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Abstract

Using wealth windfalls from lottery winnings and matched employer-employee tax files, we compare the effect of additional wealth on the entrepreneurial activity of older and younger individuals. We find that additional wealth leads older winners (aged 55 and older) to reduce business ownership and scale. In contrast, additional wealth leads younger winners to increase business ownership and performance. We also show that extra lottery wealth reduces the wage labor supply of both younger and older individuals. Thus, while younger lottery winners reduce wage labor to increase entrepreneurship, older lottery winners reduce both wage labor and entrepreneurship to retire.

JEL Codes: G5, G51, J22, L26

Keywords: Wealth, Age, Entrepreneurship, Labor Supply

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1 Introduction

Entrepreneurial activity is important for economic growth and job creation. In this paper, we show that the interaction of wealth and the age of the entrepreneur affects business entry, exit, and performance. Founder's age is an important determinant of starting and growing businesses (e.g., Liang et al., 2018, Hincapié, 2020, Azoulay et al., 2020, Gendron-Carrier, 2023). Wealth plays a key role in entrepreneurship (Bellon et al., 2021, Bernstein et al., 2022). Examining the interaction of wealth and age is important because the population is aging in many countries, with ever larger fractions of the population reaching advanced age. In addition, on average, wealth is concentrated among older individuals. Despite these trends, little is known about the different effects of additional wealth on the business activity of older versus younger individuals. The aim of this paper is to provide new evidence on this issue.

To examine this question, we use comprehensive matched employer-employee tax record data and variation in lottery prize amounts as a plausibly exogenous increase in individuals' wealth. The lottery data consist of all lottery wins over $1,000 from 2004 to 2021, provided by the lottery corporation of a Canadian province. For each of these lottery wins, we match the lottery winners to their tax-based administrative data, which include an employer-employee matched dataset. These administrative data provide us with an annual window into each lottery winner's economic decisions: whether they choose to enter or exit business ownership, how their businesses fare, how much labor supply they provide (as measured by wage income), and whether they choose to exit wage labor. Combining the lottery winnings information with the administrative data, we implement a stacked difference-in-differences (DID) empirical methodology to assess the relative effects on individuals' economic decisions of an additional dollar of wealth.

Our main finding is that additional wealth (from lottery prizes) leads older individuals (aged 55 and above) to reduce ownership of corporations. Additional wealth also leads older individuals to reduce the scale of their corporations. Further, with additional wealth, older individuals reduce their wage labor income and the number of jobs they have. We also find that older individuals are more likely to exit both wage labor and entrepreneurship, i.e., retire entirely, with additional wealth. These findings are consistent with the hypothesis that older entrepreneurs increase leisure or flow into retirement following a wealth shock.

In contrast to our findings on older individuals, younger individuals (under age 55) increase their entrepreneurial activities with extra wealth. We also find that additional wealth causes

younger people to decrease wage labor income and wage labor supply to the same degree as older individuals. However, unlike older people, who retire (by exiting both the wage labor and entrepreneurial markets), younger individuals transition from wage employment to entrepreneurial activities with additional wealth. These opposite findings for older and younger people emphasize the importance of considering age when examining the effect of wealth on entrepreneurship.

These results help explain recent findings in the literature studying labor supply decisions following wealth shocks. In a standard life-cycle model, provided that leisure is a normal good, an increase in unearned income (e.g., lottery wins) should decrease labor supply (e.g., Baird et al., 2018, Golosov et al., 2024). This relationship has been verified empirically in different contexts (see, for example, the discussion in Georgarakos et al., 2023). Importantly, in a standard life-cycle model, older individuals reduce labor supply more than younger individuals after a wealth shock because they smooth the shock over a shorter time horizon. However, recent papers using lottery winnings as wealth shocks show no statistically significant difference in the labor supply response to wealth by age (Cesarini et al., 2017, Golosov et al., 2024).[1] This lack of heterogeneity by age raises questions about why younger recipients reduce labor supply as much as older recipients, and how they replace their wage labor activity.

Our data and setting (where we examine both entrepreneurial labor supply and wage labor supply) allow us to provide a possible explanation for this puzzle. As we describe above, additional wealth from lottery wins leads younger individuals to reduce wage employment and transition into entrepreneurship. On the other hand, older individuals reduce both wage employment and entrepreneurship, which is consistent with retirement. Thus, taken together, the reduction in the total labor supply of younger individuals (wage labor plus entrepreneurial labor) is smaller than the reduction in the total labor supply of older individuals (where both entrepreneurial labor and wage labor decline). Our new findings are thus consistent with a standard life-cycle model.

Our individual results demonstrate the importance of differentiating between older and younger individuals. For example, we find that a $100,000 wealth increase results in older individuals being 2.3 percentage points less likely to own an incorporated business, but results in younger people being 1.5 percentage points more likely to own an incorporated business. The difference

[1] Cesarini et al. (2017) compare the reduction in wage income following a lottery win across three age groups (21-34, 35-54, and 55-64). They show that these reductions in wage income are similar across all three age groups in the first few years. Golosov et al. (2024) compare younger winners (age 30-46) with older winners (age 47-64), and find that wage income declines by the same amount for both older and younger winners. One alternative finding is Imbens et al. (2001), which finds that lottery winners 55 to 65 years old reduce their labor supply more than lottery winners under 55 years old.

between the propensity of younger and older individuals to own an incorporated business is 3.8 percentage points. This represents a significant difference, given the baseline rate of incorporated business ownership of approximately 10% in the data.

When examining incorporated business performance, we find that an additional $1 of wealth to an older person reduces total sales and revenues for their incorporated businesses by $1.57 and $1.51, respectively. We find no effect on the performance of younger individuals' incorporated businesses. When examining unincorporated firm performance, we show that an additional $1 of wealth increases net self-employment income for younger winners by 0.3 cents, but reduces net self-employment income for older winners by 0.7 cents. This difference between older and younger individuals is statistically significant.

We also compare exit from incorporated business by older and younger individuals (where exit is defined as having no incorporated business ownership for five or more years). Younger entrepreneurs who win an additional $100,000 are 1 percentage point less likely to exit from incorporated business ownership, but older entrepreneurs who win the same amount are 2 percentage points more likely to exit. The 3 percentage point difference between younger and older individuals is highly significant and represents a significant economic effect, given the baseline rate of incorporated business ownership of approximately 10% in the data.

While we find very significant differences between older and younger people in our business ownership and performance tests, we find older and younger individuals' responses to additional wealth are very similar to each other in our wage labor supply tests. In particular, for an additional dollar of wealth, older people reduce their wage earnings by $0.037 and younger people reduce their wage earnings by $0.047. In addition, a lottery win of $100,000 causes a 6.4 percentage point increase in the likelihood of an older person exiting wage labor, and a 4.6 percentage point increase in the likelihood of a younger person exiting wage labor (where exit is defined as five years with zero wage labor income).

An alternative explanation for the age-based heterogeneity we document in the effect of wealth on entrepreneurship is that younger individuals are more likely to be financially constrained. This argument states that younger winners, upon receiving their winnings, are more likely to start a business that they previously could not start, having had their financial constraints sufficiently eased, than older people, who were not similarly constrained. To explore this alternative explanation, we split our younger and older cohorts into financially constrained and unconstrained groups and examine their entrepreneurial outcomes. We find that the constrained groups in both

cohorts are no more likely to own a corporation with additional wealth than their unconstrained counterparts in the same cohort. These results indicate that the age-driven heterogeneity in the effect of wealth on entrepreneurship cannot be ascribed to differences in financial constraints between older and younger lottery winners.

Our study contributes to several strands of the literature. First, we contribute to the literature on financial constraints as a barrier to entry into entrepreneurship. The literature documenting financial constraints to entrepreneurship typically examines how some measure of entrepreneurship increases in response to a wealth shock that loosens the financial constraints of the entrepreneur.[2] We contribute to this literature by showing the importance of incorporating age and life cycle issues when examining the effect of wealth on entrepreneurship entry and growth.

Second, our study adds to the literature studying the effects of lottery prizes on individuals' outcomes. The existing literature has used wealth shocks from lottery prizes to examine various aspects of individual's lives including, among many other outcomes, labor supply decisions (e.g., Imbens et al., 2001, Cesarini et al., 2017, Golosov et al., 2024), stock market participation (Briggs et al., 2021), and bankruptcy filing (Hankins et al., 2011). We contribute to this literature by estimating the effects of wealth from lottery winnings on individual wage labor supply and entrepreneurial decisions, and show how these effects differ by the age of lottery winners.

