Social Insurance and Entrepreneurship: The Effect of Unemployment Benefits on New-Business Formation

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Abstract

This paper studies the impacts of social insurance on the decisions of unemployed individuals to start businesses. Exploiting staggered changes in benefit generosity across U.S. states and over time, I find that higher unemployment insurance (UI) benefits both lower the probability that an unemployed person will become self-employed, and also extend the length of time that passes before they make such a transition. The negative effects of UI benefits are concentrated on the formation of unincorporated businesses. Unincorporated businesses created by unemployed people in higher-benefit state-periods tend to be more successful, as measured by profit and survival rate, suggesting that higher benefits mainly screen out the entry of less productive firms. The negative effects are smaller during non-recession periods and in states that offer a Self-Employment Assistance program.

Keywords: Entrepreneurship, unemployed entrepreneurs, unemployment benefits, unincorporated business, Self-Employment Assistance Program.

JEL: L26, J65, H52, E32.

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1 INTRODUCTION

Startups play a crucial role in fostering competition, pushing innovation, and generating job creation (Schumpeter, 1939; Audretsch et al., 2006; Baumol and Strom, 2007; Agarwal et al., 2010; Bjørnskov and Foss, 2013). Indeed, an abundance of new firms is critical for a healthy labor market because of the span-of-control problems (Beaudry et al., 2018). And, even though most new businesses exit in their first ten years, young businesses account for 70% of gross job creation (Decker et al., 2014).

While entrepreneurship has been studied widely, few studies have examined startup businesses founded by unemployed workers. During recessions, such as, the Great Recession of 2007–9, when the unemployment rate rose as high as 10%, the human capital of a large group of people was idle. Many unemployed people spend a long time searching for new jobs, but the effectiveness of their searching is limited by the rationing of jobs during recessions (Toohey, 2014). While for most people losing a job is a challenge and a harsh reality, it can lower the opportunity cost of engaging in entrepreneurial actions.¹ A recent report by Fairlie and Desai (2021) documents that the share of new entrepreneurs who were initially unemployed reached 30% during the COVID-19 pandemic, the highest level recorded over the past 25 years, yet our understanding of what factors impact the decision of unemployed people to start businesses remains limited.²

¹Two recent papers study how labor market distress affects entrepreneurship. Hacamo and Kleiner (forthcoming) show that labor market declines increase the number of firms created by wage workers with high entrepreneurial potential; Babina (2020) documents that the financial distress of incumbents pushes employees toward pursuing entrepreneurship.

²In the same report, the authors categorize new entrepreneurs into two groups: necessity versus opportunity entrepreneurship. Individuals who are initially unemployed before starting businesses are defined as “necessity” entrepreneurs, and individuals who come out of work, school, or another labor market status are defined as “opportunity” entrepreneurs (see Fairlie and Fossen (2018) for details).

This paper studies how the unemployment insurance (UI) system affects an unemployed person’s decision to build a business, with a primary focus on the impact of the generosity of unemployment benefits. Following [Hsu et al. \(2018\)](#), I employ the product of the maximum weekly benefit and the maximum duration as a measure of the generosity of each state’s UI benefits, and exploit staggered changes in the generosity of benefits across states and over time.³ To filter out the effect of other policies, macroeconomic shocks, or shocks to some specific states, I utilize unemployed people who were ineligible for UI benefits as the control group, because changes in UI benefit generosity should not affect their decision to start a firm. The key identifying assumption is that absent changes in benefit generosity, unemployed individuals who are either eligible or ineligible for UI benefits would have similar patterns of entrepreneurial activity.

My empirical results show that higher UI benefits dissuade unemployed people from starting a firm—a one-standard-deviation increase in log state maximum UI benefits (about \$2,260 or 30% of the mean level) reduces the likelihood of starting a business among the unemployed by 0.26 percentage points—that is, 10.31% of the average transition rate. All of the estimates control for individual demographics, household-level income, and state economic conditions to ensure that the results are not driven by the differences between individuals, households, or economic situations.

