

More Cash Flows, More Options? The Effect of Cash Windfalls on Small Firms*

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Abstract

This paper studies the effect of shocks to firms' internal resources on business success and on owners' economic behaviors. We use a new source of variation in cash flows by exploiting the bonus that retailers earn when selling jackpot-winning lottery tickets. Increases in the retailer's internal resources reduce the probability the company will survive. The evidence is not consistent with deteriorating credit behavior or owner retirement but instead suggests that small business owners who receive large cash windfalls are more likely to start new businesses in non-retail industries. This effect becomes stronger when owners reside in low-income ZIP codes or do not own real estate assets. Finally, the amount of the bonus has a positive impact on revenues and number of employees for those retailers that remain open. Overall, our results suggest that small business owners may face financial constraints in their attempts to grow both internally and externally, which may result in both resource and talent misallocation.

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Small firms play a vital role in creating jobs and are often considered to be the engines of economic growth. A main impediment to small business growth and survival are financial constraints. To relax these constraints, policymakers can provide direct subsidies to small businesses in the form of increased access to capital (e.g., subsidized or guaranteed loans, access to special lending programs), which have been shown to have positive effects on the economic outcomes (e.g., revenue growth, number of employees) and survival rates of small businesses (e.g., [Kerr and Nanda, 2009](#); [Krishnan et al., 2014](#); [Fracassi et al., 2016](#)). Alternatively, policymakers could provide subsidies in the form of cash windfalls (e.g., preferential treatment through the tax code). However, recent evidence questions whether small firms want to grow and that not only financial constraints but also non-pecuniary benefits are important for small businesses ([Hurst and Pugsley, 2011](#)).

In this paper, we ask the questions: How do shocks to firms' internal resources impact business survival? Would the effect of a cash windfall be similar to the impact of increasing access to credit? How do these shocks affect firm owners' economic decisions? A recent survey on the response of small businesses to savings from the recent tax reform suggests mixed behavior. For example, a nationally representative survey by WalletHub of more than 150 business owners reports that 40% of owners plan to spend their tax savings on business development, 28% plan to pay executive/investor bonuses, and 23% plan to add the savings to their cash reserves. In contrast, an online survey of 1,000 small business owners by LendingTree reports that 35% of owners plan to pay down debt, 34% have not changed their plans as a result of the savings, and 15% intend to use it for employee compensation.

A main challenge to testing the impact of shocks to firms' internal resources is finding cash windfalls that are unrelated to investment opportunities (e.g., [Lamont, 1997](#); [Erickson and Whited, 2000](#); [Rauh, 2006](#)).¹ [Blanchard et al. \(1994\)](#) exploit windfalls in the form of a won or settled lawsuit but use a small sample of only 11 firms. [Holtz-Eakin et al. \(1994\)](#) study entrepreneurial activity using the individual income tax returns of people who

¹Most of the past literature focuses on the effects of cash windfalls on the economic behavior of individuals, e.g., [Lindh and Ohlsson \(1996\)](#); [Kuhn et al. \(2011\)](#), rather than of small businesses.

received inheritances. However, these individuals may have also had greater access to business opportunities for reasons unrelated to their wealth (Hurst and Lusardi, 2004).

In this paper, we exploit a unique setting that provides a randomized assignment of cash windfalls to small businesses that sell lottery tickets. To incentivize retailers' sales of lottery tickets, state lottery programs provide bonuses for retailers that sell jackpot tickets (i.e., prizes of at least \$40 million), usually as a percentage of the jackpot prize.² The empirical design exploits the fact that, conditional on selling a jackpot-winning ticket, the amount of the winning ticket bonus to the retailer is randomly assigned. Given the randomness of the lottery in terms of the jackpot amount and that the bonus-awarding rules vary geographically, we obtain a large dispersion in the intensity of the treatment. In addition, tests support our identifying assumption: We find that the magnitude of the bonus is not correlated with retailers' pre-treatment or local characteristics (e.g., population, income, education). We also show that the retailers' outcomes in the years prior to selling the winning ticket are unexplained by the amount of the bonus.

To conduct our analysis, we hand-collect a dataset containing information on all the retailers that sold winning Powerball (PB) and Mega Millions (MM) tickets from 2002 to 2016. PB and MM are the two most important shared jackpot games in the U.S., offered in 44 states. We then merge this dataset with information on the states' winning ticket bonus to retailers. We complement this dataset with information on firms' survival and business activity, such as revenues, number of employees, secured lending, real property investment, delinquency, and corporate bankruptcy. For a subset of retailers, we collect the owners' information, such as gender, age, secured lending, real property, delinquency, personal bankruptcy, and personal business activity. This novel dataset allows us to study not only a firm's behavior but also the owner's behavior following the positive shock to the business.

We begin our analysis by examining how a cash windfall affects a firm's likelihood of

²The mean winning ticket bonus is \$151,000 in 2016 dollars.

surviving. A large amount of literature has focused on entry into entrepreneurship, but less attention has been paid to departure from entrepreneurship. As [Holtz-Eakin et al. \(1994\)](#) point out, “the net quantity of entrepreneurs is just as dependent on departures from entrepreneurship as on the flows into entrepreneurship.” On the one hand, firms may have financial constraints and positive net present value (NPV) projects but fail to obtain funds to undertake those projects. These constraints would be relaxed by a cash windfall. Firms then could invest in these positive NPV projects and thus be more likely to survive ([Holtz-Eakin et al., 1994](#)).

On the other hand, with a lumpy cash windfall, firms may behave differently. [Hvide and Møen \(2010\)](#) find that startup profitability increases with the entrepreneur’s wealth in the first three wealth quartiles but drops in the top quartile. They conjecture that higher wealth may induce a less alert or less dedicated management. At the individual level, [Agarwal et al. \(2007\)](#) find that consumers who are initially most likely to be liquidity constrained show the largest increase in credit card spending after getting a tax rebate check. Similarly, with a cash windfall, firms may have lax management, increase debt significantly without having sufficient positive NPV projects, hence becoming more prone to credit risk and less likely to survive. In contrast, we find that the amount of the winning bonus has a negative impact on a firm’s survival following the jackpot shock. The results are robust when we control for retailer and neighborhood characteristics. The negative impact of a winning bonus on a firm’s survival is inconsistent with the findings of [Holtz-Eakin et al. \(1994\)](#).

Next, we explore potential interpretations for the negative effect of bonus size on a firm’s survival. One interpretation is that firms that receive a larger winning ticket bonus may overinvest and exhibit deteriorating credit behavior after winning, leading to financial distress and a lower probability of survival. For example, previous research at the household level has documented that after receiving cash windfalls individuals, find later themselves filing for bankruptcy ([Hankins et al., 2011](#); [Carlson et al., 2015](#)). To test this hypothesis, we examine the pattern of UCC loans (i.e., secured loans to small businesses) and new tax liens (as a

proxy for post-winning delinquency) at the retailer level. The results, which are inconsistent with deteriorating credit behavior, show that the probability of retailers obtaining UCC loans and having a new tax lien decreases with the amount of the winning bonus. In addition, the winning bonuses do not generate UCC loans, tax liens, or personal bankruptcy at the owner's level, which likewise does not support the deteriorating credit behavior channel.

A second potential interpretation is that a retail owner may be more likely to retire and close down the business after receiving a larger winning ticket bonus. However, when we estimate the effect on owners who are near to retirement age, we find their businesses actually are more likely to survive, which is inconsistent with this interpretation.

We then consider retail owners' other economic behavior that may result in business closure. We focus on how the winning ticket bonus affects the likelihood of starting a new business. The results show that owners are more likely to start new businesses after receiving larger winning ticket bonuses. Among the owners who start new businesses, 52% close down their previous retail operations. To take a closer look at how the winning bonus affects the decisions to start new businesses and close down previous firms, we break down retail owners' choices along two dimensions: 1) whether the owner keeps the previous retail establishment open, and 2) whether the owner starts a new business. We find that as the amount of the winning ticket bonus increases, owners are more likely to start a new business *and* close down the previous store than they are to only close down the previous store. Therefore, we argue that the positive impact of a winning bonus on starting new businesses can at least partially explain the negative effect of the amount of the winning ticket bonus on retailer survival.

The new businesses do not seem to be simply substitutes for the current businesses at a different location or another form of business expansion, such as an increase in the number of stores owned. There is substantial heterogeneity in the types of new businesses started by owners who receive a winning ticket bonus, including eateries (27%), grocery stores (18%), and real estate services (18%), among others. In general, these new ventures are in industries that have higher net profit margins than retail stores and that require higher startup capital.

In addition, most of these new ventures are currently open.

To explain what prevented these owners from starting new businesses prior to receiving the winning bonus, we explore the channel of financial constraints. Small business owners may have restricted access to capital, which limits the types of businesses they can start. We use the income level of the ZIP code where the retailer's owner resides and the owner's pre-treatment homeownership status to proxy for financial constraints. The results show that the impact of the size of a cash windfall on the likelihood of starting a new business is greater for owners with higher financial constraints, which supports the financial constraint interpretation.

Another interpretation could be mental accounting. Small business owners may value a dollar differently when it is earned through work, financed through credit, or given to them (as a cash windfall). Even though they have access to credit or other types of external funding, they may be more risk averse with borrowed capital than with a cash windfall. However, the fact that the documented effect on the likelihood of starting a new business is not present for owners with fewer financial constraints does not support this interpretation.

Finally, we analyze the impact of the winning ticket bonus on subsequent revenues and employment as proxies for internal growth. We find that, for the retailers that remain open, a larger bonus leads to a positive increase in both revenues and number of employees. In particular, we find that revenues on average increase by \$36,561 and number of employees by 0.87 for every \$100,000 of firms' additional internal resources, a positive effect that is economically significant at least five years following the shock. This evidence suggests that financial constraints may have restricted the internal growth of these retail stores.

A potential concern is that the effect on revenues comes from the "lucky store effect" (Guryan and Kearney, 2008), instead of the winning ticket bonus. However, the empirical strategy exploits the intensity of treatment, conditional on selling a winning ticket. Thus, all the retailers in the sample are literally "lucky." In addition, the estimated effects are persistent several years after the jackpot shock, while the "lucky store effect" dissipates in

less than a year. We also show that our estimates remain unchanged when we control for the size of the jackpot prize in order to account for the possibility that the “lucky store effect” could be more important for the larger prizes.

This paper is related to several strands of the literature. Broadly speaking, it contributes to the literature that studies the role of liquidity constraints in small business growth and survival. [Holtz-Eakin et al. \(1994\)](#) find that an inheritance-induced increase in liquidity raises entrepreneurial survival. [Fracassi et al. \(2016\)](#) exploit a regression discontinuity setting and show that startups that receive microloans are more likely to survive, generate higher revenues, and create more jobs. These findings suggest that increasing access to capital improves firms’ growth and chance of survival. In contrast, using Danish data, [Andersen and Nielsen \(2012\)](#) identify constrained entrepreneurs who start a business after receiving a large inheritance and find that these entrepreneurs have significantly lower survival rates than unconstrained entrepreneurs. [Hvide and Møen \(2010\)](#) find that start-up profitability drops when founders are in the top quartile for wealth. These findings suggest that business ownership may have a luxury-goods component ([Hurst and Pugsley, 2011](#)). Our paper offers a different perspective on survival. Though we find retailers are less likely to survive after receiving a larger winning ticket bonus, the business closures do not seem to come from deteriorating credit behavior either at the retailer level or the owner level, nor from the owners’ retirement motive, but rather from the owners starting new businesses. Our findings also highlight the importance of considering internal (revenues and employees) and external (starting a new firm) growth for small firms and their owners. These results suggest that small business owners indeed want to grow ([Hurst and Pugsley, 2011](#)), and they may face financial constraints in their attempts to grow both internally and externally.