Third, we add to a small, but growing, literature on business entry, performance, and exit by age. For example, Hincapié (2020) argues that middle-aged people are more likely to start businesses because they need to accumulate wealth, skills and experience in wage employment to be successful entrepreneurs. In addition, Gendron-Carrier (2023) finds that experience in high-quality firms is important for a small fraction of young entrepreneurs who become successful. Azoulay et al. (2020) examine the heterogeneity of firm success by founder's age and find that businesses of middle-aged founders have the highest success rates. On the other hand, Bernstein et al. (2022) explore who creates new firms in response to local demand shocks and find that younger, more educated and experienced individuals are more likely to enter entrepreneurship. Liang et al. (2018) argue that older individuals dominate managerial positions in aging societies,

[2] A variety of different kinds of shocks have been examined in providing evidence consistent with financial constraints. These shocks include: (1) lottery wins (e.g., Lindh and Ohlsson, 1996, Taylor, 2001, McKenzie, 2017, Cesarini et al., 2017, Cespedes et al., 2023, Golosov et al., 2024); (2) inheritance (e.g., Hurst and Lusardi, 2004, Cagetti and De Nardi, 2006, Andersen and Nielsen, 2012); (3) natural resource shocks (e.g., Bellon et al., 2021, Bernstein et al., 2022); (4) real estate and housing shocks (Hurst and Lusardi, 2004, Adelino et al., 2015, Corradin and Popov, 2015, Schmalz et al., 2017, Bahaj et al., 2020); and (5) changes to the availability of credit (Black and Strahan, 2002, Kerr and Nanda, 2009, Chatterji and Seamans, 2012, Bos et al., 2018, Krishnan and Wang, 2019, Dobbie et al., 2020, Herkenhoff et al., 2021).

which reduces the ability of more innovative younger individuals to acquire entrepreneurial skills on the job, thus reducing their ability to start new businesses. Our contribution to this literature is that we examine the effect of wealth on entrepreneurial decisions by age and show that younger and older individuals differ significantly in their use of additional wealth. While younger people are more likely to start and grow a business with extra wealth, older individuals tend to exit from both the wage labor market and entrepreneurship.

2 Data and Descriptive Statistics

Our paper uses two main administrative data sources to study the effects of windfall gains from lotteries on individuals' entrepreneurial decisions. First, we use administrative data on lottery wins from a single Canadian province.[3] Second, we match these lottery data to Statistics Canada's Canadian Employer-Employee Dynamics Database (CEEDD), which contains employer-employee matched administrative tax records data. We detail both data sources below, as well as the matching procedure and the final sample used in the analysis. Appendix Table A1 lists all the variables used in the analysis, their definitions, and the source of data used to construct them.

2.1 Lottery Data

We use lottery data from 2004 to 2021 from one anonymous Canadian province that cover all lottery winners with prizes larger than or equal to $1,000. Similar to other studies with lottery data, small prizes of less than $1,000 are not tracked by the lottery organization and not included in the study. This provincial lottery organization, which administers all lottery products in this province, provided us with these data under the condition that we do not disclose its name or the name of the province. For each lottery prize, the raw lottery data include winners' first and last names, six-character postal codes, the exact date of the lottery payout, the exact dollar value of each prize, and the type of lottery product. These data are recorded by the lottery organization at the time of the prize payout. We provided this lottery winner data to Statistics Canada, which then undertook the matching process whereby the lottery winner data was matched to administrative tax records. Given the highly confidential nature of tax filings and to preserve the privacy of the individuals and businesses in our study, after the matching process, Statistics Canada removed

[3] A previous vintage of the lottery data has been used in Agarwal et al. (2020) to study the effects of lottery wins on winners' neighbors, including their debt, financial distress, and consumption choices.

names, postal codes, and all personal identifiers of the individuals and businesses in our study.

Our setting allows us to precisely identify the amount won, directly from the lottery corporation, and link it to winners' administrative data on labor and business outcomes. All lottery wins are tax-free in Canada, and all payments are made as lump-sum in our data, with no lottery wins paid out as installments.[4] For prizes with multiple winners (e.g., two individuals on a winning ticket), we have either two names or in-trust information (for more than two winners). Because the raw data do not include all names of lottery winners for in-trust prizes, we remove these lottery wins from the data. For prizes with two winners, we assign 50% of the prize to each winner.

Similar to other lottery data, our data have some very large multimillion dollar wins, and numerous smaller wins. To preserve the anonymity of large winners, who could be identified in the data by their large and unique prizes, we winsorize the lottery amount at $350,000, which is approximately the 99th percentile of the lottery prize distribution. This approach also helps us to account for the effect of potential outliers in the lottery data. It is similar to previous studies with lottery data that truncate or winsorize lottery amounts at the 98th or other top percentiles of the prize distribution (e.g., Hankins et al., 2011, Agarwal et al., 2020).

To address the question of the external validity of our results, Marshall (2011) shows that in the years 2004-2009, approximately 60% of Canadians played a government-sponsored lottery, and that government lotteries were the most frequently used form of gambling in Canada. Similarly, Rotermann and Gilmour (2022) show that, in 2018, 64% of adult Canadians gambled at least once per year, with lottery games and instant lottery games being the most prevalent form of gambling.

2.2 Individual Tax and Demographic Data

Statistics Canada's Canadian Employer-Employee Dynamics Database (CEEDD) allows us to match tax records of individuals at different levels. We use individual-level tax records data (T1 Personal Master File, or T1PMF) from 2001 to 2018 as the linkage file to allow us to match a winner's personal tax data across a range of datasets, using a unique person identification number. This file is recorded at the individual level and contains the aggregate annual tax information (e.g., total labor income, investment income or business income), as well as demographic information such as age.

[4] A small fraction of lotteries from the original data could have up to two prizes (e.g., some lotteries come with extra prizes paid in installments). In such cases, these multiple prizes will be recorded in our data separately, and our criteria that individuals must win only once will drop these lottery win events.

We use data on investment income and pension contributions as recorded in the personal income data to define financial constraints at the individual level. Investment income includes interest income from any savings accounts, dividends and capital gains. Because we do not observe balances of savings accounts or contributions to them, we use income from these accounts to identify individuals with some savings. Since we have data on pension contributions, we use these data to flag people who make pension contributions as another form of saving. We define individuals as being financially constrained if they have no interest or investment income or pension contributions in the pre-win period because they have no savings observable to us.[5] Those individuals with any form of savings are defined as not financially constrained.

In addition to the aggregated tax information provided in the personal tax file, the T4 Record of Employment and Remuneration (T4ROE) provides the annual remuneration of each individual at each employer where they have worked in that year. This feature allows us to track all the different employers of a given individual each year and through time. Employers provide information on their employees, such as salary paid, reason for separation, contributions to pension programs, and number of days worked if there is a job separation. The data are available from 2001 to 2018.

We use these data to construct an empirical measure of the number of jobs per person. This variable is used to measure job separations. This outcome captures changes in the number of employment records for each person in each year, and it accounts for changes in temporary or seasonal jobs. We also use these data to compute the total annual wage conditional on having a job (in practice, we define this variable as wage conditional on not quitting a job).

2.3 Incorporated Business Data

The main source of data for incorporated businesses in the CEEDD is the National Accounts Longitudinal Microdata File (NALMF), which is a longitudinal administrative database of Canadian corporations. From these data, we obtain annual income statement and balance sheet information.

We complement these data with T2S50 files, which contain shareholder information using the same unique individual-level identifier, referred to as a business entity ID. We can therefore attribute ownership of each incorporated business to individuals in our sample. By merging both files, we are able to study the firm performance and owner decisions before and after lottery wins.

[5] In practice, we define no income and no contributions as having less than $100 for each in annual averages. We define pension contributions as contributions to a Registered Retirement Savings Plan (RRSP) account. RRSPs are similar to Individual Retirement Accounts (IRAs) in the U.S.

The data are available from 2001 to 2018.

Using these data, we assign incorporated business ownership for each person in each year. First, we create a panel of corporations owned by lottery winners during the sample period. Then, we link each incorporated business number to its owners. Finally, we create an indicator variable that measures if a winner owned at least one incorporated business during the years observed.

2.4 Unincorporated Business Data

To track unincorporated businesses, we use consolidated data on the T1 Financial Declarations (T1FD), which are filed by taxpayers who report self-employment income, and T1 Business Declarations (T1BD), which are filed by unincorporated business owners. These data are available from 2005 to 2018. Unincorporated businesses can be either sole proprietorships or partnerships. These data identify the business numbers of each unincorporated firm owned by each person in each year.

In addition to unincorporated business ownership, we compute total self-employment income from its components, such as business, commission, fishing, farming, professional and rental income, as reported in the personal income data. We use gross self-employment income and net self-employment income (net of expenses), which can be interpreted as revenues and profits from unincorporated businesses, respectively.

While we have some data on unincorporated business performance, these data are more limited than those on incorporated businesses. Moreover, reporting on unincorporated business performance is somewhat less complete, as many forms of unincorporated businesses (e.g., individuals with self-employment income) do not have to report much information to the tax authorities. As a result, when presenting findings on the performance of businesses owned by lottery winners, we primarily focus on results for incorporated businesses and, where possible, we include findings for unincorporated businesses.

2.5 Exit from Wage Employment and Firm Ownership

Similar to Golosov et al. (2024), to measure long-term exit from wage labor, we use personal income files and define it as having no reported income for five consecutive years.[6] Long-term exit

[6] Our results look similar if we define long-term exit from the labor market using a shorter period (e.g., three years).

from incorporated business is defined using the ownership variable, not business income.[7] We define exit from corporate business as having no ownership in a corporation for five consecutive years. Exit from unincorporated business is defined as no ownership of this type of business for five consecutive years.

2.6 Sample Construction

In this section, we discuss the construction of the sample used in our analysis. We start with the population of approximately 80,000 lottery wins provided by the lottery corporation over the years 2004 to 2021. As a first step in building our analysis sample, Statistics Canada matched these lottery winners to their administrative tax records. This matching is based on the first and last name of each winner, and their six-character postal codes as of the lottery payout date. Because Canadian six-character postal codes are very small geographic units containing approximately 15 households, on average, it is highly unlikely that there will be two people with the same first and last names in the same postal code at one point in time. From the original approximately 80,000 observations of lottery wins, approximately 80% were matched to a Canadian Social Insurance Number and thereby linked to a unique personal identifier in the CEEDD.