I surveyed all states’ Labor Departments to understand how starting a new business would affect UI eligibility. Among those departments that responded to the questionnaire, 88% allow unemployed people to start a business while receiving UI benefits, but any profit (gross

³A few recent papers use the same setting to study the firm-level consequences of UI programs, for instance, [Flammer and Luo \(2017\)](#), [Van Doornik et al. \(2018\)](#), [Ng et al. \(2019\)](#), and [Keum and Meier \(2020\)](#).

earning in some states) from their business has to be deducted from their unemployment benefits.⁴ This deduction requirement causes UI benefits to act as a screening device. Only when business profits exceed the total amount of UI benefits can unemployed entrepreneurs receive positive marginal revenue; otherwise, they receive zero marginal revenue and their total income is bounded by the amount of UI benefits they receive. Hence, higher benefits are likely to screen out more lower-quality unemployed entrepreneurs.

To tease out the screening effect of higher benefits, I distinguish two types of businesses, unincorporated and incorporated, and explore the heterogeneity of these two types. A major difference between them is that incorporated businesses have a legal identity separate from their owners and provide limited liability, so this legal form is usually chosen when founders seek to undertake large, risky projects. When these features are unimportant, founders tend to choose to establish unincorporated type of business. Not surprisingly, a study by [Levine and Rubinstein \(2017\)](#) shows that median hourly earnings in incorporated businesses are about 80% greater than those in unincorporated businesses using the March Annual Supplement of Current Population Survey (CPS) data. Using CPS data, I find that higher benefits have a significantly negative effect on the creation of unincorporated businesses, but a much smaller and insignificant effect on the formation of incorporated businesses. Higher benefits also delay the decision of unemployed people to start unincorporated businesses, but have no effect on the waiting period before incorporated businesses are created. These results suggest that higher UI benefits mainly deter the creation of less profitable businesses, which is consistent with the screening effect.

⁴Besides the requirement of profit deductions, all the states also require people to satisfy job search requirements and be available to accept a full-time job to keep receiving benefits. See [Table A6](#) in the Online Appendix for details of the questionnaire.

One important implication of higher UI benefits screening out lower-quality businesses is that the quality of entrepreneurial entry is expected to be higher in the state-periods with higher benefits. Indeed, using the Survey of Income and Program Participation (SIPP) data, I show that unemployed people who do start businesses in higher-benefit states tend to have better outcomes, as measured by business profits and survival. These results reinforce my conjecture that higher UI benefits mainly screen out businesses with lower expected profits, and are then associated with higher quality of entry.

Aware of this disincentive effect and in an attempt to boost entrepreneurship, eight states have adopted the Self-Employment Assistance (SEA) program. This program allows the unemployed who are involved in starting new businesses to receive the same amount of benefits as other unemployed people, and waives job search requirements to allow them to focus on their businesses (see [Kugler \(2015\)](#) and [Messenger et al. \(2002\)](#) for a detailed description of this program). The federal Middle Class Tax Relief and Job Creation Act of 2012 provides grants to each state to encourage them to adopt the SEA program (SEC. 2182 and 2183).

Ideally, introducing this program should stimulate entrepreneurship among the unemployed, and higher benefits in states offering the SEA program should have a smaller negative impact on entrepreneurship, because (i) this program removes the profit deduction requirement; and (ii) higher UI benefits could mitigate the financial constraints on unemployed individuals, which have been shown to inhibit the creation of new firms ([Evans and Jovanovic, 1989](#); [Kerr and Nanda, 2009](#); [Adelino et al., 2015](#); [Schmalz et al., 2017](#)). Focusing on states that offer the SEA program, I find the negative effect that high unemployment benefits have on starting a firm is indeed much smaller, compared to states that have not

adopted the SEA program.

My results make two main contributions to the literature on how public policies affect entrepreneurial entry and performance: (i) I provide detailed micro evidence on how the UI system in the US affects the creation of two types of businesses (unincorporated and incorporated) by unemployed people; and (ii) I show that high UI benefits influence the composition of entrepreneurs who enter self-employment by screening out lower-quality businesses.