Another related strand of the literature focuses on the impact a cash windfall has on a firm’s economic behavior. [Blanchard et al. \(1994\)](#) examine a variety of decisions by each firm, such as distribution of the cash (in the form of a dividend, share repurchases, or debt reduction), borrowing behavior, acquisition of new lines of business, etc. In emerging markets,

De Mel et al. (2008), Karlan et al. (2015), and McKenzie (2017) use randomized cash grants to generate a cash windfall for microenterprises and study the impact on the return of capital, the firm’s profits, and employment. It is worth stressing that the small business environment in the U.S. differs significantly from that in most emerging markets. We contribute to this literature by exploiting a unique, clean identification from a natural experiment. The nature of our data repository allows us to observe the credit behavior and real property investment on both the retailer and owner levels. It also allows us to follow other entrepreneurial activities conducted by the owners, facilitating a holistic view of a firm’s survival and the owner’s exit route.

There is also a growing literature that exploits the lottery setting as an exogenous liquidity shock. Most of these papers focus on the impact of a liquidity shock on individual decisions and outcomes, for example, labor supply and earnings (Imbens et al., 2001), stock market participation (Briggs et al., 2015), individual bankruptcy (Hankins et al., 2011), entry into entrepreneurship (Lindh and Ohlsson, 1996), etc. Some recent papers use lottery wins to create a quasi-experimental variation in bank funding (Parra, 2018), government fiscal policy (Da et al., 2015), or local economic conditions (Bermejo et al., 2018). In contrast, our paper exploits the random assignment (achieved by the lottery setting) of cash on the firm level, allowing us to study the impact of a cash windfall on small business decisions.

1 Background on Winning Ticket Bonuses

Lotteries have been established in 44 states, the District of Columbia, and Puerto Rico. State lotteries have programs to incentivize retailers’ ticket sales. Depending on the state, these programs usually have a bonus for retailers that sell jackpot-winning ticket.³

The winning ticket bonuses, which are exploited in the research design, vary by state and

³State lotteries also offer sales incentives for retailers, that are a percentage of the ticket sales. However, there is little variation in these sales incentives across states, and the amount is substantially lower than the winning ticket bonus. In addition, the point estimates are unaffected when we include the average income of the ZIP code, as proxy for the sales incentives and also for the size of the prize, to control for the potential hypothesis that sales incentives are greater for the larger jackpots.

even within states. First, one set of states provides the retailer a bonus that is a percentage of the prize, usually with a cap on the bonus. For example, Texas pays retailers a bonus of 1% of the prize up to \$1 million, California pays 0.5% of the prize up to \$1 million, Arkansas also pays 1%, but the maximum bonus is \$50,000. Second, another set of states pays a flat bonus. For example, Colorado pays a bonus of \$50,000 regardless of the size of the jackpot prize. Finally, there are a few states that provide no winning ticket bonus. For example, retailers in Maine do not earn bonuses for selling large-prize winning tickets.

Most of the state lotteries pay the retailers the winning ticket bonus on unclaimed prizes. One of the few exceptions is Michigan. The jackpot winner has between 90 days to one year to claim the prize depending on the state lottery. After that period, the prize becomes unclaimed. Finally, since the bonus, in most of the instances, is a percentage of the jackpot prize and because the empirical design exploits the intensity of treatment, we focus on retailers' bonuses from the most important jackpot games in the U.S.: Powerball and Mega Millions.

Powerball (PB) and Mega Millions (MM) are two U.S. jointly shared jackpot games offered in 44 states. Currently, the minimum jackpot for PB and MM is \$40 million. The jackpot increases when there is no top-prize winner, and it can be paid to the winner as an annuity or a lump sum payment.⁴ In the case of the retailer, the bonus is paid regardless of whether the jackpot winner chooses the lump sum or the annuity.

As anecdotal evidence of this shock, Dehoff's Key Market, located at 500 South Norfolk Street in San Mateo, sold a \$228.4 million PB jackpot. The retailer received a bonus of \$1 million. "We don't have final plans for the money. We have all kinds of improvements for the store that we are always working on, and we are discussing other things. This is a nice windfall since the margins in our business are so thin," said Chris Dehoff, President of Dehoff's Key Markets.

⁴For further details on PB and MM see [Parra \(2018\)](#).

2 Research Design

To estimate the causal effect of cash flow shocks to the firm’s outcomes (e.g., survival), we exploit the variation in the intensity of treatment from the winning ticket bonuses. This empirical design is similar to those employed in other papers that examine the effect of income shocks at the individual level on labor earnings (Imbens et al., 2001; Cesarini et al., 2017), health (Lindahl, 2005; Cesarini et al., 2016), and personal bankruptcy (Hankins et al., 2011).

In addition, the empirical design of this paper differs from Guryan and Kearney (2008), who exploit the shock of selling a large-prize winning ticket on lottery sales to document the “lucky store effect.” First, they focus their analysis on the effect of selling a jackpot-winning ticket on sales. Second, they do not exploit the fact that the retailers earn a bonus for selling the winning ticket, which is the novel focus of this paper.⁵

The identifying assumption of the research design is that conditional on selling a jackpot-winning ticket and receiving the respective bonus, the amount of the commission that the retailer earns is independent of all the other variables that affect the firm’s outcomes. If this assumption holds, then the residual of the regression model is uncorrelated with the winning ticket bonus, and thus the empirical analysis gives an unbiased estimator.⁶

The assumption can be empirically tested. We show that the magnitude of the bonus is not correlated with retailers’ characteristics. As an additional test, we also show that the amount of the bonus does not explain the retailers’ outcomes before selling the winning tickets. Thus, these tests suggest that the post-winning impact of the bonus can be interpreted as the causal effect of the winning ticket bonus.

⁵Their treatment variable is a winner dummy, which assumes equal intensity of treatment following the shock.

⁶An alternative empirical strategy would be to exploit the fact that conditional on lottery sales, the winning shock is randomly assigned. In this case, the strategy needs to control for the sales of each store, since the probability of selling a winning ticket is a positive function of the lottery sales. However, we do not have the nationwide sales of PB and MM nor the outcome data for the retailers that sell these games nationwide. In addition, the estimated effect with this alternative research design might be confounded by the “lucky store effect.”

Our empirical specification is similar to that of the individual level studies that exploit the lottery prizes (e.g., [Imbens et al., 2001](#); [Hankins et al., 2011](#)). Formally, we estimate the causal impact of receiving the winning ticket bonus through the following equation:

$$y_i = \alpha_t + \tau_g + \beta \ln(\text{bonus}_i) + \gamma'X_i + \epsilon_i, \quad (1)$$

where y_i is the outcome variable for retailer i within a given number of years after selling the winning ticket (e.g., an indicator variable for the retailer remaining open in or before the specified year); α_t is a set of fixed effects for the year in which the retailer sold the jackpot ticket; τ_g is a Powerball dummy variable; bonus_i is the winning ticket bonus that retailer i receives after taxes; X_i is a set of retailers' pre-treatment covariates, such as years in business, dummy variable for whether the retailer has a UCC loan, tax lien, among others. If these covariates are independent of the winning bonus, their inclusion should only affect the precision of the estimates. To account for any potential serial correlation across states, we report the standard errors clustered at the state level and robustness to heteroskedasticity.

A potential concern of the estimated effect from equation (1) is whether the effect comes from the “lucky store effect” ([Guryan and Kearney, 2008](#)), rather than the winning ticket bonus. Recall however that the empirical strategy exploits the intensity of treatment, conditional on selling a jackpot-winning ticket. Thus, all the retailers in the sample are “lucky.” In addition, the estimated effects in most cases are persistent several years after the jackpot shock, while the “lucky store effect” dissipates in less than a year (i.e., up to 40 weeks). In addition, we show, in [Section 4](#), that the point estimates remain unchanged when we control for the size of the prize to account for the possibility that the “lucky store effect” could be more important the larger the jackpot prize. Thus, it seems unlikely that the driver of the findings is due to the “lucky store effect.”

Finally, for a subset of retailers, we estimate the effect of the winning ticket bonus on the retail owners' outcomes. Specifically, we estimate:

$$y_i = \alpha_t + \tau_g + \beta \ln(\text{avg bonus}_j) + \gamma'X_i + \epsilon_i, \quad (2)$$

where y_i is the outcome variable for owner i within a given number of years after the retailer sold the winning ticket (e.g., dummy variable for filing for personal bankruptcy in or before the specified year); α_t is a set of fixed effects for the year in which the retailer sold the jackpot ticket; τ_g is a Powerball indicator; avg bonus_j is the average winning ticket bonus after taxes per owner for retailer j (i.e., the winning bonus divided by the number of owners); X_i is a set of owners' pre-treatment covariates, such as an indicator for whether the owner has a UCC loan or personal bankruptcy, among others. Finally, we cluster standard errors at the retailer level.

3 Data and Summary Statistics

To assess the impact of retailers' cash flow on the business success, we assemble a data repository merging several data sets obtained from different sources. The first dataset, which was hand collected from public sources, comprises all the retailers that sold winning PB and MM tickets from 2002 to 2016 (376 retailers in 41 states). Subsequently, we merge this dataset with information on the states' winning ticket bonuses to the retailers. This data is supplemented with discussion from state lottery representatives. We drop retailers (26) located in states for which bonus information is unavailable (i.e., Georgia after 2011, Oklahoma and Wyoming).

In addition, we use retailer information, such as their names and addresses, to manually match them with the Lexis Nexis Public Records Comprehensive Business Report (LN) database to obtain information on the business activity and financial distress before and after the jackpot shock. In particular, this database provides information on Uniform Commercial Code (UCC) secured loans, real properties, tax liens, bankruptcy filings, and owners' data

(e.g., name, address).⁷ LN aggregates data from sources such as property tax assessment records and bankruptcy records among others (for more details, see Appendix A). Finally, in the last restriction to our estimation sample, we drop retailers for which we can find no information from public records (58 stores, that are part of large chains, for which store level data is unavailable). After imposing this filter, we arrive at our main sample that comprises 292 firms. Appendix Table 1 reports the number of retailers per year.

For a subset of retailers (93), Lexis Nexis Public Records Comprehensive Person Report provides owner information (196 owners). We collect personal information, such as gender, tax liens, personal bankruptcy, real property information, and personal business, etc. Prior work has used LN to obtain data on small businesses (Fracassi et al., 2016), executives (Cronqvist et al., 2012; Yermack, 2014; Chuprinin and Sosyura, 2018), fund managers (Pool et al., 2012), and financial journalists (Ahern and Sosyura, 2015).

The retailer survival data was collected from the Dun and Bradstreet (D&B) database, which provides a regularly updated registry of existing businesses. We supplement D&B data with hand-collected data from Lexis Nexis Public Records and web searches on Yelp, Google reviews, and Google street view. First, we use D&B’s matching procedure to determine the status of the retailers that sold a winning ticket as of 2018. Firms that are successfully matched to D&B’s database are considered to have survived. Subsequently, this data is complemented with hand-collected information from other sources (e.g., LN, Yelp) to determine whether the businesses indeed survived or the year in which the retailers closed. D&B data has been previously used, for example, to study small businesses (Fracassi et al., 2016), public and private firms (Kapadia, 2011; Alfaro and Chen, 2012).