We impose three additional restrictions on the sample of individuals considered for our analysis: (i) The lottery prize must not be paid through a trust (i.e., we only consider lottery wins with two or fewer winners' names on the ticket); (ii) the winner must only win once during the sample period 2004 to 2021; and (iii) the winner must be aged 21 to 64 during the year of the win. Finally, we drop any observations where the individual tax information is missing. From this sample, about 10% of the observations have data on unincorporated business outcomes, and about 10% of the observations have data on incorporated business outcomes.

2.7 Dataset Construction

Because our data effectively include staggered treatments (lottery wins over time), we follow the recent literature to overcome the well-known issues arising when using a standard two-way fixed effect difference-in-differences (TWFE DID) model in the case of staggered treatments (e.g., Goodman-Bacon, 2021). In particular, we follow Cengiz et al. (2019), Deshpande and Li (2019) and

[7] We do not use business income to define long-term exit from corporate ownership because we cannot observe dividends that are paid to the owners.

many others in building a stacked regression model. Baker et al. (2022) shows that the stacked estimator is efficient, and its flexibility allows us to estimate both static and dynamic specifications.

The main issue in estimating a classical TWFE DID regression arises because some of the control-group individuals have been previously treated, and therefore might not serve as an adequate control group. To remedy this situation, we follow Golosov et al. (2024) and many others in building a control group that has not yet been treated using the sample of winners that won in later years in our data. We define the year in which an individual has won the lottery as the win year reported by the lottery corporation. We then group all individuals who won the lottery in a calendar year into a cohort. Each cohort of winners is analyzed in an event-time window $w + j$, with $j \in -6$ to 6 corresponding to calendar years. The control group is chosen for each cohort as the individuals that won the lottery more than six years after the current cohort, such that the treatment for these individuals happens after our estimation window ends. In other words, if the year of win of a treatment group is w, the control group for this cohort w consists of winners that won in $w^* > w + 6$. The individuals in the control group are commonly referred to as *not-yet-treated* individuals (Baker et al., 2022). Given the years for which we observe winners, the treatment group consists of winners from 2004 to 2014, and the control group consists of winners from 2011 to 2021.[8] We refer to each cohort of winners and their control group as a cohort-specific dataset (Baker et al., 2022).

2.8 Descriptive Statistics

We do not currently provide any descriptive statistics in our results. This is because these statistics must undergo thorough disclosure review by Statistics Canada before they are released. We will update the table when the final version is approved and ready.

Table A1 provides definitions of all the variables used along with their sources. The source files are as follows: (1) Lottery data; (2) personal tax information; (3) unincorporated business data from the year 2005 onward; (4) information on shareholders who own a stake in the company; (5)

[8] The use of *not-yet-treated* individuals as the control group forces us to use a restricted sample of winners because we exclude lottery wins for which we do not have a valid control group. We do not impose perfect balance over the event-study to maximize the number of data points that can be used in the analysis. As an illustration, for the 2004 cohort, the treatment group consists of winners from the year 2004, and the control group consists of winners from the years 2011 to 2021. For the 2014 cohort, the treatment group consists of winners from the year 2014, and the control group consists of winners from the year 2021. The same winner can appear as a control and a treated person in our data in different event windows. For example, a 2011 winner will be used as a control individual for the 2004 cohort of winners with the data from 2001 to 2010 (outside this winner's treatment window). Then, this same 2011 winner will be used as a treatment person in 2011 with his 2005-2017 data.

incorporated business performance data; and (6) remuneration and job duration information for each employer-employee pair.

3 Empirical Model and Estimation

The analysis sample we create allows us to measure the effect of lottery wins for each cohort of winners, using a control group of not-yet-treated individuals. To estimate the causal effect of lottery wins across different cohorts, we follow the recent advances in the DID literature on staggered treatment and estimate a stacked regression model. For this estimation, each cohort-specific dataset is stacked, and the estimation is performed on the stacked sample. In estimating the model in this fashion, the main variables are defined for each cohort-specific dataset, and individual and time fixed effects are saturated with indicators for dataset identifiers. This estimation is equivalent to estimating treatment effects for each cohort of winners and then applying variance weighting to estimate average effects across cohorts (Baker et al., 2022).

Unless explicitly reported, most of our analysis identifies the causal effect of lottery wins from the variation in the dollar amount won across individuals. Formally, we estimate the following event study specification:

$$Y_{itc} = \sum_{\substack{j=-6 \\ j\neq -1}}^{6} \mathbb{I}(\text{Time}_{ijc}) \times \left[\beta_{0j}\text{Amount}_i \times \text{Treated}_{ic} \times \text{Younger}_i + \beta_{1j}\text{Amount}_i \times \text{Treated}_{ic} + ...\right] + \alpha_{i,c} + \lambda_{t,c} + \varepsilon_{itc}, \quad (1)$$

where i indexes individuals, c indexes cohorts of winners, j indexes event-time years and t indexes calendar years. Y_{itc} represents the different outcomes we study, such as labor earning, entrepreneurship ventures or firm outcomes, $\mathbb{I}(\text{Time}_{ijc})$ represents a series of event-time dummies, Amount_i is the lottery winning for individual i, Treated_{ic} is the cohort-specific individual treatment identifier, and Younger_i is an indicator variable for whether individual i is younger than age 55 in the year of the win. We include all other interactions and all level terms for these variables, which are not absorbed by the other fixed effects. In this equation, the series of β_{1j} coefficients measures the average effect of one dollar in lottery wins for each year, relative to the year before the win, on the outcome of interest Y_{itc} for the older individuals (the omitted group). The series of β_{0j} coefficients measures the same effect for the difference between the younger and older individ-

uals. This specification combining a stacked regression model with varying intensity of treatment is similar to Butters et al. (2022). The models we estimate include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects (Wing et al., 2024). We cluster the standard errors at the level of the individual in each cohort-year, which is the level of variation we exploit to identify the effect of lottery wins.

In addition to estimating an event study specification, we report results from a DID model in the following form:

$$Y_{itc} = \beta_3 \text{After}_{it} \times \text{Amount}_i \times \text{Treated}_{ic} \times \text{Younger}_i + \beta_4 \text{After}_{it} \times \text{Amount}_i \times \text{Treated}_{ic} + ... + \alpha_{i,c} + \lambda_{t,c} + \varepsilon_{itc}, \quad (2)$$

where we replace the set of event time dummy variables with one indicator variable After_{it}, which is equal to one for the year of and after the lottery win date and is zero otherwise. The rest of this equation is the same as equation (1). In this equation, β_4 represents the effect for older individuals (the omitted group), and β_3 measures the effect for the difference between the younger and older individuals. We report the effects for younger and older individuals separately, and we use the Delta method to calculate their standard errors.

4 Results

In this section, we present our findings on the different effects of wealth on economic outcomes for older and younger individuals. We examine four sets of outcomes to study these effects: business ownership, business performance, wage labor supply, and long run exit from wage labor and entrepreneurship. For each set of outcomes, we study the effects on older individuals and younger individuals and then consider the differences between them.[9] We provide interpretations of our results in the following section.

[9] In the Appendix, we present our results for the combined sample, including both older and younger winners. See Tables A2-A5.

4.1 Incorporated Versus Unincorporated Businesses

For our business ownership and business outcome analyses, we examine effects on incorporated and unincorporated businesses separately. Recent literature has documented that there is considerable heterogeneity among entrepreneurial projects (e.g., Bellon et al., 2021, Herkenhoff et al., 2021, Bos et al., 2018, Levine and Rubinstein, 2017). At one end of the spectrum are high-growth-potential incorporated startups, which, if successful, can have meaningful impacts on an economy. At the other end of the spectrum are less growth-oriented, unincorporated businesses, wherein the entrepreneur may, for example, do freelance work, own a small stand at a local market, or drive for a ride-sharing company. Given the differing motivations of their founders, the differing organization forms, and the differing growth prospects of these entrepreneurial businesses, it seems plausible that wealth shocks may affect individuals' incorporated and unincorporated ventures quite differently. For instance, additional wealth may reduce the labor supply for entrepreneurs with less growth-oriented projects, consistent with the overall effect documented in Bellon et al. (2021). Or, additional wealth may shift entrepreneurs' labor-leisure decision towards increased leisure and reduce their entrepreneurial effort across both types of businesses. Finally, increased wealth may induce greater entrepreneurship among individuals for both types of businesses, consistent with Bermejo et al. (2018), Herkenhoff et al. (2021), Bahaj et al. (2020), and Schmalz et al. (2017). On the basis of these potential differences, we study incorporated and unincorporated businesses separately in this paper.

4.2 Wealth Effects on Business Ownership

We first study the effects of lottery winnings on ownership of businesses. As explained above, we examine these effects on incorporated and unincorporated businesses separately.