Several papers have studied the relation between UI systems and self-employment. [Hombert et al. \(2020\)](#) study a large-scale French reform that provided generous downside insurance for unemployed individuals who started a business. They find that after the risk of losing UI benefits was reduced due to the reform, monthly firm creation increased by 25%. Complementing their findings, I show that higher benefits significantly impede new business creation by unemployed workers, while increasing the average quality of newly created firms in the context of the US unemployment insurance system, where profits have to be deducted from UI benefits. [Koellinger and Minniti \(2009\)](#) find that higher unemployment benefits crowd out nascent entrepreneurial activity, although this finding applies to the general population rather than to the unemployed; and [Røed and Skogstrøm \(2014\)](#) study the transition to entrepreneurship around the time of UI exhaustion, employing variations in benefit duration rather than maximum benefits.

My paper contributes to the literature on unemployed entrepreneurs ([Dencker et al., 2009](#); [Caliendo and Kritikos, 2010](#); [Dencker and Gruber, 2015](#); [Amorós et al., 2019](#)). In this strand of literature, unemployed entrepreneurs are also classed as necessity entrepreneurs, in contrast to opportunity entrepreneurs who are pulled into entrepreneurship by its attractiveness. Such a dichotomous view often considers necessity entrepreneurs as homoge-

neously low-skilled individuals and relegates the differences in the constraints faced by them (Dencker et al., 2021). One exception is Nikiforou et al. (2019), who explore the impact of unemployment duration on a founder’s industry-choice decision. I extend this literature by studying how the large social program—unemployment insurance—affects the decisions and composition of necessity entrepreneurs.

My paper also contributes to the large literature studying the drivers and constraints affecting people’s decisions to start a business (see a survey by Åstebro et al. (2014)). Previous papers find that important factors include risk preferences, political connection, overconfidence and non-pecuniary benefits (Hurst and Pugsley, 2011; Frederiksen et al., 2016; Burt and Oppen, 2020; Landier and Thesmar, 2008). While all of these factors could apply to the unemployed, my paper investigates a new and important constraint that most unemployed entrepreneurs face—the unemployment insurance system. In this regard, my results enrich the discussion in Campbell et al. (2017), who summarize labor market frictions on employee transitions to entrepreneurship.

Finally, my paper is related to a growing literature that studies the policy determinants of firm entry and entrepreneurial outcomes (Autor et al., 2007; Castellaneta et al., 2020; Bradley et al., 2021; Stevenson et al., 2021). The closest paper to mine is Starr et al. (2018), who show that greater enforceability of non-compete agreements screens out lower-quality entrants, and is then associated with lower entry rate, but larger initial size and a higher survival rate of within-industry spinouts. My empirical results suggest that higher UI benefits have a similar screening effect, because total UI benefits bound the expected income for a founder with less profitable projects, and then dissuade unemployed entrepreneurs who are likely to have lower expected profits from entering the market.

The rest of this paper proceeds as follows. [Section 2](#) introduces the unemployment insurance system in the United States, while [Section 3](#) proposes the economic framework and develops hypotheses. [Section 4](#) describes the data and empirical strategy. [Section 5](#) presents the main results. [Section 6](#) concludes and discusses policy implications.

2 UNEMPLOYMENT INSURANCE SYSTEM

The current UI system in the United States is designed to provide income to unemployed workers for a limited period, given that they satisfy four basic requirements. First, claimants must have had a sufficiently long working history and earned a sufficient amount of money in the previous year or five quarters. Second, claimants must have lost their job through no fault of their own. A person who quits is typically not eligible for UI benefits, although some states have exceptions—for example, if the departure is caused by sexual assault, domestic violence, or a spouse’s job relocation, he or she may qualify for partial or full unemployment benefits. However, a worker who becomes unemployed after closing his or her own business is not eligible for UI benefits. The third requirement relates to job search effort. Unemployed people are required to make contact with potential employers, keeping a record of these contacts for each week. The final requirement is that claimants must be available for full-time work.