⁷UCC is a state-level filing registry that records loans secured by fixed assets. Liens are court rulings that provide a creditor the right to take possession of a debtor’s real property if the debtor fails to fulfill contractual obligations.

3.1 Summary Statistics

The shaded areas in Figure 1 highlight the counties in which there was a jackpot winner over the sample period and the size of the winning ticket bonus.

[INSERT FIGURE 1 HERE]

Table 1 reports summary statistics for our sample firms. The average (median) jackpot prize in our sample is \$155 (105) million (in 2016 dollars). The average (median) winning ticket bonus after taxes (in 2016 dollars) is \$151,000 (55,000). The retailers sampled are located across 39 states and 200 counties. The average (median) retailer has 9.98 (10) years in business before the jackpot shock and has 0.7 (0) stores connected (i.e., stores in other locations). In addition, 29% of the retailers in our sample have UCC loans, 11% own real properties, and 8% have tax liens. The average survival retailer rate after five years post treatment is 90%. Moreover, 12% contract at least one UCC loan after the jackpot shock, 4% buy new real properties, 5% receive tax liens, and none of the retailers file for corporate bankruptcy.

[INSERT TABLE 1 HERE]

For the set of retailers for which owners' data is available (93), we find information on 196 owners. On average, most of the owners are male (75%), they are 49.52 years old and have tenure as owners of 9.44 years at the time of the shock. In addition, 31% have UCC loans, 33% own at least one real property, and 9% have tax liens. Following the jackpot shock, 13% acquire at least one UCC loan, 12% start a new business, 17% buy a real property, 7% are subject to tax liens, and 3% file for personal bankruptcy.

Finally, we test whether the sub-sample of retailers for which owners' data is available is different from the full sample in pre-treatment characteristics and outcome variables. Appendix Table 2 shows that retailers in both samples are statistically indistinguishable in the bonus received, pre-treatment covariates, and post-winning outcomes.

4 Results

4.1 Tests of the Identification Strategy

To show that the size of the winning ticket bonus shock is randomly assigned and thus uncorrelated with all the other variables that could affect the firm’s outcomes, we provide two tests. First, we present a series of randomization tests to check whether the bonus is explained by retailers’ pre-treatment characteristics. Specifically, we regress the winning bonus on the number of years in business at the time of the shock, number of connected stores, indicator variables for whether the retailer has UCC loans, real properties, tax liens, and neighborhood characteristics, such as level income, population, and fraction of the population with college degrees, measured at ZIP code level. We control for year of winning and game fixed effects and cluster standard errors at the state level. Column 1 of Table 2 reports results with retailers’ characteristics. None of the variables are significantly related to the winning ticket bonus, and a joint F-test of the hypothesis that all coefficients are equal to zero has a p-value of 0.483. Column 2 includes ZIP code controls. We also find that none of the covariates are significantly related to the bonus, and the joint F-test has a p-value of 0.206.

[INSERT TABLE 2 HERE]

Second, we examine a series of falsification tests to check whether the retailers’ outcomes prior to the jackpot shock are related by the amount of the bonus later won. Figure 2 reports the estimates before and after the shock on an indicator for the retailer having a UCC loan in or before the indicated year. Similarly, we also perform the same test for real properties and tax liens. We control for retailers and neighborhood covariates (e.g., number of years in business, number of connected stores, $\ln(\text{Population})$, $\ln(\text{Income per capita})$) and include year of winning and game fixed effects. We estimate the impact of the bonus for each year separately. Standard errors are clustered at the state level throughout. All the estimates prior to the jackpot shock for all the variables show no relation between the retailers’ outcomes

before winning and the amount of the bonus won. Overall, the results are supportive of the identifying assumption that the bonus won is randomly assigned.

[INSERT FIGURE 2 HERE]

4.2 The Effect of the Winning Ticket Bonus on Firms' Survival

We now turn to the central question of the paper: what is the impact of internal resources on a small firm's success? The most basic measure of firm success is survival.

To determine survival rates, we first match the retailers in the sample with the D&B private company database of September 2018 using their Optimizer matching program. We complement this information with LN records, Yelp, Google reviews, and Google street view.⁸ We identify a retailer as surviving if it meets the following criteria: 1) the establishment is matched to a D&B retailer by the Optimizer program; 2) the firm is reported as active by LN. We also verify whether the establishment remains open using Yelp and Google (reviews and maps).⁹ For those retailers that did not survive based on these criteria, we verify through public records that the retailers did not move to a different location. However, D&B does not provide information about when an establishment closed. To estimate the closing date, we rely on the dissolution date or the date when the establishment became inactive based on LN. In addition, we use Google street view to check approximately when the establishment closes. In particular, we compare street views around the dates when the business was reported closed. Moreover, we also check when the last review was recorded in Yelp or Google. Using this procedure, we find that 10% of all retailers did not survive five years following the jackpot shock.

Figure 3 presents the corresponding results of equation (1) measuring the causal effect of the winning ticket bonus on firm survival. The dependent variable for each regression is an indicator for survival in or before the specified year. For ease of interpretation, the winning

⁸Google Maps provide panoramic views from positions along many streets in the world. It was launched in 2007 in several cities in the United States and has since expanded to include rural areas.

⁹Users in both local-research services can report a business as closed.

bonus variable is standardized. We control for the following characteristics at the time of the shock: number of years in business, number of connected stores, dummies for UCC loans, real properties, tax liens, percentage of population with college degree, $\ln(\text{Population})$, and $\ln(\text{Income per capita})$. We also include year of winning and game FE. Standard errors are clustered at the state level. We estimate the impact of the bonus for each year separately. Table 3 presents the survival estimates across the first three post-winning years.

Figure 3 shows that there is a negative and significant impact of the winning bonus two years following the jackpot shock. The impact of the bonus remains both economically and statistically significant for the first five post-winning years.

[INSERT FIGURE 3 HERE]

Turning to Table 3 for the estimates after three years following the jackpot shock, Column 1 presents estimates from the specification without any control or fixed effects. A one standard deviation increase in the winning bonus reduces the probability of survival in 4 percentage points, a change of 40% from the mean closure rate (0.10). Columns 2–3 in Table 2 include control variables to study to what extent the estimates of the bonus are sensitive to the inclusion of other variables. We first include year of winning and game fixed effects in Column 2, which do not affect the estimate. Column 3 adds control for retailers’ characteristics. Again, the estimate does not change.

[INSERT TABLE 3 HERE]

As previously discussed, a potential threat to our estimates is the “lucky store effect.” Albeit all the retailers in the sample are winners’ stores, this effect could potentially be greater the larger the prize (even though it is very likely that all the winning retailers receive local media attention and hang the “Winning Ticket Sold Here” sign). Thus, we include the $\ln(\text{Prize})$ to account for the possibility that this effect could be greater the larger the jackpot amount. It is therefore reassuring to see in Column 3 that our estimate does not change when we control for the size of the prize, a finding that provides further support that the

effects documented in this paper are not driven by the “lucky store effect.” Finally, Column 4 includes controls at the neighborhood level. Again, the estimate is quite similar, although more precisely estimated.

The findings show that surprisingly exogenous shocks to the firms’ internal resources reduce the probability of survival. Existing literature documents a strong correlation between entrepreneurial wealth and the propensity to keep a business (Holtz-Eakin et al., 1994). This result potentially raises questions about whether subsidizing small businesses may be appropriate if liquidity constraints prevent small businesses from securing the financing they need to operate (e.g., Evans and Jovanovic, 1989; Evans and Leighton, 1989).

4.3 Firm Survival: Potential Channels

Why does the winning bonus reduce the probability of survival? In this section, we explore potential channels to explain this finding.

4.3.1 Deteriorating Credit Behavior after Receiving the Winning Ticket Bonus

One explanation for our survival results, which show that lower survival rates accompany greater winning ticket bonuses, is that the effect comes from post-winning financial distress due to deteriorating credit behavior. Previous research has documented, at the individual level, that following income from lotteries (or earnings from professional athletes), individuals find themselves filing for bankruptcy later (Hankins et al., 2011; Carlson et al., 2015). To test for this hypothesis, we estimate the impact of the winning bonus on UCC loans, which are secured loans to smalls business, as proxy for firm leverage. Figure 2 reports the bonus effect on a dummy equal to one for the retailer having a UCC loan in or before the indicated year. The bonus has a negative impact on the probability of contracting a UCC loan in the first-year following the jackpot shock.

Figure 2 also shows that the impact of the bonus remains statistically significant for the first five post-winning years. Panel A of Table 4 reports the estimates three years following

the shock. Column 1 shows that a one standard deviation increase in the winning bonus reduces the probability of UCC loans in 3.7 percentage points, a change of 30% from the mean (0.12). We find similar estimates if we condition on firm survival (Appendix Table 3). The negative effect, beginning in the first post-winning year, suggests that retailers are less likely to contract new secured loans the greater the winning ticket bonus.

[INSERT TABLE 4 HERE]

Next, we turn to estimate the effect on new tax liens, a proxy for post-winning firm delinquency (see more details about the variable definition in Appendix A). Figure 2 shows that the greater the bonus the larger the negative impact on the probability of receiving a tax lien. Similar as before, the shock effect remains significant five years post-winning. Column 2 in Panel A of Table 4 reports the estimates three years following the shock. A one standard deviation increase in the winning ticket bonus leads to a reduction of 2 percentage points in the probability of getting a tax lien, a change of 40% relative to the mean (0.05). In addition, Column 3 shows no effect on the winning bonus on corporate bankruptcy, since none of the retailers file for corporate bankruptcy during the sample period. These findings, beginning in the first-year post-winning, provide suggestive evidence that the greater the winning bonus the lower the probability of post-winning delinquency. Finally, we consider the effects on real properties, as proxy for firm real investment. Both Figure 3 and the estimates in Table 4 Column 4 show that the winning ticket bonus has no effect on real properties purchases.

The evidence so far is inconsistent with the hypothesis of deteriorating credit behavior. However, it could be the case that the owners of these businesses are those facing financial distress rather than the retailer following the jackpot shock. For example, if the business is in distress and the owner is a sole proprietor, the individual can file for personal bankruptcy (either for Chapter 13 or Chapter 7 bankruptcy protection). Thus, we now proceed to look at the impact of the winning ticket bonus on potential deteriorating credit behavior at the owners' level. We start by estimating, equation (2), the effect of the average winning bonus (i.e., winning ticket bonus divided by the number of owners) on UCC loans. Column 1 in

Panel B of Table 4 shows that the impact of the bonus is small and imprecise for UCC loans. Columns 2 and 3 show similar results for tax liens and personal bankruptcy, respectively. Interestingly, Column 4 reports that the bonus has a positive effect on the likelihood of acquiring a real property, as proxy for owner real investment. A potential concern is that the power of the tests is insufficient to find a significant effect of the winning bonus on owners' outcomes. However, the positive and significant effect on real properties shows that the tests on owners' outcomes do have power.

Overall, the evidence at the retailer and owner level do not support the deteriorating credit behavior channel.