4.2.1 Incorporated Firms

We present findings on the ownership of incorporated businesses in column (1) of Table 1. For every additional $100,000 received in lottery winnings, older individuals are 2.3 percentage points less likely to own an incorporated business and younger individuals are 1.5 percentage points more likely to own an incorporated business after winning the lottery. Both of these effects are statistically significant. Moreover, the difference in the effect between younger and older individ-

uals, 3.8 percentage points, is also highly statistically significant.[10] These coefficients represent important economic effects, given the baseline rate of incorporated business ownership of about 10% in the data.

In Figure 1 (a) and (c), we present the dynamics of the effects on incorporated business ownership for younger and older lottery winners, respectively. We find that the effect on both groups is increasing over time after the lottery win, with the effect being increasingly negative for older individuals and increasingly positive for younger individuals.

These figures show that the lottery amount does not predict corporation ownership or any other outcomes in any of the pre-win years (from year t-6 to year t-2). This finding indicates that the lottery prizes are random and not correlated with pre-win outcomes. These dynamic results also allay concerns about non-parallel trends, which is unsurprising given the random nature of lottery winnings.

In sum, our analysis shows that additional wealth increases incorporated business ownership among younger individuals and decreases it among older individuals. Moreover, the effect on the two groups is large, and it increases over time.

4.2.2 Unincorporated Firms

In column (2) of Table 1, we report the effects of lottery win amounts on the ownership of unincorporated businesses. We find that additional winnings do not significantly change the likelihood that older individuals own unincorporated businesses. On the other hand, an additional $100,000 in lottery winnings increases the likelihood that a younger individual owns an unincorporated business by 1.4 percentage points, though that increase is only weakly statistically significant. The 2.8 percentage point higher likelihood of owning an unincorporated business for younger individuals relative to older individuals is more precisely estimated ($p < 0.05$).

We examine the dynamic effects on unincorporated business ownership in Figure 1 (b), which shows a positive and relatively steady effect of lottery winnings on the likelihood of younger individuals owning unincorporated businesses. Figure 1 (d) reports some evidence of a negative effect for older individuals, although this effect is both statistically insignificant and declining over time. Overall, we find that increased wealth causes an increase in the likelihood of younger

[10] In Appendix Tables A2 - A3, we report results for the full sample (combining older and younger lottery winners) for incorporated and unincorporated business ownership and performance. Almost all coefficients are statistically insignificant. These insignificant findings for the full sample emphasize the importance of examining older and younger lottery winners separately.

individuals owning unincorporated businesses, but it does not seem to affect the likelihood among older individuals.

4.3 Wealth Effects on Business Performance

Having documented the effect of lottery winnings on older and younger individuals' likelihood of owning a business, we then examine the performance of ongoing businesses already owned by the lottery winner. As before, we study incorporated and unincorporated business effects separately.

4.3.1 Incorporated Firms

First, we examine the effect of lottery winnings on incorporated businesses' performance. In Table 2, we show that, among lottery winners with ongoing incorporated businesses, every additional $1 in lottery winnings causes older individuals' firms' total sales to decrease by $1.57 and has no significant effect on younger individuals' firms. An additional dollar of winnings also causes older individuals' firms to reduce expenses by $1.15 and revenues by $1.52, while there are no effects on those measures for younger individuals' firms. For all these outcomes, the differences between the two groups are statistically insignificant.

In Figure 2, we present the dynamic effects of lottery winnings on incorporated business performance for younger and older winners, respectively. This figure shows that older individuals' ongoing incorporated businesses' sales, expenses, and revenues are lower in all of the post-win years, though the decrease is not statistically significant in most years. We also see some evidence of an increase in all three measures of incorporated business performance for younger winners' firms, but the increase is never statistically significant. Overall, these results show that additional wealth induces older winners to reduce the scale of their ongoing incorporated businesses, whereas there seems to be no significant effect on the scale of younger winners' ongoing incorporated businesses, though there is some evidence in the dynamic analyses that there may be a positive effect.

4.3.2 Unincorporated Firms

Next, we consider the effects of lottery winnings on ongoing unincorporated businesses' performance. As mentioned earlier, business performance data for unincorporated businesses are less detailed, so we study lottery winners' self-employment income, which captures income from any

unincorporated businesses owned by the individual. As we report in column 1 of Table 3, additional winnings do not affect older individuals' likelihood of reporting gross self-employment income (i.e., revenue), whereas every additional $100,000 in winnings increases a younger individual's likelihood of reporting gross self-employment income by 1.5 percentage points. The difference, however, in the effect between the two groups is not statistically significant. In column 2, we show results for the probability of having net self-employment income (profits). An additional $100,000 in wealth increases the likelihood of reporting net self-employment income by 1.7 percentage points for younger individuals, and it has no statistically significant effect for older people. The difference between the two groups is 2.5 percentage points, and it is significant.

We also study net self-employment income and find a $0.007 decrease for every additional $1 in winnings for older individuals and a $0.003 increase in self-employment income for younger individuals. The difference in net self-employment income between the two groups is statistically significant ($p < 0.05$), with younger individuals reporting $0.01 more self-employment income per additional dollar of wealth than older individuals.[11]

Figure 3 presents the dynamic analysis findings for unincorporated business performance. In this figure, we see an immediate increase in the likelihood of reporting gross and net self-employment income among younger individuals. The effect for the amount of net self-employment income is not as strong, but it seems to be similarly positive. Figure 3 shows no consistent effect on the probability of reporting gross and net self-employment income for older individuals (figures (d) and (e)), but there seems to be a clear negative effect of additional wealth in later years on the amount of net self-employment income (figure (f)). Overall, we find evidence that younger individuals scale up their unincorporated businesses with additional wealth and some evidence that older individuals scale down their unincorporated businesses.

4.4 Wealth Effects on Wage Labor Supply

We next study how additional lottery winnings impact winners' labor market choices. Existing papers in the literature already show that lottery wins reduce labor supply (including Imbens et al., 2001, Cesarini et al., 2017, Picchio et al., 2018, Golosov et al., 2024). On the other hand,

[11] In unreported tests, we also examined the effect of additional lottery winnings on net self-employment conditional on reporting any self-employment income. We find no effect of additional winnings on this outcome. This result, in conjunction with the findings in column 1 of Table 3, indicates that the effect of additional wealth on younger winners' ongoing unincorporated businesses after a lottery win is generally on an extensive margin. Younger individuals change from reporting no self-employment income to positive self-employment income with greater winnings but do not report an increase in such income if they previously reported such income.

several other studies have shown that additional financial resources allow individuals to fund an increase in job search (e.g., Herkenhoff et al., 2024), which may serve to increase labor supply or wage earnings. An example of this is Doornik et al. (Forthcoming), where a lottery provides individuals with a motorcycle which allows recipients to access jobs across a wider distance. We consider the effects of lottery winnings on four measures of winners' wage labor supply: amount of wage earnings, reporting any wage earnings, number of jobs, and wage earnings conditional on having a job.

We present our findings on wage labor supply in Table 4. The effects on older and younger individuals are the same across all the measures we study. First, in column 1, we show that an additional dollar of lottery winnings causes younger people to reduce their wage earnings by \$0.047 and older people to reduce their wage earnings by \$0.037. Both negative effects on wage earnings are highly statistically significant.

In the remaining columns of Table 4, we separate wage labor supply effects into impacts on the extensive and intensive margins. In columns 2 and 3, we present extensive margin effects. Column 2 shows that both younger and older individuals' likelihood of reporting any wage earnings decreases with additional wealth. Younger people are 5.5 percentage points less likely and older people are 7.3 percentage points less likely to report any wage earnings with every additional \$100,000 in lottery winnings. Both of these effects are highly statistically significant. In column 3, we show that an additional \$100,000 in lottery winnings reduces the number of jobs reported by a younger winner by 0.103 and by an older winner by 0.096. Again, both of these effects are highly statistically significant.

Finally, in column 4 of Table 4, we examine intensive margin effects. We show that, conditional on having a job, every additional dollar of lottery winnings reduces reported earnings by \$0.038 among younger winners and by \$0.034 among older winners. The effects on both groups are highly statistically significant. Together, the results in Table 4 indicate that additional wealth induces younger and older individuals to reduce their labor supply and that the effect is not limited to just impacts on the intensive or the extensive margin. Rather, the effect of additional wealth on the wage labor supplied arises from both the extensive margin (e.g., any wages and number of jobs) and the intensive margin (e.g., wages conditional on having a job).

We also present the dynamic effects on wage labor supply in Figure 4. In figures (a) through (d), we see a clear, immediate, and persistent negative effect on all wage labor measures for younger people. The effects on older individuals' wage labor, shown in figures (e) through (h), are

clear and immediate as well, though they seem to lessen somewhat over time. Overall, we find that additional wealth causes both older and younger individuals to reduce their supplied wage labor.

4.5 Wealth Effects on Long-Term Exit

In this section, we examine the effect of additional wealth on long-term exit from three types of economic activity: wage-based employment, incorporated business ownership, and unincorporated business ownership.

