population	0.582 (1.25)	-0.417 (-0.54)	0.546 (0.91)	0.537 (0.78)	0.734 (1.12)
GDP	0.408 (0.71)	-0.488 (-0.58)	0.408 (0.60)	0.797 (0.93)	0.795 (0.99)
Housing Prices	-0.712*** (-3.25)	1.246*** (2.91)	-0.975*** (-3.14)	-0.612* (-1.80)	-0.763** (-2.39)
Bank Loans	0.014* (1.97)	-0.036*** (-2.94)	0.025** (2.55)	0.017** (2.03)	0.015* (1.74)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	1150	1150	1150	1150	1150
Adjusted R^2	0.962	0.936	0.950	0.927	0.929

Table IA.6: New Firm Outcomes: Excluding Non-Tradable Industries

This table presents estimates of regressions of outcomes of new firms in their first five years of life at the firm level. Firm outcomes are the logarithm of assets, the logarithm of the number of employees, the logarithm of wages and return on assets (ROA) in year t , year $t+1$, year $t+2$, year $t+3$ and year $t+4$. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t-1$. All regressions include the lottery expenditure (in thousands of euros per capita) in year $t-1$ (*Lottery Expenditure*) as a control (coefficient not shown). The sample covers the period 1994-2016. The sample excludes non-tradable industries. 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(Assets)				
	t	$t+1$	$t+2$	$t+3$	$t+4$
Lottery Prize	0.064 (0.90)	0.109** (2.17)	0.138*** (3.14)	0.115** (2.31)	0.123** (2.22)
Time \times Industry FE	Yes	Yes	Yes	Yes	Yes
Province \times Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	159779	159779	159779	159779	159779
Adjusted R^2	0.118	0.163	0.179	0.182	0.176
	log(Employment)				
	t	$t+1$	$t+2$	$t+3$	$t+4$
Lottery Prize	0.034** (2.15)	0.043** (2.24)	0.054** (2.55)	0.056*** (2.73)	0.062** (2.58)
Time \times Industry FE	Yes	Yes	Yes	Yes	Yes
Province \times Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	159779	159779	159779	159779	159779
Adjusted R^2	0.091	0.119	0.122	0.125	0.130
	log(Wages)				
	t	$t+1$	$t+2$	$t+3$	$t+4$
Lottery Prize	0.037 (0.87)	0.040 (1.27)	0.047 (1.37)	0.065* (1.98)	0.064 (1.66)
Time \times Industry FE	Yes	Yes	Yes	Yes	Yes
Province \times Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	112611	112611	112611	112611	112611
Adjusted R^2	0.082	0.099	0.098	0.096	0.094
	Return on Assets				
	t	$t+1$	$t+2$	$t+3$	$t+4$
Lottery Prize	0.001 (0.11)	0.007 (1.52)	0.008* (1.79)	0.013** (2.36)	0.009* (1.70)
Time \times Industry FE	Yes	Yes	Yes	Yes	Yes
Province \times Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	119188	119188	119188	119188	119188
Adjusted R^2	0.024	0.021	0.025	0.025	0.027

Table IA.7: Business Cycle

This table presents estimates of regressions of the entry rate (new firms in year t divided by number of firms in year $t - 1$ in percentage) at the province level. *Lottery Prize* is the lottery prize (in thousands of euros per capita) in year $t - 1$. *Lottery Expenditure* is the lottery expenditure (in thousands of euros per capita) in year $t - 1$. *Inflation Rate* is the growth of the CPI (consumer price index) in year $t - 1$. *Unemployment Rate* is the unemployment rate in year $t - 1$. *Population* is the logarithm of the population (in thousands). *GDP* is the logarithm of GDP (in thousand of euros) per capita in year $t - 1$. *Housing Price* is the logarithm of the housing price index (in euros per square meter) in year $t - 1$. *Bank Loans* are bank loans (in thousands of euros per capita) in year $t - 1$. The *Recession Any Month* group includes sample years with at least one month classified as recession by the OECD. The *Recession 6 Months* group includes sample years with at least six months classified as recession by the OECD. The low and high groups consist of sample years below and above the yearly median of the annual *Business Confidence Index* (BCI), and *Consumer Confidence Index* (CCI). The sample covers the period 1994-2016. Robust t -statistics clustered at the province level are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Recession Any Month		Recession 6 Months		Business Confidence Index		Consumer Confidence Index	
	Yes	No	Yes	No	Low	High	Low	High
Lottery Prize	0.305*** (2.73)	0.090 (0.82)	0.406*** (3.17)	0.110 (1.19)	0.394*** (3.74)	0.197** (2.10)	0.393*** (3.21)	0.206* (1.99)
Lottery Expenditure	22.577*** (3.45)	14.172*** (2.90)	15.861*** (2.84)	15.628*** (2.99)	17.569*** (3.13)	15.178*** (2.69)	17.814*** (3.26)	16.567*** (3.16)
Inflation Rate	0.193 (1.32)	0.724* (1.86)	-0.135 (-0.60)	0.716* (1.94)	0.089 (0.53)	0.815*** (2.68)	0.528** (2.05)	0.247 (1.15)
Unemployment Rate	-0.072** (-2.16)	-0.081** (-2.18)	-0.078** (-2.61)	-0.069* (-1.94)	-0.056* (-1.80)	-0.064* (-1.70)	-0.037 (-1.59)	-0.080** (-2.34)
Population	-6.752* (-1.89)	-5.273 (-1.59)	-8.417** (-2.36)	-5.433* (-1.68)	-6.834* (-1.94)	-5.275 (-1.55)	-7.990*** (-2.69)	-3.895 (-1.14)
GDP	-2.848 (-0.95)	-4.695* (-1.85)	-1.830 (-0.63)	-4.741* (-1.90)	-3.367 (-1.21)	-3.753 (-1.42)	-3.015 (-1.24)	-2.949 (-1.08)
Housing Prices	-0.376 (-0.68)	-1.358* (-1.68)	-0.685 (-1.42)	-1.091 (-1.29)	-1.194** (-2.22)	-0.156 (-0.21)	-1.286*** (-2.71)	0.044 (0.06)
Bank Loans	0.032 (0.82)	0.034 (1.05)	0.018 (0.59)	0.031 (0.86)	0.023 (0.61)	0.024 (0.75)	0.010 (0.34)	0.037 (0.96)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	600	550	500	650	600	550	550	600
Adjusted R^2	0.901	0.880	0.903	0.879	0.903	0.860	0.891	0.876

Nova School of Business & Economics
Campus de Carcavelos
Rua da Holanda 1
2775-405 Carcavelos | Portugal
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