4.3.2 Retirement after Receiving the Winning Ticket Bonus

A second explanation for the estimated effects is that the larger winning ticket bonus leads retail' owners to retire and thus, this translates into negative effects on survival rates. For example, [Imbens et al. \(2001\)](#) find at the individual level, that unearned income reduces labor earnings.¹⁰ To test for this hypothesis, we exploit the cross-sectional difference in age at the time of the jackpot shock for those owners for whom age data from LN is available. In particular, we augment specification (2) with additional explanatory variables. First, we consider age by including an indicator for whether the owner's age is above the sample median (50 years), and we also interact the age dummy with the treatment variable ($\ln(Bonus)$). The coefficient of interest is the one from the interaction term. The results are reported in Table 5. Column 1 shows that for owners with ages above the sample median, the winning bonus increases the probability of survival. Next, we test the interaction effect with a dummy for owners of ages greater than 60. Column 2 shows that the coefficient of the interaction term is even larger. Consistent with the previous estimates, in Column 3, we find similar results if the indicator variable is equal to 1 for owners with ages greater than 65 (i.e., retirement age). Thus, the evidence is inconsistent with the hypothesis that the negative effects on survival

¹⁰However, [Cesarini et al. \(2017\)](#) find only a modest reduction in labor earnings from wealth shock in Sweden.

are driven by retail' owners retiring.

[INSERT TABLE 5 HERE]

Overall, the evidence does not support the explanations that the greater the winning ticket bonus the more financial distress (both at the retailer and owner level) or that owners are more likely to retire following these shocks. Then, what is the explanation for the documented findings? In the next section, we test for a newly proposed explanation: small business owners are more likely to start a new business with larger amounts of the firms' cash flow windfalls.

5 Winning Ticket Bonus and Starting New Businesses

To explore other interpretations that could explain the negative relationship between firm survival and the cash windfall, we next consider other economic behaviors of the retail owners that may result in the retailer closure. We start by looking at how the winning ticket bonus affects the likelihood of starting new businesses. The new businesses may be more profitable than convenience stores, may be where the owners' true passions reside (Hurst and Pugsley, 2011), or may require the (busy) owners' full attention, all of which could lead to owners who start the new ventures closing down (or selling) their prior businesses. If the owners are more likely to start new businesses after receiving a larger amount of winning ticket bonus and subsequently to close down their current business, we would observe a negative relationship between the retailer survival and the amount of the winning ticket bonus.

To determine new business creation, we identify which owners file for a "doing business as" (DBA), apply for a business license, form a limited liability company (LLC), or register a corporation following the winning ticket bonus shock. Business creation data were obtained from LN. Using this procedure, we find that 12.43% of owners create a new business five years following the jackpot shock and in total 22 business were created during the sample period. Moreover, most of these new businesses are currently open (20 out of 22).

Figure 4 shows the results for the likelihood of starting new businesses five years following the jackpot shock. This figure depicts that the effect becomes significant two years after the cash windfall and remains large and significant at least for five years post-winning.

[INSERT FIGURE 4 HERE]

Table 6 presents the estimates after three years following the bonus shock. Recall that the average winning bonus variable is standardized. Column 1 presents estimates from the specification without any control or fixed effects. As Column 1 shows, a one standard deviation increase in the average bonus increases the probability of starting new businesses in 4.4 percentage points, a change of 36.67% from the mean business creation (0.12). Column 2 includes fixed effects for the game and the year of winning. The results are similar. Column 3 adds control for retailers and neighborhood characteristics. Again, the point estimate is quite similar.

[INSERT TABLE 6 HERE]

The new businesses do not seem to be simply substitutes of the current businesses at a different location or another form of business expansion such as increasing the number of stores owned rather than store sizes. Table 7 reports the types of businesses that are started three years after receiving the winning ticket bonuses. First, we see that only a small percentage of all new businesses are in the same category —16% if we only consider convenience stores as being in the same category, 32% if we consider a broader category which includes both convenience stores and grocery stores. More importantly, we see a wide variety in the new businesses started, ranging from eateries (26%) and real estate services (16%) to repair services (16%), among others. The choice of the types of new businesses could be driven by a combination of factors, such as diversification within entrepreneurial portfolios, expertise in specific fields (e.g. automotive repair, home maintenance, etc.), non-pecuniary preferences for specific lines of business (e.g. opening a restaurant to pursue a long-term

passion for cooking), or for greater economic profits. Finally, 52% of the new businesses correspond to a retailer closure.

[INSERT TABLE 7 HERE]

Given that not all the new businesses that were started are from owners who closed their retail outlet, we estimate a multinomial model to study the choices of remaining open (or exiting) and starting a new firm (or not starting). In particular, we estimate a multinomial response model in which the choices are between the following: 1) close retailer and do not start a new business, 2) close retailer and do start a new business, 3) keep current retailer open and do not start a new business, and 4) keep current retailer open and do start a new business. Assuming that the error term in the model is type I extreme value distributed, this assumption yields the multinomial logit model which can be estimated by maximum likelihood.

We regress the described choices on the average of the winning ticket bonus per owner and other controls. The standard errors are clustered at the retailer level. The first category (close retailer and do not open a new business) is the base category. Table 8 Panel A reports the results. All the coefficients of the winning bonus are significant. However, we perform a joint test of the significance of the winning ticket bonus, since the individual test results depend on the omitted category, through a Wald test we find that the bonus is statistically significant (p -value=0.0003 of the Wald test). In terms of the coefficient interpretation, Column 1 shows that an increase in the average bonus leads to an increase in the probability of closing the current retailer and opening a new business, relative to the base category. We also report the marginal effects at the mean of a change in the winning bonus on the probability that a specific alternative is the outcome. Table 8 Panel B reports the estimates. Column 1 shows that a one standard deviation increase in the average winning bonus increases by 0.078 the probability of closing the current retailer and opening a new business rather than closing and doing nothing else, remaining open and starting a new business, and remaining open and not beginning a new business. Column 2 shows that with an increase in the bonus, owners

are more likely to keep the retailer open and start a new firm relative to the other options. Interestingly, Column 3 shows that with an increase in the bonus, the owners are less likely to remain open and do not start new businesses.

[INSERT TABLE 8 HERE]

5.1 Potential Interpretation

If the substantial heterogeneity of new businesses is driven by expertise in specific fields or non-pecuniary preferences for specific types of businesses, a natural question would be: What has prevented these owners from starting the new businesses in the past?

One interpretation relates to financial constraints. [Blanchflower and Oswald \(1998\)](#) provide survey evidence that aspiring and current entrepreneurs consider the lack of capital or money to be the principal reason that prevents them from starting and growing businesses. Past literature also shows that liquidity constraints or insufficient funds reduce the probability of individuals becoming entrepreneurs ([Evans and Jovanovic, 1989](#); [Evans and Leighton, 1989](#)). In our setting, small business owners may be financially constrained and only have restricted access to capital, which may put constraints on the opportunity set of the types of businesses they are able to start or to develop and prevent them from entering businesses for which they have expertise or non-pecuniary preferences.

Another interpretation relates to mental accounting. The investment choices or the decisions of whether to start a new business may vary with the source of funding. In other words, small business owners may value a dollar differently when it is earned through work, financed through credit, or given to them (as a cash windfall). Even though small business owners have access to credit or other types of external funding, they may be more risk averse with borrowed capital than with a cash windfall. In a survey run by the NFIB Research Foundation in 2003, when small business owners were asked what they would like to do supposing they had a high-growth opportunity to make an investment that allows earnings to rise 25% within the next two years with minimal risk, only 48% of respondents chose to borrow the

money and make the investment, while a large group of respondents (42%) still wanted to wait until they had accumulated enough cash to make the investment.

To examine these hypotheses, we construct two proxies for financial constraints: 1) the income level of the ZIP code where the retail owner resides; and 2) whether the retail owner is a homeowner or not before the shock (Adelino et al., 2015; Schmalz et al., 2017).¹¹ We interact the treatment intensity (log of the average winning ticket bonus after taxes per owner) with two indicators for owners with fewer financial constraints: 1) the owner resides in a ZIP code with an income above the sample median; and 2) the owner is a homeowner before the shock. The results in Table 9 support the financial constraint interpretation. As Columns 1 and 2 show, the interaction term is negative and statistically significant, and the relationship between starting a new business and the amount of the cash windfall is much weaker for retail owners with fewer financial constraints. In addition, if we add up the interaction term and the main effect on the log of the average winning ticket bonus, the relationship between starting a new business and the amount of cash windfall is close to zero for owners with fewer financial constraints, which suggests that the mental accounting interpretation might not be present here; otherwise, we would expect a weaker but still positive relationship for retail owners with fewer financial constraints.

[INSERT TABLE 9 HERE]

6 Internal Growth: Revenues and Employment

To estimate the effect of shocks to internal resources on revenues and employment, we calculate the revenue and employment growth for surviving firms in the sample by subtracting the log of one plus revenue (number of employees) the year before selling the jackpot winning ticket from the log of one plus the respective revenue (number of employees) year. We

¹¹Since owners' income data are not available, we use median income of the ZIP code where the owner resides.

regress revenues growth, and employment, on the winning ticket bonuses with firm controls. Figure 5 and Table 10 present the estimates.

Figure 5 shows that a greater winning bonus leads to a positive and significant increase in revenues and number of employees following one year of the jackpot shock. Interestingly, the fact that the winning bonus leads to an increase in sales, and employees, after the second post-winning year (Year 1) further supports the notion that our estimates are from the winning bonus and not the lucky store effect. This is because the “lucky store effect” dissipates in less than a year, and also since we exploit the intensity of treatment. Finally, Figure 5 shows that the employment and sales have an economically significant effect for the first five post-winning years.

[INSERT FIGURE 5 HERE]

Table 10 reports the estimates three years following the jackpot shock. Column 1 of Panel A presents the estimates from the specification (1) on sales. A one standard deviation increase in the winning bonus leads to an increase in revenues of 27.9 percentage points. Column 1 of Panel B reports the results for employment growth. A one standard deviation in the winning bonus increases employment by 14.4 percentage points. We also regress the log of one plus the current revenues on the log of the bonus. Column 3 of Panel A presents the standardized results, whereas Column 4 includes pre-treatment characteristics. A one standard deviation increase in the winning bonus increases the revenues 14.9%, which implies an elasticity of 0.109 (i.e., point estimate without the standardization). This suggests that revenues increase by \$36,561 for every \$100,000 of additional internal firm resources, calculated at the sample averages.

[INSERT TABLE 10 HERE]

In terms of employment, Column 2 of Panel B shows that a one standard deviation increase in the winning bonus raises the number of employees 17.1%. Moreover, the effect

without the standardization is 0.128. This elasticity implies that the number of employees increases by 0.87 for every \$100,000 of additional internal firm resources.

Overall, these findings suggest that financial constraints may have restricted the internal growth of these retail stores.

7 Discussion

This findings in this paper raise the interesting question of whether survival of an owner's current business can imply failure. One potential interpretation of our results is that many owners, upon receiving a cash windfall, may have executed a planned exit strategy, closed a business without excessive debt, or sold a viable business. As partial support for this interpretation, we find: 1) the effect of a winning bonus on closure appears two years following the jackpot shock, which coincides with the average time that small business owners need to sell their business; 2) a large winning bonus has a negative impact on a firm's secured debt; and 3) in untabulated results for the subset of retailers with ownership information, we find that a winning bonus has a positive effect on the probability of a change of ownership, as proxy for a business sale. Thus, our findings are consistent with the closure of retailers as an exit route for the owners, who are potentially reallocating their skills to new firms that better fit their preferences, provide higher non-pecuniary benefits, or enable higher profits.