As we show in column 1 of Table 5, we find that, for every additional $100,000 in lottery winnings, older individuals are 6.4 percentage points more likely to exit from wage-based employment and younger individuals are 4.6 percentage points more likely to exit from wage-based employment. Both of these effects are highly statistically significant but statistically not different from each other. On the other hand, an additional $100,000 in lottery wealth causes older individuals to be 2.0 percentage points more likely to exit from their incorporated businesses and younger people to be 1.0 percentage points less likely to exit from their incorporated businesses (column 2). Both of these effects are statistically significant. The difference between them, showing that younger individuals are 3.0 percentage points less likely than older individuals to exit from businesses with an additional $100,000, is highly statistically significant. Finally, in column 3, we show that there is no significant effect of wealth on older individuals' exit from unincorporated businesses, though, as with exit from incorporated businesses, the coefficient is positive. Similarly, younger individuals show no significant response to additional wealth in their exit from unincorporated businesses, though the coefficient is negative, as with exit from incorporated businesses. The difference between the two groups is not statistically significant, though it suggests that younger individuals are less likely to exit from unincorporated businesses with additional wealth.

In Figure 5, we present the dynamic effects of additional wealth on exit from the three types of economic activity. For wage earnings (figures (a) and (d)), we find an immediate and persistent increase in exit in response to additional wealth. In figures (b) and (e), we find that there is no effect on exit from incorporated businesses for younger individuals, but older individuals seem immediately more likely to exit from incorporated businesses, with the effect growing over time. For exit from unincorporated businesses (figures (c) and (f)), we find no significant effect of additional wealth for either group in any post-win year. Overall, these findings show that exit is a

method by which older and younger individuals reduce their wage labor supply after winning the lottery. Older individuals also seem to exit from incorporated businesses, whereas younger people do not do so. The findings for unincorporated business exits are similar to incorporated business exits, though the effects are substantially more subdued.

5 Interpretations

5.1 Implications for Providers of Funding to Entrepreneurs

These findings have important policy implications for lenders and government programs focused on promoting business formation and growth. Our findings for the effect of additional wealth on business ownership, business formation and closures show very different effects of wealth based on the age of the business owner. While younger individuals tend to increase their overall business ownership in response to an increase in their wealth, older individuals tend to decrease firm ownership.

We also find that additional wealth does not change the incorporated business performance of younger business owners, but it shrinks the scale of existing incorporated businesses owned by older individuals. In addition, younger entrepreneurs increase their unincorporated business performance, e.g., net self-employment income (net profits). Taken together, these findings may imply that unincorporated businesses grow in response to the investment of younger business owners. However, older owners reduce their business size and performance in response to additional wealth.

5.2 Labor-Leisure Choice of Older and Younger Individuals

Comparing our results for the labor supply responses of older and younger individuals to wealth shocks, we find that both of these groups reduce their labor supply by a very similar degree. This finding is puzzling within the context of standard life-cycle models that, provided that leisure is a normal good, imply that older individuals should reduce their labor supply to a larger extent than younger individuals. This implication is because older individuals will smooth the wealth shock over a shorter time horizon compared with younger people. Our finding of similar labor supply responses to wealth increases by age is consistent with results in the recent literature (Cesarini et al., 2017, Golosov et al., 2024).

However, we can provide a possible explanation for this puzzle because we observe both wage labor supply and entrepreneurial activity. We show that younger individuals decrease their wage labor supply in response to additional wealth and engage in entrepreneurial activity. On the other hand, older individuals reduce their labor supply in both the wage labor market and entrepreneurial labor market. In addition, older individuals exit from both markets. Taken together, these findings for older and younger individuals are consistent with the standard life-cycle model.

5.3 Wealth Effects on Corporations and Unincorporated Businesses

The distinction between incorporated and unincorporated businesses is important, as emphasized by Levine and Rubinstein (2017). As we discuss in detail in Section 4, incorporated firms can proxy for businesses with growth potential, while unincorporated firms are often started by individuals looking for part-time jobs or those experimenting with business ideas. Furthermore, unincorporated businesses may offer non-pecuniary benefits to their owners, such as being their own bosses or engaging in a favorite activity (Jones and Pratap, 2020).

Comparing our results for incorporated and unincorporated firms for younger individuals, we observe that additional wealth increases their ownership of both types of business by about the same degree. Thus, younger individuals respond to benefits provided by corporations such as limited liability and growth potential and benefits offered by unincorporated businesses, such as flexibility and business experimentation. In terms of the business performance of open firms, we find no effect of additional wealth on corporate business performance, and a small positive effect on unincorporated business performance (e.g., higher self-employment income). Overall, younger individuals adjust their business participation through an extensive margin (increasing business ownership) in a similar way for both corporations and unincorporated firms.

For older winners, we find different effects of wealth on incorporated and unincorporated firms. For these individuals, additional wealth reduces their ownership of incorporated firms, with weaker or no effects on their ownership of unincorporated firms. We also find that older individuals use additional wealth to reduce the scale of their corporations (e.g., decreasing sales and revenues). The effect of wealth on unincorporated business performance is much smaller than the effect on incorporated business performance. In addition, older winners increase their exit from incorporated businesses and do not change their exit from unincorporated firms.

Taken together, these results indicate that older individuals may be more likely to withdraw from incorporated business activities with extra wealth, while still remaining attached to a de-

gree to unincorporated firms. This difference may be explained by the different benefits and requirements of these two types of businesses (e.g., unincorporated businesses may provide non-pecuniary benefits, which increase the incentive for older lottery winners to remain in those businesses).

5.4 Financial Constraints As an Explanation

In this section, we discuss how our findings relate to the large literature on financial constraints to entrepreneurship. This literature uses plausibly exogenous wealth increases (e.g., Bellon et al., 2021) to show that individuals open new businesses in response to additional wealth. Such a finding is usually interpreted as evidence that individuals were financially constrained before their wealth increased and, as a result, were unable to open new businesses until after the wealth increase. Since younger individuals, on average, have less wealth than older people, an alternative possible explanation for our findings above (that younger individuals create new businesses with additional lottery wealth) is that the younger winners are more likely to be financially constrained. In this section, we provide evidence on this alternative possible explanation.

To test this hypothesis, we define financial constraints at the individual level (see Section 2.2 for more details). We use data on investment income (interest income from savings accounts, dividends and capital gains) and pension contributions to measure if a person had any savings before the lottery win. Those without savings or pension contributions are labeled as financially constrained and those with some savings are not constrained.[12] Based on this distinction, we split the younger and the older samples into financially constrained and unconstrained groups.

Table 6 summarizes the effect of wealth on business ownership for financially constrained and unconstrained lottery winners of different age cohorts. The results indicate that younger individuals who are financially constrained increase their corporation ownership by a smaller degree than younger people who are not constrained. This finding is not consistent with the prediction of the financial constraints hypothesis.

In addition, Table 6 shows that, for constrained older individuals, additional wealth decreases corporation ownership. For unconstrained older people, we find a smaller negative effect of additional wealth on business ownership. These results are not consistent with older individuals opening new firms when their financial constraints are relaxed by lottery wins. Instead, we find

[12] We also define financial constraints based on whether the individual has above or below median income before winning a lottery and obtain similar results.

support for the hypothesis that older individuals will increase leisure or exit entrepreneurship with additional wealth. Taken together, our evidence is not consistent with age being a proxy for financial constraints.

6 Conclusion

In this paper, we examine how wealth affects the entrepreneurial decisions of younger and older individuals. The motivations for examining this issue are the importance of entrepreneurship for economic growth and job creation, and the rapidly aging population in many countries. We match lottery winner data to employer-employee tax files, which allows us to observe both wage labor and entrepreneurial activity.

Our main finding is that older and younger individuals respond very differently to a wealth increase. On the one hand, younger individuals reduce their wage labor supply and they increase their entrepreneurial activity with additional wealth. On the other hand, for older individuals, additional wealth reduces both their wage labor supply and entrepreneurial activity, which is consistent with retirement. These new results emphasize the importance of accounting for age when examining the effect of wealth on entrepreneurship.

Because we can observe both entrepreneurial activity and wage labor (using matched employer-employee data), we are also able to provide an explanation for a puzzling result that both younger and older individuals reduce labor supply to the same degree in response to wealth increases. This result is inconsistent with standard life-cycle models, which predict that older individuals should reduce labor supply by a larger amount than younger people. By simultaneously examining wage labor supply and entrepreneurial activity, we can document that total work activity (wage labor plus entrepreneurial activity) does indeed decline more for older compared with younger individuals, which is consistent with the standard theory.

Finally, our results have important policy implications for financial institutions and policy makers who provide financing for entrepreneurs. Our results that older individuals reduce both labor supply and entrepreneurial activity in response to wealth increases indicate that providing additional financing for older individuals may not generate increased entrepreneurial activity. As we document in this paper, older entrepreneurs have much stronger preferences for leisure (i.e., retirement) compared with younger entrepreneurs.

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Tables and Figures

Table 1: Business Ownership

	(1) $\mathbb{I}$(Has inc. bus.)	(2) $\mathbb{I}$(Has uninc. bus.)
Younger	0.015***	0.014*
	(0.005)	(0.008)
Older	-0.023***	-0.014
	(0.009)	(0.011)
Difference	0.038***	0.028**
	(0.010)	(0.013)

Note: This Table shows the effect of additional wealth ($100,000) on business ownership estimated using the model in equation (2). The sample is constructed as described in Section 2.6. Younger and older represent winners aged 21 to 54, and 55 to 64, respectively, in the year of the win. Having an incorporated business is measured with an indicator variable for owning at least one incorporated business, and we follow the same definition for unincorporated businesses. All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors clustered at the individual level in each cohort-year are presented in parentheses. ***, **, and * represent significance at the 1, 5 and 10 percent levels, respectively.