While the requirements for UI eligibility are clear, it is unclear how starting a business while collecting UI benefits is treated in this system: is it treated as finding a new job, a part-time job, a side business, or a separate category? How does the decision to start a new firm jeopardize a person’s eligibility for UI benefits and the amount he or she will receive? I

searched states' Labor Department websites and UI claimant handbooks, but unfortunately, the answers to these questions are not clear in most states.⁵

To understand these policy details in practice, I devised a simple questionnaire with six questions and sent it to the Labor Department of each state via email or online form (see [Table A6](#) in the Online Appendix for the questionnaire). Out of 17 states that replied, all but two indicated that they allow unemployed people to start a business while receiving benefits. All 17 states, however, require people to satisfy job search requirements and be available to accept a full-time job in order to keep receiving benefits, and any profit (gross earnings in some states) from business has to be deducted from their UI benefits using different rules. For example, South Dakota requires that “seventy-five percent of [a person’s] earnings over \$25 will be deducted from their weekly benefit amount”; while in West Virginia, “a person would have to report his or her gross earnings minus any expenses for the business. A person can earn up to \$60 per week without any deducting earnings from his or her weekly benefit amount. After that, we would deduct dollar for dollar from the weekly benefit amount.” Therefore, if their business profits are below a certain threshold, unemployed persons earn zero marginal profit from effort.

In the process of contacting each state’s Labor Department, I learned about the Self-Employment Assistance (SEA) program, which aims to remove barriers for the unemployed who plan to start a firm. This program targets unemployed people who wish to start their own business by waiving their job search requirements and allowing them to receive full UI benefits without deduction. As of 2016, eight states had this program in 2016 (based

⁵Through my search, I was only able to find relevant information on the Labor Department websites of five states (Maryland, Minnesota, Nevada, Ohio, Virginia).

on information in [Kugler \(2015\)](#) and [Messenger et al. \(2002\)](#)). Two states (Pennsylvania and Maryland) discontinued it in 2009 (having conducted the program in 1997 and 2000, respectively) due to a lack of funding. Maine, New York, and Rhode Island have had this program since 1995, Delaware and Oregon since 1996, and New Jersey since 1998. Mississippi and New Hampshire launched the program recently (in 2012 and 2013, respectively) after former President Barack Obama signed the Middle Class Tax Relief and Job Creation Act of 2012, which provides grants to each state to promote the implementation of SEA. Although the SEA program attracts a lot of attention and discussions (see [Weigensberg et al. \(2017\)](#) for details), due to participation restrictions, it is a small program so far, with only about 2,000 participants each year (see the Green Book 2016 published by the Congressional Research Service).

To understand the potential effect of the UI system on entrepreneurship among the unemployed, we need to know how large benefits would usually be. The total amount of benefits depends on both the number of weeks that a claimant can collect benefits and the weekly amount. To determine the weekly amount, the unemployment agency in each state applies a benefit schedule linked to the individual's prior wage, but capped at the state's maximum weekly benefit (the replacement rate does not vary much below the earning cap). State benefit caps are binding for about half of UI recipients ([Hsu et al., 2018](#)). The length of time that benefits can be received (i.e., duration) is also capped. I use the product of the maximum weekly benefit and maximum duration to measure the generosity of each state's UI benefits annually between 1995 and 2016, following [Agrawal and Matsa \(2013\)](#), [Flammer and Luo \(2017\)](#), and [Hsu et al. \(2018\)](#).

Many factors lead to variations in UI benefits across states and over time periods. First,

economic conditions, like local unemployment rates and average wage levels, usually relate to changes in benefits. There are, however, noneconomic reasons that also influence changes in UI benefits: governors could increase UI benefits to win reelection, and political parties could enact different policies in the UI system. For example, in California, the UI maximum benefit was kept at \$230 per week for more than a decade, until it was increased to \$330 in 2002, allegedly to bolster political support for the governor’s reelection ([Agrawal and Matsa, 2013](#)). [Table 2](#) and [Table 3](#) also show that changes in benefit generosity appear to be uncorrelated with state macroeconomic variables or changes in other government benefits, etc., conditional on state and year fixed effects, which is consistent with the findings of [Hsu et al. \(2018\)](#); thus, the variation in benefit generosity could be considered as plausibly exogenous.

Moreover, according to my questionnaire results (question 4), once a claimant starts to receive benefits, the amount will not change, even he or she is receiving the maximum benefit, and there is an increase in the maximum benefit during the periods that he or she receives it. This policy means that there is no variation in UI benefits for each unemployment episode of an unemployed person. In the empirical section, I use the maximum benefits in the month that people lose their job to measure the generosity of benefits they face.