Why choose a new business industry? As previously mentioned, the owner's choice may be driven by various motives. In particular, we look at the potential profitability of the new industries relative to the retailer industry. In general, the new business industries have higher net profit margins than retail stores. According to the statistics collected by Sageworks, the net profit margin for grocery stores is 2.85%, which is among the lowest 10 profitable industries in the U.S. In contrast, the net profit margins for the new business industries identified in our sample are much higher—for example, 6.1% for eateries, 6.74% for transportation services, 7.19% for house construction, and 15.2% for real estate services. Even though this evidence does not rule out the non-pecuniary benefits hypothesis, it seems that profitability

was a strong driver of the retail owners' decisions regarding new business.

The finding that financial constraints appear to drive new business creation suggests that external financing is important for firm owners in the context of starting new businesses. In contrast, the literature has mostly highlighted the importance of capital for aspiring entrepreneurs or for the growth of an existing business. In addition, the new business industries in our sample tend to have higher barriers to entry than grocery stores. According to Kauffman Firm Survey Data, the startup capital required for the new business industries are much higher than that for grocery stores. For example, the startup capital required for real estate services is about 2.5 times as much as for grocery stores and for eateries and transportation services, the startup capital is twice that ration, at 5 times higher than for grocery stores; the only exception is construction, which requires about 70% of the startup capital needed to startup grocery stores. CreditDonkey.com also considers other dimensions related to the barrier to entry, such as tax complexity and government regulation, market competition, and employment challenges. For these dimensions, construction is the only industry among all new businesses with lower barrier to entry than grocery stores. An implication of these findings is that liquidity constraints may limit the set of new business choices available to an entrepreneur, thus potentially resulting in a misallocation of human capital.

8 Conclusion

In this paper, we provide evidence on the impact of firms' internal resources on the survival and other economic behaviors of small businesses and their owners. To this end, we use a novel source of variation in firms' cash flow, exploiting the amount of the bonus that retailers earn when they sell jackpot winning tickets. We find support for the identifying assumption of the empirical design, where conditional on selling a jackpot winning ticket, the winning bonus is randomly assigned. The estimates show that increases in internal firm resources reduce the probability of firm survival. This evidence is inconsistent with theories of deteriorating credit behavior or owner retirement after receiving the bonus. Our paper highlights a new channel

to explain the negative impact of firms' cash flows on business survival: small business owners are more likely to start a new business when they receive larger cash windfalls. These new firms are generally in industries other than the current business, with higher profit margins and requiring larger startup capital. The results also show that reduced financial constraint is what appears to drive new business creation following a jackpot shock.

The findings of this paper raise the question of whether firm closure (i.e., a firm not surviving) truly implies failure. One interpretation of our findings is that subsequent to a winning bonus, retailer owners closed (or sold) their viable business, and that this closure allowed an exit route for the owners to enter other industries and create new firms.

Our results also suggest that, individuals might have entered the retail industry as an optimal choice given their initial financial constraints, and that they were deterred from entering other businesses which could have produced higher net profit margins and potentially better suitability for their expertise or personal interests. Once the financial constraints are relaxed, individuals would choose to start new ventures and move towards their new optimal choice, which result in great variability in the types of new businesses. Prior literature emphasizes how financial constraints have a large impact on deterring individuals from becoming entrepreneurs; we contribute to the literature by providing evidence that financial constraints may also affect an individual's choice of the type of businesses to open and might also have implications for the (mis)allocation of talent.

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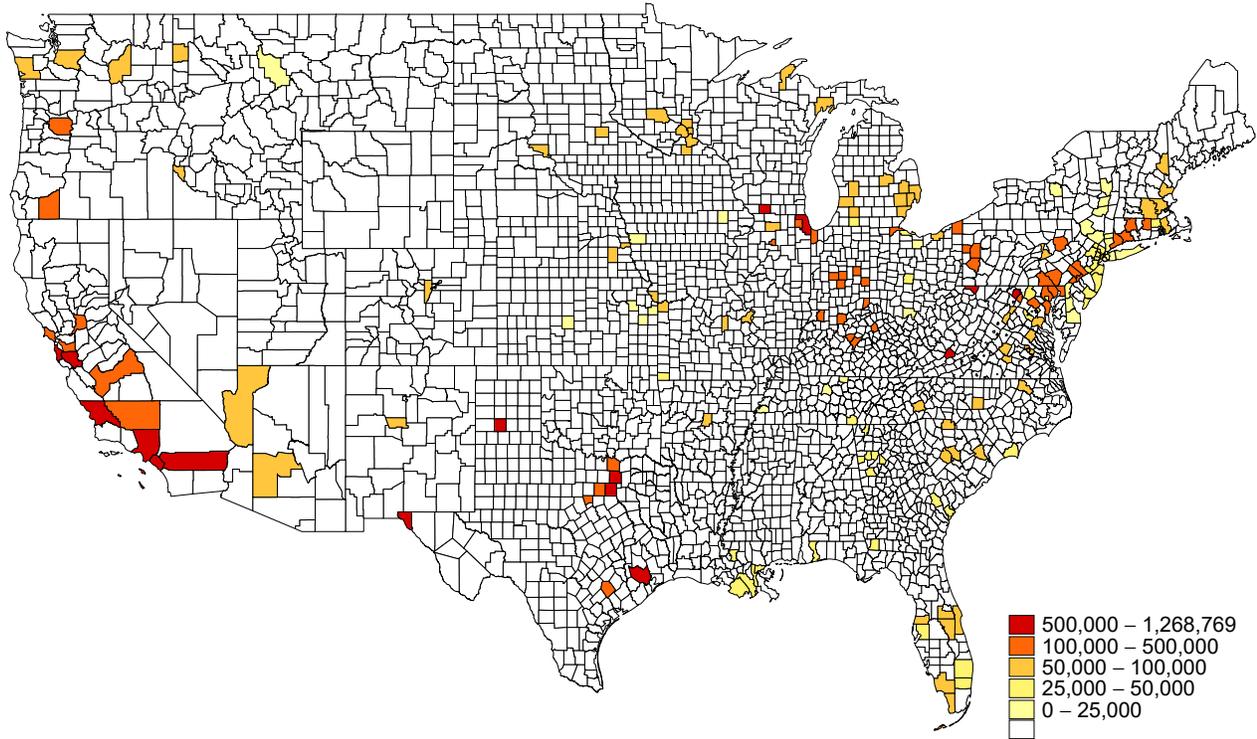


Figure 1. Retailers that Sold Mega Millions and Powerball Jackpot Winning Tickets by County, 2002-2016

This figure depicts the counties in which retailers sold Mega Millions or Powerball jackpot winning tickets during the period 2002–2016. Lotteries are established in 44 states. The areas highlighted are the treated counties where at least one retailer received a bonus for selling a jackpot winning ticket in the sample period. In the instances in which a county had more than one jackpot winner, the figure shows the maximum winning ticket bonus. State lotteries offer bonuses to retailers that sell jackpot winning tickets, which can be a percentage of the prize, usually with a cap on the bonus. For example, Texas pays retailers a bonus of 1% of the prize up to \$1 million, some states pay a flat bonus (e.g., \$50,000), and there are a few states, such as Maine, that do not provide a bonus for selling a winning ticket. All monetary values are expressed in real 2016 dollars.

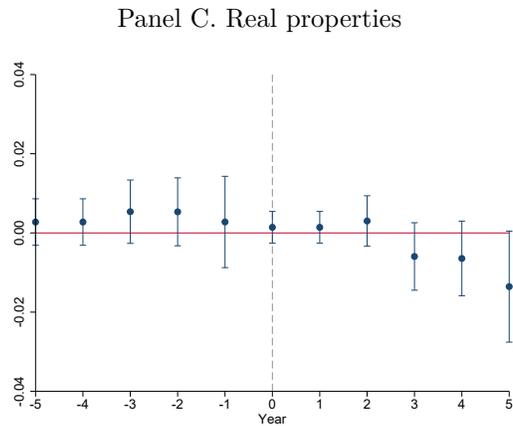
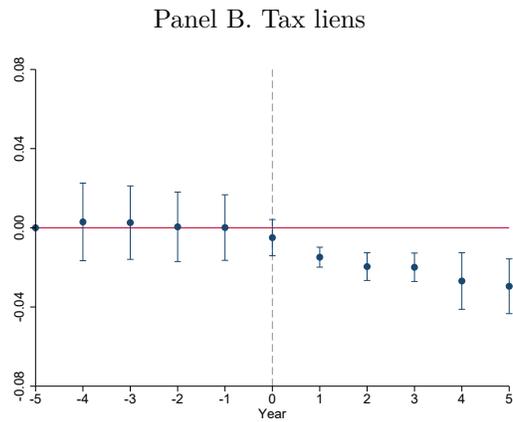
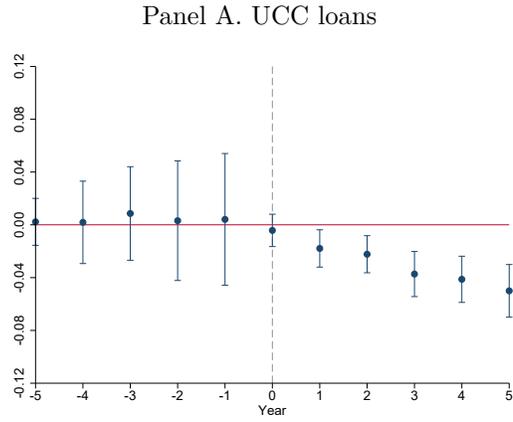


Figure 2. Effect of the Winning Ticket Bonus on Other Firms' Outcomes

These figures show the effect of receiving a bonus for selling a winning ticket on having Uniform Commercial Code (UCC) loans, tax liens, and real properties. The independent variable is $\ln(\text{Bonus})$, which is the commission that retailers receive after taxes for selling a jackpot winning ticket after taxes. Panel A reports the estimates prior and after the jackpot shock on an indicator for the retailer having a UCC secured loan in or before the indicated year. Panel B presents the estimates prior and after the shock on an indicator for the retailer having a tax lien placed against its property in or before the indicated year. Panel C shows the estimates prior and after the shock on an indicator for the retailer having a real property. Year 0 indicates the year when a retailer receives the bonus. All monetary values are expressed in real 2016 dollars, and continuous variables are standardized. All specifications include pre-treatment characteristics at the retailer level, game and year of winning fixed effects. Standard errors are heteroskedasticity-robust and clustered at state level.