Table 2: Incorporated Business Performance

	(1) Total sales	(2) Expenses	(3) Revenues
Younger	0.087	0.182	-0.250
	(0.931)	(0.802)	(0.924)
Older	-1.571**	-1.153*	-1.515**
	(0.701)	(0.685)	(0.723)
Difference	1.658	1.335	1.265
	(1.165)	(1.055)	(1.174)

Note: This Table shows the effect of additional wealth ($1) on business performance estimated using the model in equation (2). The sample is constructed based on Section 2.6. Younger and older represent winners aged 21 to 54, and 55 to 64, respectively, in the year of the win. Total sales are defined as the sum of reported sales of goods and services. Expenses are defined as the sum of all non-farm expenses reported. Revenues are defined as the sum of farm and non-farm revenue. All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors clustered at the level of the individual in each cohort-year are presented in parentheses. ***, **, and * represent significance at the 1, 5 and 10 percent levels, respectively.

Table 3: Unincorporated Business Performance

	(1) 𝕀(Has gross self-emp. inc.)	(2) 𝕀(Has net self-emp. inc.)	(3) Net self-emp. inc.
Younger	0.015**	0.017***	0.003**
	(0.006)	(0.006)	(0.001)
Older	-0.004	-0.008	-0.007*
	(0.010)	(0.008)	(0.004)
Difference	0.019	0.025**	0.010**
	(0.012)	(0.010)	(0.004)

Note: This Table shows the effect of additional wealth on business performance estimated using the model in equation (2). Columns (1) and (2) show the effects of $100,000 in lottery wins, while column (3) shows the effect of $1 of extra wealth. The sample is constructed based on Section 2.6. Younger and older represent winners aged 21 to 54, and 55 to 64, respectively, in the year of the win. Having gross self-employment income is measured using a dummy variable for having gross self-employment income in the tax records. Having net self-employment income is measured using a dummy variable for having net self-employment income in the tax records. Net self-employment income is measured in dollars as the gross self-employment income minus eligible deductions (similar to profits). Gross self-employment income is all self-employment income without deducting expenses (similar to revenue). All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors clustered at the level of the individual in each cohort-year are presented in parentheses. ***, **, and * represent significance at the 1, 5 and 10 percent levels, respectively.

Table 4: Wage Labor Supply

	(1) Wage earnings	(2) 𝕀(Has wage earnings)	(3) Nb of jobs	(4) Wage earnings | has job
Younger	-0.047***	-0.055***	-0.103***	-0.038***
	(0.007)	(0.007)	(0.015)	(0.011)
Older	-0.037***	-0.073***	-0.096***	-0.034***
	(0.009)	(0.013)	(0.019)	(0.011)
Difference	-0.010	0.018	-0.007	-0.003
	(0.012)	(0.015)	(0.024)	(0.015)

Note: This Table shows the effect of additional wealth on wage labor supply estimated using the model in equation (2). Columns (2) and (3) show the effects of $100,000 in lottery wins, while columns (1) and (4) show the effects of $1 of extra wealth. The sample is constructed based on Section 2.6. Younger and older represent winners aged 21 to 54, and 55 to 64, respectively, in the year of the win. Wage earnings are defined as employment income received from a business enterprise, including wages, salaries, and commissions, before deductions, and excluding self-employment income. Having wage earnings is measured with a dummy variable for having some wage earnings in the tax records. Number of jobs is defined as the number of jobs held by the individual in a tax year using employer-employee pairing derived from the administrative data. Wage earnings conditional on having a job are measured conditional on having at least one employer. All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors clustered at the level of the individual in each cohort-year are presented in parentheses. ***, **, and * represent significance at the 1, 5 and 10 percent levels, respectively.

Table 5: Long-Term Exit from Wage Labor Supply and Entrepreneurship

	5-year exit from		
	(1) Wage earnings	(2) Inc. bus.	(3) Uninc. bus.
Younger	0.046***	-0.010*	-0.005
	(0.007)	(0.005)	(0.009)
Older	0.064***	0.020**	0.014
	(0.013)	(0.009)	(0.013)
Difference	-0.018	-0.030***	-0.019
	(0.015)	(0.010)	(0.016)

Note: This Table shows the effect of additional wealth ($100,000) on the probability of exit from wage labor and entrepreneurship estimated using the model in equation (2). The sample is constructed based on Section 2.6. Younger and older represent winners aged 21 to 54, and 55 to 64, respectively, in the year of the win. We measure 5-year exits from wage earnings as having no employment income for the individual in the following 5 years from the year observed. We define 5-year exits from incorporated and unincorporated businesses as no ownership in these types of businesses for the following 5 years. All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors clustered at the level of the individual in each cohort-year are presented in parentheses. ***, **, and * represent significance at the 1, 5 and 10 percent levels, respectively.

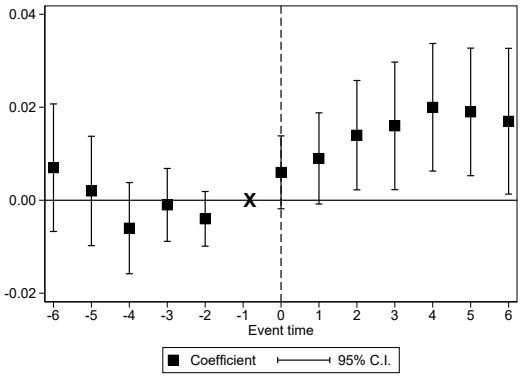
Table 6: Business Ownership and Financial Constraint Effects

	(1) Younger	(2) Older
A. Incorporated firms		
Constrained	0.011	-0.041**
	(0.007)	(0.019)
Unconstrained	0.017**	-0.018*
	(0.007)	(0.010)
Difference	-0.006	-0.023
	(0.010)	(0.022)
B. Unincorporated firms		
Constrained	0.005	-0.011
	(0.012)	(0.017)
Unconstrained	0.019*	-0.015
	(0.010)	(0.013)
Difference	-0.013	0.004
	(0.016)	(0.021)

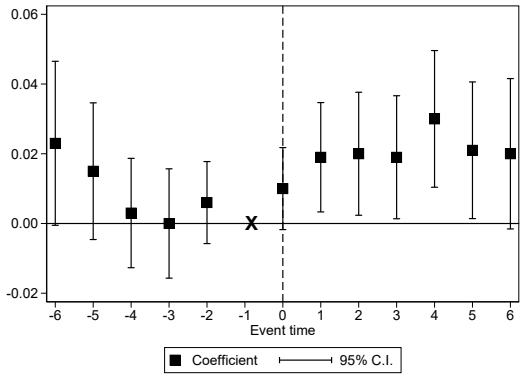
Note: This Table shows the effect of additional wealth ($100,000) on business ownership by financial constraints. The results are estimated using equation (2). The sample is constructed based on Section 2.6. Younger and older represent winners aged 21 to 54, and 55 to 64, respectively, in the year of the win. We measure having an incorporated business with an indicator variable for owning at least one incorporated business, and we follow the same definition for unincorporated businesses. We measure financial constraints with an indicator variable equal to 1 if the winner has no savings (as measured by no interest income on savings accounts, no dividends nor capital gains) and does not contribute to personal retirement accounts (no pension savings) in the pre-win years, and 0 otherwise. All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors clustered at the level of the individual in each cohort-year are presented in parentheses. ***, **, and * represent significance at the 1, 5 and 10 percent levels, respectively.

Figure 1: Business Ownership

I. Younger

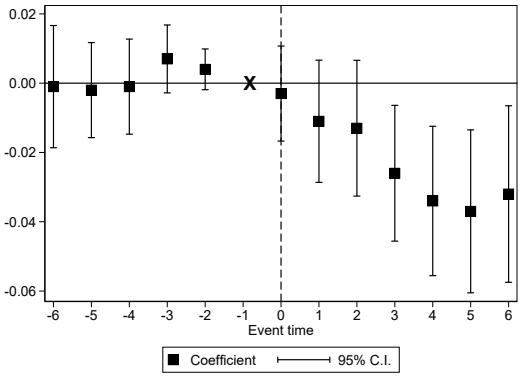


(a) Incorporated

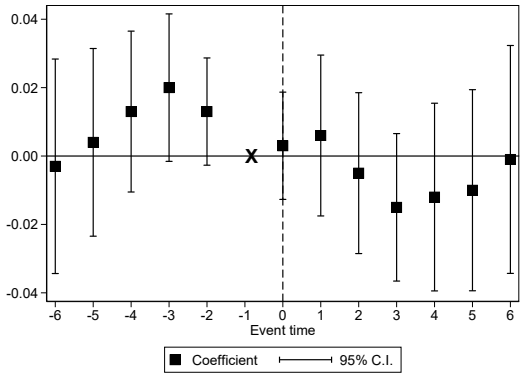


(b) Unincorporated

II. Older



(c) Incorporated

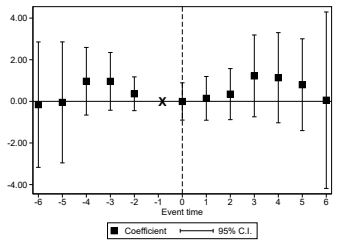


(d) Unincorporated

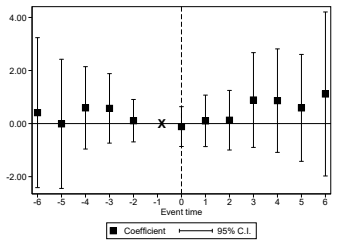
Note: This Figure shows the effect of additional wealth ($100,000) on business ownership estimated using equation (1). The sample is constructed as described in Section 2.6. Younger and older represent winners aged 21 to 54, and 55 to 64, respectively, in the year of the win. Having an incorporated business is measured with an indicator variable for owning at least one incorporated business, and we follow the same definition for unincorporated businesses. All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors are clustered at the level of the individual in each cohort-year. Point estimates are given along with the 95% confidence interval.