3 HYPOTHESES DEVELOPMENT

After understanding the policy details, how then should UI benefits affect an unemployed person’s decision to start a business? What types of businesses are more likely to be affected? How will benefits affect the composition of new ventures? In this section, I build a theoretical

framework and develop six hypotheses to examine these questions.

3.1 UI Benefits and business creation

The traditional job search model suggests that UI benefits distort the relative price of leisure and consumption, reducing the marginal incentive to search for a job (Pissarides, 1985; Mortensen and Pissarides, 1994). The same logic can also apply to becoming self-employed: consider starting a business and getting a new job as two alternatives to staying unemployed. More generous UI benefits will increase reservation profits or reservation wages, and thus increase the probability of staying unemployed. This has also been interpreted as the “substitution effect.” Chetty (2008) proposes another channel through which UI benefits affect search intensity, called the “liquidity effect.” The idea is that many unemployed individuals have limited liquidity and exhibit high sensitivity of consumption to cash on hand, while UI benefits can increase cash on hand and then relieve the pressure to find a new job quickly. Both of these two effects mean the unemployed are more likely to stay unemployed, and are less likely to start businesses. There are, however, other channels through which UI benefits can influence the decision to start a business.

Starting a business is an investment decision that involves a lot of uncertainty. How to cover living expenses in the case of loss or failure is an important question facing most unemployed individuals who consider starting businesses. Most do not have significant savings, so UI benefits would be useful to cover the basic costs of living in the case of failure—thereby reducing tail risk (Flammer and Luo, 2017; Hombert et al., 2020). This can be called the “insurance effect.” In this sense, the UI system helps to reduce risk and provides downside

insurance, so more generous benefits could prompt more unemployed individuals to start businesses. In the current UI system, however, profits in most states (i.e., states without the SEA program) need to be deducted from UI benefits, and all job search efforts still need to be satisfied. This profit deduction and other extra requirements enlarge the disincentive effect of UI benefits and could dominate other effects. This leads to my first hypothesis:

Hypothesis 1. *Higher UI benefits have a negative impact on the probability of unemployed people's transition to entrepreneurship.*

3.2 Screening out effects of UI benefits

The requirement in UI policy that business profits have to be deducted from UI benefits acts as a screening device that generates heterogeneous effects on different types of businesses. For founders who plan to start small businesses, whose expected profits are below a certain threshold, their total income will be bounded by the total amount of UI benefits they could receive. Hence, the marginal profit of starting a business is zero, so the negative effect should be more salient for this type of business. For owners who have good ideas and plan to build businesses with larger expected profits, the disincentive effect should be less important, because once their profits are above the total amount of UI benefits, their total income is no longer bounded, and the marginal profit of their effort becomes positive.

Prior research has shown that incorporated businesses are usually much more profitable, growth-oriented, and more likely to undertake large, risky investment than unincorporated businesses (Levine and Rubinstein, 2017, 2018; Fairlie, 2020; Can and Fossen, 2020). Moreover, the legal form of both types of business is quite stable: unincorporated businesses

rarely incorporate, and incorporated ones rarely become unincorporated sole partnerships, reflecting the ex ante nature of the business rather than its ex post performance (Levine and Rubinstein, 2017). Based on these prior findings, I categorize businesses created by unemployed people into two groups, unincorporated vs. incorporated, and propose the following hypothesis:

Hypothesis 2. *Higher UI benefits mainly deter the creation of unincorporated businesses, and do not affect the probability of starting incorporated businesses.*

The other possible response to the profit deduction requirement of the UI system is to delay the decision to open a business until the expiration of UI benefits. Unemployed people may satisfy the search requirement to receive benefits, while spending time setting up a business. Then, they can open the business on the day benefits end. In this case, higher UI benefits would essentially extend the duration of unemployment and delay the starting of a business, leading to a longer waiting period, especially for businesses that do not make large profits, like unincorporated businesses. However, higher UI benefits should have a relatively small effect on the waiting period for starting incorporated businesses. Therefore, I propose:

Hypothesis 3. *Higher UI benefits mainly delay the creation of unincorporated businesses, but have no such effect on the creation of incorporated businesses.*

Because higher UI benefits dissuade the entry of unemployed entrepreneurs who have lower-quality projects, we expect that unemployed people who do start unincorporated businesses should on average have better outcomes. I consider two main measures for firm outcomes: profits and survival. Hence, the next hypothesis follows:

Hypothesis 4. *Unincorporated businesses created by unemployed people in the higher-benefit state-periods tend to earn more profits and have higher survival rates.*

3.3 Heterogeneous effects across states and periods

In [section 2](#), I mentioned that eight states have adopted the SEA program, which allows the unemployed who start new businesses to receive the same amount of benefits and waives the job search requirement. The program is designed to encourage and enable unemployed workers to create their own jobs by starting their own small businesses. Under this program, business profits do not need to be deducted from UI benefits. Hence, their total income is no longer bounded by the total benefits, even for those who start less profitable businesses; they can keep all their profits as well as receive regular benefits. The screening effect, therefore, should be less salient in state-years with this program, i.e., the negative effects of UI benefits on business creation should be relatively smaller. Hence,

Hypothesis 5. *The negative effect of UI benefits on business formation is smaller in state-years that have adopted the SEA program.*

The number of unemployed workers increases sharply during recession, making their transitions to entrepreneurship even more important. For example, the number of unemployed persons reached 23 million in April 2020 due to the outbreak of the COVID-19 pandemic, and 15 million in late 2009, due to the financial crisis.⁶ Because anticipated profits from businesses decrease during recession, while UI benefits usually increase, more unincorpo-

⁶These numbers are from reports of the U.S. Bureau of Labor Statistics (see <https://www.bls.gov/opub/ted/2020/unemployment-rate-rises-to-record-high-14-point-7-percent-in-april-2020.htm> and <https://www.bls.gov/opub/mlr/2018/article/great-recession-great-recovery.htm> for the two most recent recessions.)

rated businesses might have expected profits below the threshold and would subsequently be screened out during economic downturns (see [Bartik et al. \(2020\)](#) for a survey results on business owners’ expectations during the pandemic.) Thus, we can expect that higher UI benefits will have a larger negative effect on transitions to entrepreneurship during recessions relative to non-recession periods. Hence,

Hypothesis 6. *The negative effect of UI benefits on transitions to entrepreneurship is larger in recession periods than in non-recession periods.*

4 DATA AND EMPIRICAL STRATEGY

4.1 Data description

I use three sources of data. Information on each state’s benefit schedule is obtained from the U.S. Department of Labor’s publication “Significant Provisions of State UI Laws,” which provides information on maximum duration and maximum weekly benefit amounts for each state and each year from 1995 to 2016.⁷ I use the product of these two maximums to measure the generosity of UI benefits (max benefits) for each state in each year. To isolate the real changes in UI benefits, I use monthly CPI provided by the U.S. Bureau of Labor Statistics to adjust the max benefits. I take the price level in January 1995 as the baseline.

The information on individuals’ labor market status mainly comes from Current Popu-

⁷For each state and year, the Department of Labor provides the maximum duration and weekly benefit in January and July. I combined this information and adjusted it using the monthly inflation rate. I also cross-checked the effective date of benefit changes through reading the relevant description in the Department of Labor’s Annual Reports on State UI Legislation, and found that most changes became effective at the beginning of January or July, although a few changes were made in months other than January and July, which might create measurement errors.

lation Survey (CPS) monthly data. In these data, each individual receives an interview per month for four consecutive months, followed by a gap of eight months. After that, the same person receives an interview every month for an additional four months. Assuredly, some interviewees do not complete all eight interviews. Each month, interviewees are asked about their labor market status: whether or not they are unemployed. Those who are not unemployed are asked whether they have a paid job or are self-employed. Those who report having started a business need to state whether the business is incorporated or unincorporated.

Information on reasons for unemployment is also available, sorted into five different categories: (1) Job loser/On layoff; (2) Other job loser; (3) Temporary job ended; (4) Job leaver; (5) Re-entrant. I grouped the first two categories into the “Layoff” group and the last three into the “Quit” group. In the “Layoff” group, people are likely to be eligible to receive UI benefits if they satisfy certain requirements, while those in the “Quit” group are not eligible for UI benefits. I validated the accuracy of this proxy for UI eligibility by embedding information from the Displaced Worker Supplement concerning whether individuals “received unemployment insurance benefits after that job ended.” [Table A1](#) in the Online Appendix shows that out of the total 2,716 matched observations, 1,235 individuals in the “Layoff” group reported that they received UI benefits, and only 648 respondents reported that they did not receive benefits. Similarly, the number of people in the “Quit” group who reported not receiving benefits was greater than the number of those who reported receiving benefits. These results show that overall the quality of this proxy is good, although it includes measurement errors. I obtained the CPS and its supplement data sets from the IPUMS-CPS website ([Ruggles et al., 2015](#)).