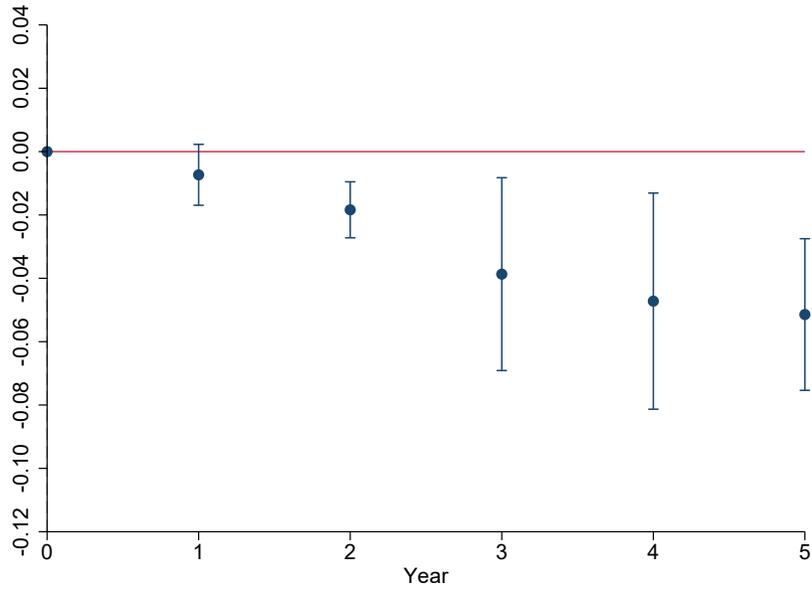


Figure 3. Effect of the Winning Ticket Bonus on Firm Survival

This figure shows the effect of receiving a bonus for selling a winning ticket on firm survival. The dependent variable for each regression is an indicator for survival in or before the specified year. The independent variable is $\ln(Bonus)$, which is the bonus that retailers receive after taxes for selling a jackpot winning ticket. Year 0 indicates the year when a retailer receives the bonus. All monetary values are expressed in real 2016 dollars, and $\ln(Bonus)$ is standardized. All specifications include pre-treatment characteristics at the retailer level, game and year of winning fixed effects. Standard errors are heteroskedasticity-robust and clustered at state level.

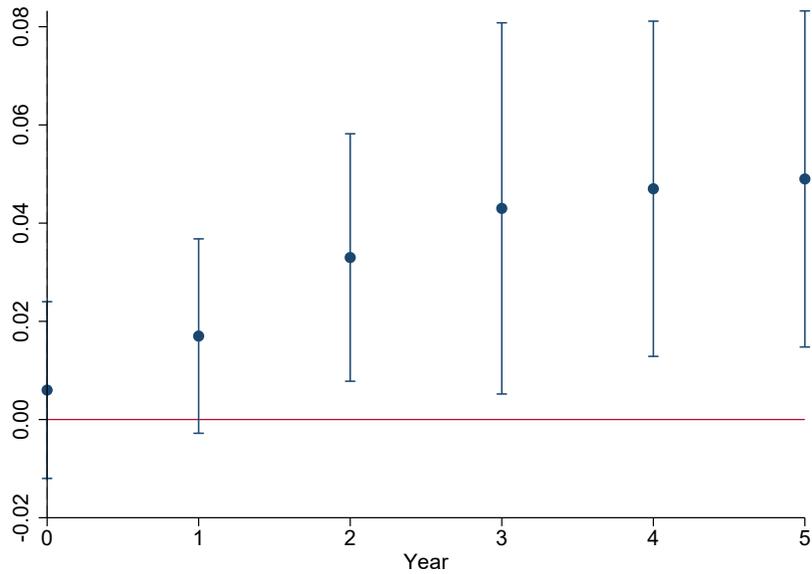


Figure 4. Effect of the Winning Ticket Bonus on Starting a New Business

This figure shows the effect of receiving a bonus for selling a winning ticket on starting a new business. The dependent variable for each regression is an indicator variable equal to one if the owner files for a “doing business as” (DBA), files for a business license, forms a limited liability company (LLC), or registers a corporation in or before the specified year. The independent variable is $\ln(Avg\ bonus)$ which is the amount in U.S. dollars that retailers receive for selling a jackpot winning ticket divided by the number of owners per store. Year 0 indicates the year when a retailer receives the bonus. All monetary values are expressed in real 2016 dollars, and $\ln(Avg\ bonus)$ is standardized. All specifications include pre-treatment characteristics at the owner level, game and year of winning fixed effects. Standard errors are heteroskedasticity-robust and clustered at retailer level.

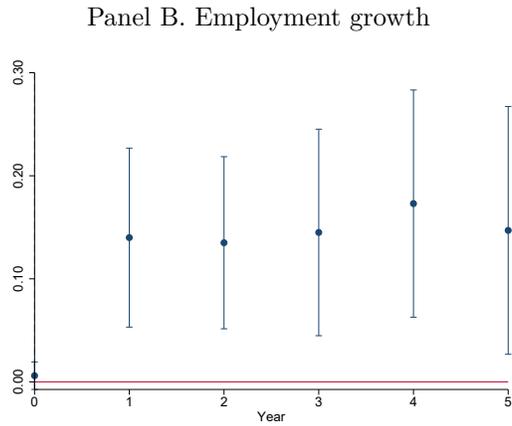
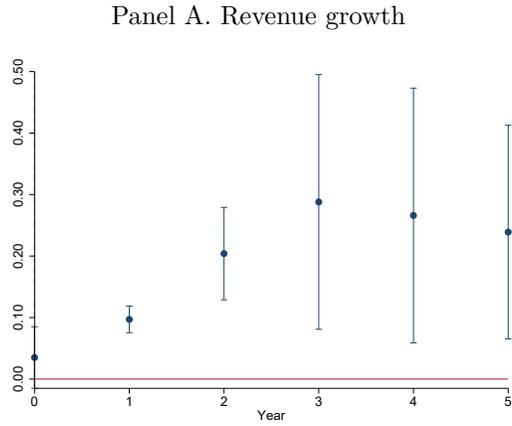


Figure 5. Effect of the Winning Ticket Bonus on Revenues and Employment

These figures show the effect of receiving a bonus for selling a winning ticket on revenues and number of employees. The independent variable is $\ln(Bonus)$, which is the commission that retailers receive after taxes for selling a jackpot winning ticket. Panel A reports the estimates of the effect of receiving a bonus on the revenue growth from one year before the shock to the indicated year after the shock. Panel B depicts the estimates of the effect of receiving a bonus on the growth in number of employees from one year before the shock to the indicated year after the shock. Year 0 indicates the year when a retailer receives the bonus. All specifications include pre-treatment characteristics at the retailer level, game and year of winning fixed effects. Standard errors are heteroskedasticity-robust and clustered at state level.

Table 1. Summary Statistics

This table reports summary statistics for the sample of retailers that sold Mega Millions or Powerball jackpot winning tickets between 2002 and 2016. The retailer and bonus datasets come from different public sources and are complemented with information collected from discussions with representatives from 39 state lotteries. The retailer covariates and outcomes come from Lexis Nexis Public Records (LN) and Dun and Bradstreet (D&B) and are complemented with local level data from the 2000 Census. The dataset contains 292 jackpot retailers that sold jackpot winning tickets in the sample period. For a subset of retailers (93), LN provides owner’s information (196 owners). *Prize* is the amount in U.S. dollars of the jackpot prize. *Bonus* is the amount in U.S. dollars that retailers receive for selling a jackpot winning ticket. The pre-treatment characteristics are: *Number of connected stores* is the number of other locations that the firm has, *UCC loans* is an indicator for whether the retailer ever had a secured debt Uniform Commercial Code (UCC) filing prior to receiving the bonus, *Real properties* is an indicator variable for whether the retailer owned a real property prior to receiving the bonus, and *Tax liens* is an indicator variable for whether the retailer had any history of tax liens before the shock. Outcomes variables are measured five years following the jackpot shock. *Retailer closed* is an indicator variable equal to one if the retailer is reported as closed. We identify a retailer as closed if it meets the following criteria: (1) the establishment is not matched to a D&B retailer by the Optimizer program and (2) the firm is reported as inactive or dissolved by public records. *Start new business ex-post* is an indicator variable equal to one if the owner files for a “doing business as” (DBA), files for a business license, forms a limited liability company (LLC), or registers a corporation. *Corporate bankruptcy* is an indicator variable equal to one if the business files for bankruptcy protection. *Personal bankruptcy* ex-post is an indicator variable equal to one if the owner files for personal bankruptcy protection. All monetary values are expressed in real 2016 dollars.

| Panel A: retailers | | | |
|--|------------|--------------------|-----------|
| Variable | Mean | Standard deviation | Median |
| | (1) | (2) | (3) |
| Prize (thousands) | 155,382.13 | 181,801.64 | 105,132.4 |
| Bonus (thousands) | 151.70 | 261.28 | 55.67 |
| Number of retailers that sold a jackpot winning ticket | 292 | - | - |
| Number of states affected by the shocks | 39 | - | - |
| Number of counties affected by the shocks | 200 | - | - |
| <i>Pre-treatment characteristics at retailers’ level</i> | | | |
| Number of years in business | 9.98 | 10.05 | 10 |
| Number of connected stores | 0.70 | 1.78 | 0 |
| Average sales (thousands) | 477.49 | 646.67 | 361.42 |
| Average employees | 7.66 | 13.59 | 5 |
| UCC loans | 0.29 | 0.46 | - |
| Real properties | 0.11 | 0.31 | - |
| Tax liens | 0.08 | 0.26 | - |
| Percentage population college degree (ZIP code) | 14.99 | 7.98 | 13.45 |
| Population (thousands, ZIP code) | 9.83 | 6.67 | 9.22 |
| Median income (thousands, ZIP code) | 55.38 | 15.93 | 52.72 |
| <i>Outcomes at the retailers’ level</i> | | | |
| Retailer closed | 0.10 | 0.23 | - |
| Average sales ex-post (thousands) | 508.85 | 694.17 | 396.04 |
| Average employees ex-post | 8.24 | 16.51 | 6 |
| UCC loans ex-post | 0.12 | 0.32 | - |
| Real properties ex-post | 0.04 | 0.20 | - |
| Tax liens ex-post | 0.05 | 0.21 | - |
| Corporate bankruptcy | 0.00 | 0.00 | - |

Table 1 (Continued)

| Panel B: owners | | | |
|---|-------|--------------------|--------|
| Variable | Mean | Standard deviation | Median |
| | (1) | (2) | (3) |
| <i>Pre-treatment characteristics at owners' level</i> | | | |
| Median income (thousands, ZIP code) | 68.05 | 28.84 | 62 |
| Age | 49.52 | 13.55 | 50 |
| Number of years as owner | 9.44 | 10.79 | 10 |
| Male | 0.75 | 0.43 | - |
| UCC loans | 0.31 | 0.46 | - |
| Real properties | 0.33 | 0.47 | - |
| Tax liens | 0.09 | 0.28 | - |
| <i>Outcomes at owners' level</i> | | | |
| UCC loans ex-post | 0.13 | 0.34 | - |
| Real properties ex-post | 0.17 | 0.37 | - |
| Start a new business ex-post | 0.12 | 0.19 | - |
| Tax liens ex-post | 0.07 | 0.25 | - |
| Personal bankruptcy ex-post | 0.03 | 0.18 | - |

Table 2. Test of Randomization

This table reports reduced form results testing the random assignment of the winning jackpot bonus. $\ln(\text{Bonus})$ is the amount in U.S. dollars that retailers receive after taxes for selling a jackpot winning ticket. Columns 1-2 report estimates from an OLS regression of $\ln(\text{Bonus})$ on the variables listed and year of winning and game fixed effects. All monetary values are expressed in real 2016 dollars. Continuous variables are standardized. The p-value is for an F-test of the joint significance of the variables listed in the rows. Standard errors are heteroskedasticity-robust and clustered at state level. Significance levels 10%, 5%, and 1% are denoted by *, **, and ***, respectively.