Figure 2: Business Performance of Incorporated Firms

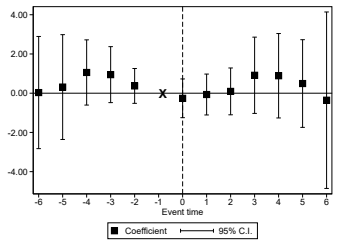
I. Younger



(a) Total sales

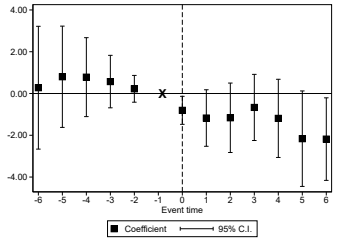


(b) Expenses

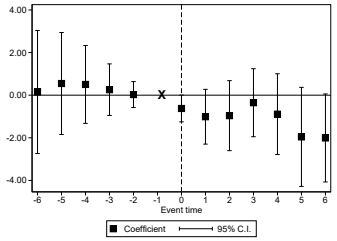


(c) Revenues

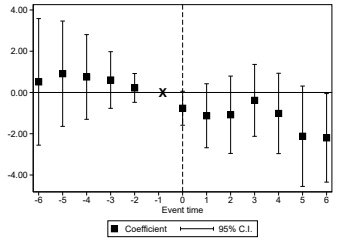
II. Older



(d) Total sales



(e) Expenses

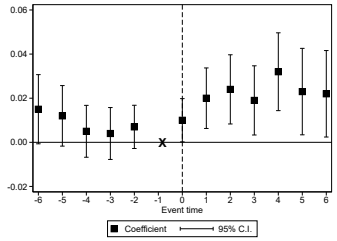


(f) Revenues

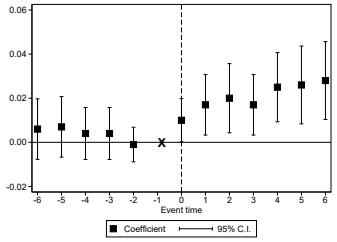
Note: This Figure shows the effect of additional wealth ($1) on business performance estimated using equation (1). The sample is constructed based on Section 2.6. Younger and older represent winners aged 21 to 54, and 55 to 64, respectively, in the year of the win. Total sales are defined as the sum of reported sales of goods and services. Expenses are defined as the sum of all non-farm expense amounts reported. Revenues are defined as the sum of farm and non-farm revenue. All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors are clustered at the level of the individual in each cohort-year. Point estimates are given along with the 95% confidence interval.

Figure 3: Business Performance of Unincorporated Firms

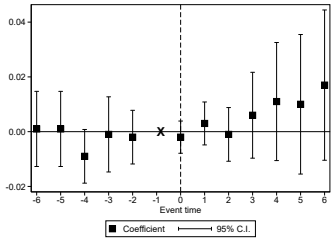
I. Younger



(a) 𝕀(Has gross self-emp. inc.)

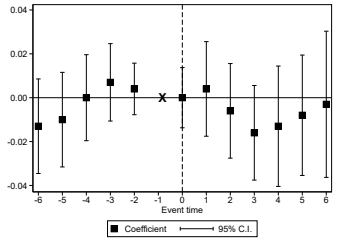


(b) 𝕀(Has net self-emp. inc.)

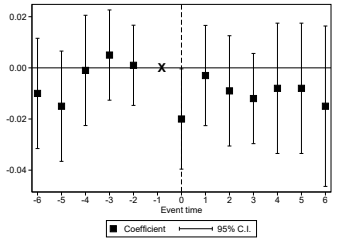


(c) Net self-emp. inc.

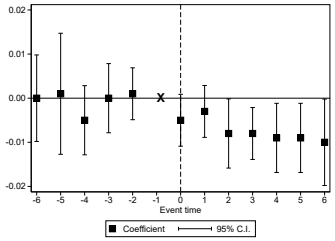
II. Older



(d) 𝕀(Has gross self-emp. inc.)



(e) 𝕀(Has net self-emp. inc.)

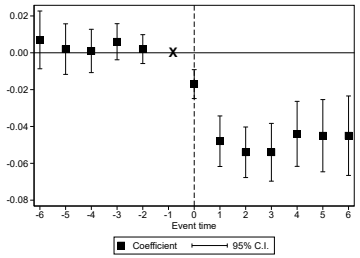


(f) Net self-emp. inc.

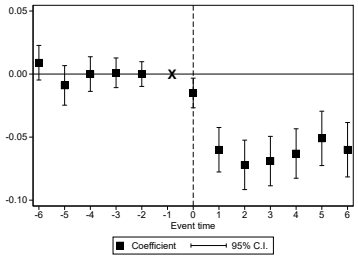
Note: This Figure shows the effect of additional wealth on business performance estimated using the model in equation (1). Panels (a), (b), (d) and (e) show the effects of $100,000 in lottery wins, while panels (c) and (f) show the effect of $1 of extra wealth. The sample is constructed based on Section 2.6. Younger and older represent winners aged 21 to 54, and 55 to 64, respectively, in the year of the win. Having gross self-employment income is measured using a dummy variable for having gross self-employment income in the tax records. Having net self-employment income is measured using a dummy variable for having net self-employment income in the tax records. Net self-employment income is measured in dollars as the gross self-employment income minus eligible deductions (similar to profits). Gross self-employment income is all self-employment income without deducting expenses (similar to revenue). All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors are clustered at the level of the individual in each cohort-year. Point estimates are given along with the 95% confidence interval.

Figure 4: Wage Labor Supply

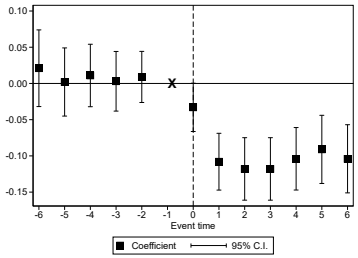
I. Younger



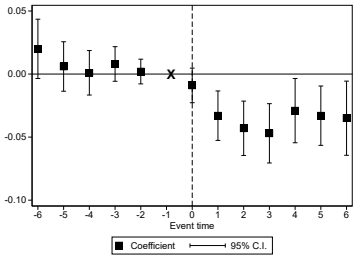
(a) Wage earnings



(b) Has wage earnings

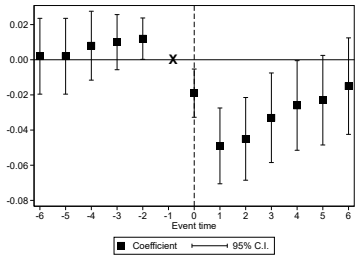


(c) Nb of jobs

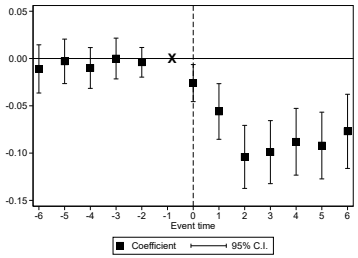


(d) Wage earnings | has job

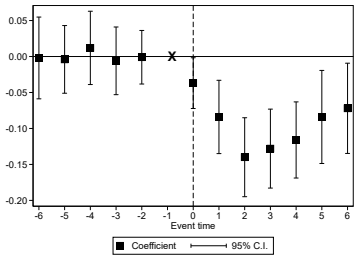
II. Older



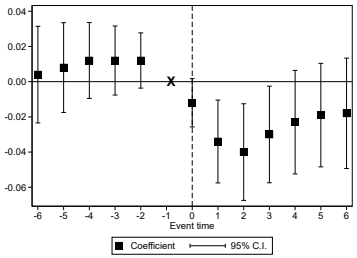
(e) Wage earnings



(f) Has wage earnings



(g) Nb of jobs

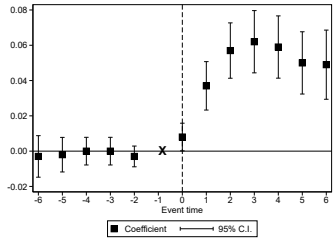


(h) Wage earnings | has job

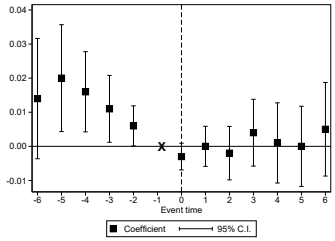
Note: This Figure shows the effect of additional wealth on wage labor supply estimated using equation (1). Panels (b), (c), (f) and (g) show the effects of $100,000 in lottery wins, while panels (a), (d), (e) and (h) show the effect of $1 of extra wealth. The sample is constructed based on Section 2.6. Younger and older represent winners aged 21 to 54, and 55 to 64, respectively, in the year of the win. Wage earnings are defined as employment income received from a business enterprise, including wages, salaries, and commissions, before deductions, and excluding self-employment income. Having wage earnings is measured with a dummy variable for having some wage earnings in the tax records. Number of jobs is defined as the number of jobs held by the individual in a tax year using employer-employee pairing derived from the administrative data. Wage earnings conditional on having a job are measured conditional on having at least one employer. All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors are clustered at the level of the individual in each cohort-year. Point estimates are given along with the 95% confidence interval.