As I focus on the decisions of unemployed people and how their job status changes

after being unemployed, I include only people who were unemployed during at least one period of the sample, and not self-employed before losing a job, to ensure that those in the sample would be eligible for UI benefits. The age restriction is between 20 and 70. I also set a restriction that unemployed people who do not switch to self-employment have to stay in the sample for at least three months after losing jobs. This ensured that I would have reasonably long periods to observe their choices.⁸ I keep one observation for each individual, because according to the survey results I collected, UI benefits will not change once unemployed people start to receive UI, which means there is no variation in UI benefit for each unemployment episode.

Although the CPS data contain a rich set of individual level variables, like gender, age, education, family income, marital status, etc., they do have a few limitations. First, they do not have detailed information about business performance, like profits, sales, or size/employment. Second, in the monthly CPS data, I could not directly observe whether people received UI benefits, although I validate the accuracy of using people being laid off as a proxy for eligibility, using information from the annual Displaced Worker Supplement. Third, for each respondent in the CPS data, I can observe their activities for at most 16 months, which may not be long enough to observe their transition decision.⁹

To overcome these limitations, I employ alternative longitudinal household data—the Survey of Income and Program Participation (SIPP)—from the US Census Bureau. The SIPP is well suited for my study because it has rich information about business profits and

⁸Results are robust without this restriction, but a little smaller in magnitude.

⁹The eight-month gap between interviews might create measurement errors, because I assume an unemployed person transitions from unemployment to self-employment if he or she is unemployed in the last month of the first four consecutive interviews, and self-employed in the first month of the second four consecutive interviews.

whether respondents received UI benefits, and it tracks respondents for a longer time. The number of observations in the SIPP, however, is much smaller than that of CPS. It tracks 60,000–80,000 individuals for up to 64 months. My study examines data from the three most recent SIPP panels starting in 2004, 2008, and 2014, respectively. The 2004 and 2008 panels interviewed respondents every four months, commonly referred as a wave, following respondents for 48 and 64 months, respectively. Nevertheless, there was a redesign in the 2014 SIPP panel, which shifted interviews from occurring every four months to one annual interview, covering years 2013–16.¹⁰ Because SIPP data provide information about whether the respondent received UI benefits, I directly consider people who received UI benefits right before starting businesses as the treatment group (represented by the dummy variable “*Received UI benefits*”). This group of people should be affected by changes in UI benefits. Other unemployed individuals who did not receive UI benefits are then in the control group.

Table 1 shows the summary statistics of all variables from CPS used in this paper. There are 252,791 observations in the main sample. In the sample period, about 2.55% of unemployed people choose to start a business after losing a job; 2.30% of them choose to start an unincorporated business, and only 0.25% decide to start an incorporated business. The average maximum benefit, adjusted for monthly inflation, is \$7,535 (about \$289 per week), and the average log max benefit is 8.88. The average unemployment rate from 1995 to 2016 is 4.86%. Based on my classification, 46% of unemployed people are laid off, so they are likely to be eligible for UI benefits. About 15% of state-periods have the SEA program.

¹⁰Despite the comprehensive information contained in the SIPP data, it covers a relatively small number of unemployed entrepreneurs compared to CPS, due to its smaller sample size and generally low percentage of unemployed people switching to self-employment. The smaller sample of SIPP restricts the ability to estimate the effect of UI benefits precisely in some settings. For more technical details on the design of the SIPP, see the Census Bureau’s website: <https://www.census.gov/programs-surveys/sipp/data/datasets.html>.