| Dependent variable | ln (Bonus) | |
|---|-------------------|-------------------|
| | (1) | (2) |
| Number of years in business | 0.010 (0.007) | 0.011 (0.008) |
| Number of connected stores | -0.003 (0.030) | -0.003 (0.034) |
| UCC loans ex-ante | -0.009 (0.222) | 0.002 (0.233) |
| Real properties ex-ante | -0.004 (0.411) | 0.003 (0.406) |
| Tax liens ex-ante | 0.022 (0.432) | 0.008 (0.444) |
| Percentage population college degree (ZIP code) | | -0.012 (0.011) |
| ln (Population ZIP code) | | 0.045 (0.135) |
| ln (Median income ZIP code) | | 0.109 (0.089) |
| Joint F-Test | [0.483] | [0.206] |
| Year FE | Y | Y |
| Game FE | Y | Y |
| Observations | 292 | 292 |
| R-squared | 0.044 | 0.053 |

Table 3. Effect of the Winning Ticket Bonus on Firm Survival

This table reports the estimates of the effect of receiving a bonus for selling a winning ticket on firm survival. *Survival* is an indicator variable equal to one if the retailer remains open three years after receiving the winning ticket bonus. $\ln(\text{Bonus})$ is the amount in U.S. dollars that retailers receive after taxes for selling a jackpot winning ticket. We identify a retailer as surviving if it meets the following criteria: 1) the establishment is matched to a D&B retailer by the Optimizer program and 2) the firm is reported as active by public records. We also check whether the establishment remains open using Yelp and Google. Column 1 presents the estimate for the main specification without any control or fixed effects. Columns 2–4 include year of winning and game fixed effects. Column 3 includes pre-treatment characteristics at the retailer level, and Column 4 also includes pre-treatment characteristics at the ZIP code level based on retailer location. All monetary values are expressed in real 2016 dollars. Continuous variables are standardized. Standard errors are heteroskedasticity-robust and clustered at state level. Significance levels 10%, 5%, and 1% are denoted by *, **, and ***, respectively.

| Dependent variable | Survival | | | |
|---|---------------------|---------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) |
| $\ln(\text{Bonus})$ | -0.040** (0.018) | -0.037** (0.017) | -0.037** (0.016) | -0.037** (0.015) |
| $\ln(\text{Prize})$ | | | -0.013* (0.008) | -0.014* (0.008) |
| Number of years in business | | | 0.001 (0.001) | 0.001 (0.001) |
| Number of connected stores | | | 0.009 (0.007) | 0.008 (0.007) |
| UCC loans ex-ante | | | -0.005 (0.037) | -0.008 (0.034) |
| Real properties ex-ante | | | 0.061*** (0.017) | 0.062*** (0.018) |
| Tax liens ex-ante | | | -0.067 (0.066) | -0.058 (0.068) |
| Percentage population college degree (ZIP code) | | | | -0.002 (0.002) |
| $\ln(\text{Population ZIP code})$ | | | | -0.018 (0.010) |
| $\ln(\text{Income ZIP code})$ | | | | 0.026** (0.013) |
| Year FE | N | Y | Y | Y |
| Game FE | N | Y | Y | Y |
| Observations | 280 | 280 | 280 | 280 |
| R-squared | 0.029 | 0.086 | 0.105 | 0.114 |

Table 4. Effect of the Winning Ticket Bonus on Other Firms' and Owners' Outcomes

This table reports the effect of receiving a bonus for selling a winning ticket on having Uniform Commercial Code (UCC) loans, tax liens, bankruptcy, and real properties. $\ln(\text{Bonus})$ is the amount in U.S. dollars that retailers receive after taxes for selling a jackpot winning ticket. $\ln(\text{Avg bonus})$ is the winning ticket bonus divided by the number of owners per store. Panel A reports the estimates of the effect of the winning ticket bonus on retailers' outcomes. Panel B reports the results of the impact of the average winning bonus on owners' outcomes. Column 1 of Panel A reports the estimates for the retailer having a UCC secured loan three years following the bonus shock. Column 2 presents the estimates on an indicator variable for the retailer having a tax lien three years after the shock. Column 3 reports the estimates on an indicator variable for the retailer filing for corporate bankruptcy. Column 4 shows the estimates on an indicator variable for the retailer having a new real property three years after the shock. Column 1 of Panel B reports the estimates for the owner having a UCC secured loan three years following the bonus shock. Column 2 presents the estimates on an indicator variable for the owner having a tax lien three years after the shock. Column 3 shows the estimates on an indicator variable for the owner filing for personal bankruptcy. Column 4 shows the estimates on an indicator variable for the owner having a new real property three years after the shock. All monetary values are expressed in real 2016 dollars. Continuous variables are standardized. Controls include number of years in business, number of connected stores, UCC loans ex-ante, real properties ex-ante, tax liens ex-ante, percentage of population with college degree (ZIP code), $\ln(\text{Population ZIP code})$, and $\ln(\text{Income ZIP code})$. All specifications control for game and year of winning fixed effects. Standard errors in Panel A are heteroskedasticity-robust and clustered at state level, and in Panel B are heteroskedasticity-robust and clustered at retailer level. Significance levels 10%, 5%, and 1% are denoted by *, **, and ***, respectively.

| Panel A: retailers | | | | |
|-------------------------|----------------------|----------------------|----------------------|--------------------|
| Dependent variable | UCC Loans | Tax liens | Corporate bankruptcy | Real properties |
| | (1) | (2) | (3) | (4) |
| $\ln(\text{Bonus})$ | -0.037*** (0.009) | -0.020*** (0.004) | 0.000 (0.000) | -0.006 (0.004) |
| Controls | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y |
| Game FE | Y | Y | Y | Y |
| Observations | 280 | 280 | 280 | 280 |
| R-squared | 0.067 | 0.060 | 0.000 | 0.073 |
| Panel B: owners | | | | |
| Dependent variable | UCC loans | Tax liens | Personal bankruptcy | Real properties |
| | (1) | (2) | (3) | (4) |
| $\ln(\text{Avg bonus})$ | 0.007 (0.024) | -0.004 (0.016) | 0.021 (0.018) | 0.055** (0.026) |
| Controls | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y |
| Game FE | Y | Y | Y | Y |
| Observations | 177 | 177 | 177 | 177 |
| R-squared | 0.221 | 0.066 | 0.088 | 0.193 |

Table 5. Firm Survival and Owners' Age

This table reports the estimates of the effect of receiving a bonus for selling a winning ticket on firm survival for different age groups of owners. *Survival* is an indicator variable equal to one if the retailer remains open three years after receiving the bonus. $\ln(\text{Avg bonus})$ is the amount in U.S. dollars that retailers receive for selling a jackpot winning ticket divided by the number of owners per store. *Age* is an indicator variable equal to one if owner age is above the sample median. *Age > 60* is an indicator variable equal to one if owner age is above 60. *Age > 65* is an indicator variable equal to one if owner age is above 65. All monetary values are expressed in real 2016 dollars. Continuous variables are standardized. Controls include number of years in business, number of connected stores, UCC loans ex-ante, real properties ex-ante, tax liens ex-ante, percentage of population with college degree (ZIP code), $\ln(\text{Population ZIP code})$, and $\ln(\text{Income ZIP code})$. All specifications control for game and year of winning fixed effects. Standard errors are heteroskedasticity-robust and clustered at retailer level. Significance levels 10%, 5%, and 1% are denoted by *, **, and ***, respectively.

| Dependent variable | Survival | | |
|--|----------------------|----------------------|-------------------|
| | (1) | (2) | (3) |
| $\ln(\text{Avg bonus})$ | -0.132*** (0.035) | -0.059*** (0.020) | -0.035 (0.026) |
| Age (=1: age > median; =0: otherwise) | 0.028 (0.041) | | |
| $\ln(\text{Avg bonus}) \times \text{age}$ | 0.002** (0.001) | | |
| Age > 60 (=1: age > 60; =0: otherwise) | | -0.041 (0.066) | |
| $\ln(\text{Avg bonus}) \times \text{age} > 60$ | | 0.103** (0.039) | |
| Age > 65 (=1: age > 65; =0: otherwise) | | | 0.027 (0.017) |
| $\ln(\text{Avg bonus}) \times \text{age} > 65$ | | | 0.051* (0.026) |
| Controls | Y | Y | Y |
| Year FE | Y | Y | Y |
| Game FE | Y | Y | Y |
| Observations | 148 | 148 | 148 |
| R-squared | 0.153 | 0.188 | 0.140 |

Table 6. Effect of the Winning Ticket Bonus on Starting a New Business

This table reports the estimates of the effect of receiving a bonus for selling a winning ticket on owners starting a new business. $\ln(\text{Avg bonus})$ is the amount in U.S. dollars that retailers receive for selling a jackpot winning ticket divided by the number of owners per store. *Start new business* is an indicator variable equal to one if the owner files for a “doing business as” (DBA), files for a business license, forms a limited liability company (LLC), or registers a corporation. Column 1 presents estimates from the specification without any control or fixed effects. Columns 2–4 include year of winning and game fixed effects. Column 3 includes controls such as: number of years in business, number of connected stores, UCC loans ex-ante, real properties ex-ante, tax liens ex-ante, and $\ln(\text{Income ZIP code})$. All monetary values are expressed in real 2016 dollars. Continuous variables are standardized. Standard errors are heteroskedasticity-robust and clustered at retailer level. Significance levels 10%, 5%, and 1% are denoted by *, **, and ***, respectively.

| Dependent variable | Start new business | | |
|-------------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) |
| $\ln(\text{Avg bonus})$ | 0.044** (0.016) | 0.043** (0.021) | 0.045** (0.020) |
| Controls | N | N | Y |
| Year FE | N | Y | Y |
| Game FE | N | Y | Y |
| Observations | 177 | 177 | 177 |
| R-squared | 0.048 | 0.116 | 0.140 |

Table 7. Types of New Businesses Started after Receiving the Winning Ticket Bonus

This table reports the types of business started after the jackpot shock.

| New lines of business | % |
|-------------------------|----|
| Eateries | 27 |
| Grocery stores | 18 |
| Repair services | 18 |
| Real estate services | 14 |
| Convenience stores | 14 |
| House construction | 5 |
| Transportation services | 5 |

Table 8. Multinomial Logit Estimates of Remaining Open and Starting a New Business

This table reports the estimates of multinomial logit regressions of the effect of receiving a bonus for selling a winning ticket on keeping the current retailer open and starting a new business. The choices are between the following: 1) close current business and do not start a new business, 2) close current business and do start a new business, 3) current business remains open and do not start a new business, and 4) current business remains open and do start a new business. The first category (close retailer and do not open a new business) is the base category. $\ln(\text{Avg bonus})$ is the amount in U.S. dollars that retailers receive for selling a jackpot winning ticket divided by the number of owners per store. Panel A presents the estimates for the multinomial logit and Panel B reports the marginal effects. Continuous variables are standardized. Standard errors are heteroskedasticity-robust and clustered at retailer level. Significance levels 10%, 5%, and 1% are denoted by *, **, and ***, respectively.

| Panel A | Close and Start (1) | Remain Open and Start (2) | Remain Open and Nothing (3) |
|-------------------------|------------------------|------------------------------|--------------------------------|
| $\ln(\text{Avg bonus})$ | 1.679*** (0.571) | 0.810** (0.407) | -0.023** (0.010) |
| Controls | | Y | |
| Observations | | 177 | |
| Log-likelihood | | -128.87 | |
| Pseudo R-squared | | 0.100 | |

| Panel B | Close and Start (1) | Remain Open and Start (2) | Remain Open and Nothing (3) |
|-------------------------|------------------------|------------------------------|--------------------------------|
| $\ln(\text{Avg bonus})$ | 0.078*** (0.027) | 0.044** (0.019) | -0.115*** (0.028) |
| Controls | | Y | |
| Observations | | 177 | |