Figure 5: Long-Term Exit from Wage Labor and Entrepreneurship

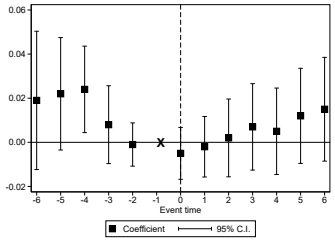
I. Younger



(a) Exit wage earnings

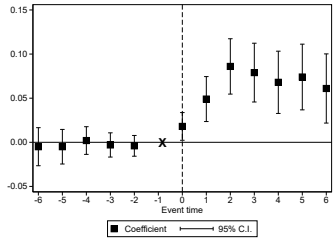


(b) Exit inc. bus.

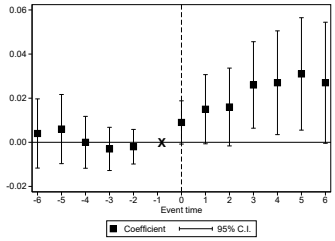


(c) Exit uninc. bus.

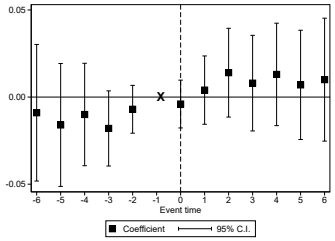
II. Older



(d) Exit wage earnings



(e) Exit inc. bus.



(f) Exit uninc. bus.

Note: This Figure shows the effect of additional wealth ($100,000) on the probability of exit from wage labor and entrepreneurship estimated using the model in equation (1). The sample is constructed based on Section 2.6. Younger and older represent winners aged 21 to 54, and 55 to 64, respectively, in the year of the win. We measure 5-year exits from wage earnings as having no employment income for the individual in the following 5 years from the year observed. We define 5-year exits from incorporated and unincorporated businesses as no ownership in these types of businesses for the following 5 years. All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors are clustered at the level of the individual in each cohort-year. Point estimates are given along with the 95% confidence interval.

A Appendix

Tables

Table A1: Definitions of Variables

Variable	Definition	Source
A. Demographics and event-study		
Unique individual identifier	Unique longitudinal person identifier (casenum)	CEEDD
Year	Year of tax record	CEEDD
Year of win (cohort)	Year of payment of the lottery prize	Lottery Corporation
Amount won	Amount of lottery prize	Lottery Corporation
Event time	Number of years from the year of winning the lottery	Derived
After	Indicator if the observed year is during the event time t+0 to t+6	Derived
Treated flag	Indicator if the individual is part of the treatment group	Derived
Age	Difference between the tax year and harmonized birth year from T1	T1PMF
Younger	Indicator variable equal to 1 if the winner is aged 21 to 54 the year of the win, and 0 otherwise	Derived
Older	Indicator variable equal to 1 if the winner is aged 55 to 64 the year of the win, and 0 otherwise	Derived
Financial constraint	Indicator variable equal to 1 if the winner has no investment income and does not contribute to personal retirement accounts in the pre-win years, and 0 otherwise	Derived
B. Wage Labor Supply		
Wage earnings	Employment income received from a business enterprise, including wages, salaries, and commissions (self-employment income is excluded)	T1PMF
$\mathbb{I}$(Has wage earnings)	Indicator for having wage earnings in the current year	Derived
Nb of jobs	The number of jobs held by the individual in a tax year using employer-employee pairing	T4ROE
Wage earnings $\mid$ has job	Wage earnings, conditional on having at least one employer	Derived
5-year exit from wage earnings	Indicator representing if the individual does not earn employment income for the following 5 years from the year observed	Derived
C. Unincorporated business		
$\mathbb{I}$(Has uninc. bus.)	Indicator for owning at least one unincorporated business	Derived
$\mathbb{I}$(Has gross self-emp. inc.)	Indicator for having gross self-employment income	Derived
$\mathbb{I}$(Has net self-emp. inc.)	Indicator for having net self-employment income	Derived
Net self-emp. inc.	Net self-employment income (in dollars)	T1FDBD
5-year exit from uninc. bus.	Indicator representing if the individual does not own any incorporated business for the following 5 years from the year observed	Derived
D. Incorporated business		
$\mathbb{I}$(Has inc. bus.)	Indicator for owning at least one incorporated business	Derived
Total sales	Sum of reported sales of goods and services	NALMF
Expenses	Sum of all non-farm expense amounts reported	NALMF
Revenues	Sum of farm and non-farm revenue	NALMF
5-year exit from incorp. bus.	Indicator representing if the individual does not own any unincorporated business for the following 5 years from the year observed	Derived

Table A2: The Effect of Wealth on Business Ownership (Full Sample)

(1)	(2)
𝕀(Has inc. bus.)	𝕀(Has uninc. bus.)
0.004	0.007
(0.005)	(0.006)

Note: This Table presents the effect of additional wealth ($100,000) on business ownership estimated using equation (2) without the interaction of Younger with After × Amount × Treated. The sample is constructed as described in Section 2.6. We identify having an incorporated business as having at least one incorporated business, and follow the same definition for unincorporated businesses. All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors clustered at the level of the individual in each cohort-year are presented in parentheses. ***, **, and * represent significance at the 1, 5 and 10 percent levels, respectively.

Table A3: The Effect of Wealth on Business Performance (Full Sample)

	(1)	(2)	(3)
A. Incorporated Business Performance			
	Total sales	Expenses	Revenues
	-0.520	-0.343	-0.720
	(0.629)	(0.566)	(0.630)
B. Unincorporated Business Performance			
	𝕀(Has gross self-emp. inc.)	𝕀(Has net self-emp. inc.)	Net self-emp. inc.
	0.010*	0.011**	0.001
	(0.005)	(0.005)	(0.001)

Note: This Table presents the effect of additional wealth on business performance estimated using equation (2) without the interaction of Younger with After $\times$ Amount $\times$ Treated. Panel A and column (3) in panel B show the effect of \$1 in additional wealth, while columns (1) and (2) of panel B show the effect of \$100,000 in extra wealth. The sample is constructed based on Section 2.6. Total sales are defined as the sum of reported sales of goods and services. Expenses are defined as the sum of all non-farm expense amounts reported. Revenues are defined as the sum of farm and non-farm revenue. Having gross self-employment income is measured using a dummy variable for having gross self-employment income in the tax records. Having net self-employment income is measured using a dummy variable for having net self-employment income in the tax records. Net self-employment income is measured in dollars as the gross self-employment income minus eligible deductions (similar to profits). Gross self-employment income is all self-employment income without deducting expenses (similar to revenue). All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors clustered at the level of the individual in each cohort-year are presented in parentheses. ***, **, and * represent significance at the 1, 5 and 10 percent levels, respectively.

Table A4: The Effect of Wealth on Wage Labor Supply (Full Sample)

(1) Wage earnings	(2) 𝕀(Has wage earnings)	(3) Nb of jobs	(4) Wage earnings | has job
-0.045***	-0.061***	-0.100***	-0.040***
(0.006)	(0.006)	(0.012)	(0.008)

Note: This Table presents the effect of additional wealth on business performance estimated using equation (2) without the interaction of Younger with After $\times$ Amount $\times$ Treated. Columns (2) and (3) show the effects of $100,000 in lottery wins, while columns (1) and (4) show the effects of $1 of extra wealth. The sample is constructed based on Section 2.6. Wage earnings are defined as employment income received from a business enterprise, including wages, salaries, and commissions, before deductions, and excluding self-employment income. Having wage earnings is measured with a dummy variable for having some wage earnings in the tax records. Number of jobs is defined as the number of jobs held by the individual in a tax year using employer-employee pairing derived from the administrative data. Wage earnings conditional on having a job are measured conditional on having at least one employer. All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors clustered at the level of the individual in each cohort-year are presented in parentheses. ***, **, and * represent significance at the 1, 5 and 10 percent levels, respectively.

Table A5: The Effect of Wealth on Long-Term Exit from Wage Labor Supply and Entrepreneurship (Full Sample)

5-year exit from		
(1)	(2)	(3)
Wage earnings	Inc. bus.	Uninc. bus.
0.053***	-0.001	0.001
(0.006)	(0.004)	(0.008)

Note: This Table shows the effect of additional wealth ($100,000) on the probability of exit from wage labor and entrepreneurship estimated using equation (2) without the interaction of Younger with After $\times$ Amount $\times$ Treated. The sample is constructed based on Section 2.6. We measure 5-year exits from wage earnings as having no employment income for the individual in the following 5 years from the year observed. We define 5-year exits from incorporated and unincorporated businesses as no ownership in these types of businesses for the following 5 years. All specifications include individual and calendar-year fixed effects, both of which we fully saturate with cohort-year fixed effects. Standard errors clustered at the level of the individual in each cohort-year are presented in parentheses. ***, **, and * represent significance at the 1, 5 and 10 percent levels, respectively.