Table 9. Start a New Business: Cross-sectional Tests

This table reports the effect of the winning bonus for the retail owners on starting a new business three years after the shock. $\ln(\text{Avg bonus})$ is the amount in U.S. dollars that retailers receive for selling a jackpot winning ticket divided by the number of owners per store. *Start new business* is an indicator variable equal to one if the owner files for a “doing business as” (DBA), files for a business license, forms a limited liability company (LLC), or registers a corporation three years after the shock. *High income ZIP code* is an indicator variable equal to 1 if the owner lives in a ZIP code with an income above the sample median. *Homeownership* is an indicator variable equal to one if the retail owner is a homeowner before the shock. *Age* is an indicator variable equal to one if the owner’s age is above the sample median. All monetary values are expressed in real 2016 dollars. Continuous variables are standardized. Controls include number of years in business, number of connected stores, UCC loans ex-ante, real properties ex-ante, tax liens ex-ante, and $\ln(\text{Income ZIP code})$. All specifications control for game and year of winning fixed effects. Standard errors are heteroskedasticity-robust and clustered at retailer level. Significance levels 10%, 5%, and 1% are denoted by *, **, and ***, respectively.

| Dependent variable | Start new business | | |
|---|---------------------|---------------------|--------------------|
| | (1) | (2) | (3) |
| $\ln(\text{Avg bonus})$ | 0.093*** (0.031) | 0.073** (0.027) | 0.086** (0.038) |
| High income ZIP code (=1: ZIP code income > median; =0: otherwise) | -0.021 (0.029) | | |
| $\ln(\text{Avg bonus})$ x high income ZIP code | -0.086** (0.039) | | |
| Homeownership (=1: Yes; =0: No) | | -0.016 (0.042) | |
| $\ln(\text{Avg bonus})$ x homeownership | | -0.069** (0.032) | |
| Age (=1: age > median; =0: otherwise) | | | -0.043 (0.044) |
| $\ln(\text{Avg bonus})$ x age | | | -0.034 (0.060) |
| Controls | Y | Y | Y |
| Year FE | Y | Y | Y |
| Game FE | Y | Y | Y |
| Observations | 177 | 177 | 148 |
| R-squared | 0.101 | 0.082 | 0.103 |

Table 10. Effect of the Winning Ticket Bonus on Revenues and Employment

This table reports the estimates of the effect of receiving a bonus for selling a winning ticket on revenues and number of employees. $\ln(\text{Bonus})$ is the amount in U.S. dollars that retailers receive after taxes for selling a jackpot winning ticket. *Revenue Growth* measures the revenue growth from one year before the shock to three years after receiving the winning ticket bonus. $\ln(\text{Revenue})$ is the log of one plus the revenues three years after receiving the winning ticket bonus. *Employee Growth* measures the growth in number of employees from one year before the shock to three years after receiving the winning ticket bonus. $\ln(\text{Employees})$ is the log of one plus the number of employees years after receiving the winning ticket bonus. All monetary values are expressed in real 2016 dollars. Continuous variables are standardized. Standard errors are heteroskedasticity-robust and clustered at state level. Significance levels 10%, 5%, and 1% are denoted by *, **, and ***, respectively.

| Panel A | Revenue Growth | Revenue Growth | $\ln(\text{Revenue})$ | $\ln(\text{Revenue})$ |
|---------------------|--------------------|--------------------|-------------------------|-------------------------|
| | (1) | (2) | (3) | (4) |
| $\ln(\text{Bonus})$ | 0.279** (0.127) | 0.288** (0.124) | 0.149** (0.061) | 0.150** (0.057) |
| Controls | N | Y | N | Y |
| Year FE | Y | Y | Y | Y |
| Game FE | Y | Y | Y | Y |
| Observations | 166 | 166 | 166 | 166 |
| R-squared | 0.527 | 0.593 | 0.141 | 0.164 |
| Panel B | Employee Growth | Employee Growth | $\ln(\text{Employees})$ | $\ln(\text{Employees})$ |
| | (1) | (2) | (3) | (4) |
| $\ln(\text{Bonus})$ | 0.144** (0.064) | 0.145** (0.060) | 0.171** (0.082) | 0.183** (0.078) |
| Controls | N | Y | N | Y |
| Year FE | Y | Y | Y | Y |
| Game FE | Y | Y | Y | Y |
| Observations | 186 | 186 | 186 | 186 |
| R-squared | 0.111 | 0.122 | 0.157 | 0.178 |

Appendix

Appendix Table 1. Number of Retailers that Sold Jackpot Winning Tickets

This table reports the number of retailers that sold Mega Millions or Powerball jackpot winning tickets between the period 2002–2016.

| Year | Number of Retailers |
|------|---------------------|
| 2002 | 9 |
| 2003 | 21 |
| 2004 | 19 |
| 2005 | 17 |
| 2006 | 16 |
| 2007 | 28 |
| 2008 | 20 |
| 2009 | 25 |
| 2010 | 23 |
| 2011 | 21 |
| 2012 | 22 |
| 2013 | 27 |
| 2014 | 15 |
| 2015 | 17 |
| 2016 | 12 |

Appendix Table 2. Sample Differences

This table reports the differences in retailers' pre-treatment characteristics and outcome variables between the full sample and the sample of retailers for which LN provides owners' information. The full sample comprises 292 retailers and for 92 of them, information about the owners is available through LN (196 owners). *Bonus* is the amount in U.S. dollars that retailers receive for selling a jackpot winning ticket. *Number of connected stores* is the number of other locations that the firm has. *UCC loans* is an indicator for whether the retailer ever had a secured debt (i.e., UCC filing) prior to receiving the bonus. *Real properties* is an indicator variable for whether the retailer owned a real property prior to receiving the bonus. *Tax liens* is an indicator variable for whether the retailer had any history of tax liens placed against its property before the shock. Outcome variables are measured five years following the shock. *Retailer closed* is an indicator variable equal to one if the retailer is reported closed. We identify a retailer as closed if it meets the following criteria: 1) the establishment is not matched to a D&B retailer by the Optimizer program and 2) the firm is reported as inactive or dissolved in public records. All monetary values are expressed in real 2016 dollars.

| Variable | Full sample | Owners' sample | Difference | p-value |
|---|-------------|----------------|------------|---------|
| | (1) | (2) | (3) | (4) |
| Bonus (thousands) | 98,982.82 | 124,245.18 | -25,262.36 | 0.27 |
| <i>Pre-treatment characteristics</i> | | | | |
| Number of years in business | 10.55 | 9.33 | 1.22 | 0.21 |
| Number of connected stores | 0.69 | 0.88 | 0.19 | 0.27 |
| UCC loans | 0.28 | 0.31 | 0.03 | 0.24 |
| Real properties | 0.09 | 0.09 | 0 | 0.90 |
| Tax liens | 0.09 | 0.07 | 0.02 | 0.11 |
| Percentage population college degree (ZIP code) | 15.39 | 14.50 | 0.89 | 0.34 |
| Population (thousands, ZIP code) | 9.75 | 9.95 | 0.2 | 0.80 |
| Median income (thousands, ZIP code) | 56.33 | 54.22 | 2.11 | 0.26 |
| <i>Outcomes</i> | | | | |
| Retailer closed | 0.11 | 0.10 | 0.01 | 0.42 |
| UCC loans ex-post | 0.13 | 0.11 | 0.02 | 0.33 |
| Real properties ex-post | 0.03 | 0.04 | 0.01 | 0.56 |
| Tax liens ex-post | 0.03 | 0.05 | 0.02 | 0.38 |

Appendix Table 3. Effect of the Winning Ticket Bonus on Other Firms' Outcomes Conditional on Surviving

This table reports the effect of receiving a bonus for selling a winning ticket on having Uniform Commercial Code (UCC) loans, tax liens, and real properties for the sub-sample of firms that survived. The sample consists of retailers that were reported as open three years after the shock. $\ln(\text{Bonus})$ is the amount in U.S. dollars that retailers receive for selling a jackpot winning ticket. Column 1 reports the estimates for the retailer having a UCC secured loan three years following the bonus shock. Column 2 presents the estimates on an indicator variable for the retailer having a tax lien placed against its property three years after the shock. Column 3 shows the estimates on an indicator variable for the retailer having a real property three years after the shock. All monetary values are expressed in real 2016 dollars. Continuous variables are standardized. Controls include number of years in business, number of connected stores, UCC loans ex-ante, real properties ex-ante, tax liens ex-ante, percentage of population with college degrees (ZIP code), $\ln(\text{Population ZIP code})$, and $\ln(\text{Income ZIP code})$. All specifications control for game and year of winning fixed effects. Standard errors are heteroskedasticity-robust and clustered at state level. Significance levels 10%, 5%, and 1% are denoted by *, **, and ***, respectively.

| Dependent variable | UCC loans (1) | Tax liens (2) | Real properties (3) |
|---------------------|----------------------|----------------------|------------------------|
| $\ln(\text{Bonus})$ | -0.040*** (0.010) | -0.016*** (0.003) | -0.005 (0.005) |
| Sample | Survived | Survived | Survived |
| Controls | Y | Y | Y |
| Year FE | Y | Y | Y |
| Game FE | Y | Y | Y |
| Observations | 263 | 263 | 263 |
| R-squared | 0.078 | 0.059 | 0.075 |

Data Appendix

Variable Definitions

| Variable | Description | Data source |
|------------------|--|---|
| Survival | Indicator variable equal to one if the establishment is not matched to a D&B retailer by the Optimizer program and a registry records the firm as inactive or dissolved in or before the indicated year following the jackpot shock | Dun and Bradstreet Lexis Nexis Public Records Comprehensive Business Report Yelp Google Street View |
| Start a Business | Indicator variable equal to one if a registry records a filing for a “doing business as” (DBA), an application for a business license, a filing for a limited liability company (LLC) or a corporation in or before the indicated year following the jackpot shock | Lexis Nexis Public Records Comprehensive Comprehensive Person Report |
| UCC Loans | Indicator variable equal to one if a registry records a UCC loan secured by fixed assets in or before the indicated year following the jackpot shock | Lexis Nexis Public Records Comprehensive Business Report Business Report (retailers) and Comprehensive Person Report (owners) |
| Tax Liens | Indicator variable equal to one if a registry records that a lien has been placed upon a property to secure the payment of taxes in or before the indicated year following the jackpot shock | Lexis Nexis Public Records Comprehensive Business Report Business Report (retailers) and Comprehensive Person Report (owners) |
| Real Properties | Indicator variable equal to one if a registry records an acquisition of a real property in or before the indicated year following the jackpot shock | Lexis Nexis Public Records Comprehensive Business Report Business Report (retailers) and Comprehensive Person Report (owners) |
| Bankruptcy | Indicator variable equal to one if a debtor files for bankruptcy protection in or before the indicated year following the jackpot shock | Lexis Nexis Public Records Comprehensive Business Report Business Report (retailers) and Comprehensive Person Report (owners) |
| Revenues | Average annualized revenue at store level reported by the business | Dun and Bradstreet |
| Employees | Number of employees at store level reported by the business | Dun and Bradstreet |