The average person in the sample is 37 years old, 49% are female, 39% are married with a spouse present, 25% have a college degree or above, and 32% have a spouse who had a job when the respondent became unemployed. CPS data also provide categories of family income. In my sample, 30% have a family income below \$20,000; 33% have a family income between \$20,000 and \$50,000; 13% have a family income between \$50,000 and \$75,000; and only 14% have a family income above \$75,000.

[INSERT TABLE 1 HERE]

Consistent with expectation, an increase in max benefits is correlated with larger state unemployment insurance payments. Employing the semi-annual data on state UI and other payments from year 1995 through 2016 from the United States Bureau of Economic Analysis' (BEA) regional economic accounts, I regress the log of total UI benefit payments on the log of max UI benefit with state and period fixed effects controlled. Because the max benefit information from the U.S. Department of Labor is semi-annual, all the regressions use the same frequency. The results, shown in column (1) of [Table 2](#), indicate that the elasticity of total UI payments to maximum benefits is approximately 0.88 in this period.

One concern over the changes in UI benefit is that it might be correlated with other government benefits or transfers, which may confound my estimates. In columns (2)–(4), I test the relations between max UI benefit and state social security benefits, health insurance payment (combining Medicare and Medicaid benefits), and all other personal transfers. The results show that the elasticities of state social security payments, health insurance payments, and all other transfers to max UI benefit are all small, and not significant, meaning that changes in max UI benefits are not accompanied by changes in other benefits after controlling

for both state and period fixed effects.

[INSERT TABLE 2 HERE]

Another concern is that the changes in max UI benefits may be related to economic conditions, and these economic variables could affect people’s decision to start a business. To investigate the determinants of max benefits, I test the relation of max benefit with macroeconomic variables conditional on state and period fixed effects in [Table 3](#). Specifically, I obtain the semi-annual unemployment data from Local Area Unemployment Statistics (LAUS), average wage and employment information from the Quarterly Census of Employment and Wages (QCEW), and regress the max benefit on these variables.¹¹ The results in [Table 3](#) show that there is no statistically significant relationship between max benefit and unemployment rate, monthly average wage, or total employment.

[INSERT TABLE 3 HERE]

4.2 Empirical strategy

I mainly rely on the linear probability model to analyze the effects of UI benefits and other factors at the individual or firm level. The main specification is as follows:

$$Y_{ist} = \beta_1 \times \log(\max UI benefit)_{st} + \beta_2 \times \log(\max UI benefit)_{st} \times Layoff_{ist} \\ + \beta_3 \times Layoff_{ist} + \beta_4 \times X_{ist} + \gamma_t + \alpha_s + \epsilon_{ist}$$

where i indexes individual/business, s indexes state, and t indexes year-month. Y_{ist} refers to

¹¹As mentioned before, the max benefit data are semi-annual, so all the regressions use the same frequency.

the outcomes of interest for individual/firm i in state s and year-month t : a dummy variable indicating that this unemployed person has switched from unemployment to self-employment; log profits of new businesses created by unemployed people; dummies for surviving 12, 18, 24, 36 months. *Max UI benefit* is the product of maximum weekly benefit and maximum duration. I follow [Hsu et al. \(2018\)](#) in interacting *Layoff* with $\log(\text{max UI benefit})_{st}$, so that I use unemployed people who are ineligible for the UI benefits as the control group, because changes in UI benefit generosity should not affect their decision to start a firm.

The key identifying assumption is that absent changes in benefit generosity, people who are eligible or ineligible for UI benefits would have had similar patterns of entrepreneurial activity. $\log(\text{max UI benefit})_{st}$ is demeaned (with respect to the mean for the entire sample) before it is interacted with *Layoff*, so the coefficient on *Layoff* represents the change in the probability of switching to self-employment associated with being laid off in a state with average UI generosity. X refers to the state unemployment rate and demographic variables, including age, education, marital status, spouse’s job status, and family income. [Table A7](#) in the Online Appendix presents a detailed explanation of these variables. I also add state (α_s), year by month (γ_t) fixed effects. Besides using this linear probability model, I also employ multinomial logit regression to study the determinants of unemployed people’s varied choices: (1) starting an unincorporated business; (2) starting an incorporated business; (3) finding a new job; and (4) dropping out of the labor force. All standard errors are clustered at the state level, except three columns in [Table 8](#), where standard errors are clustered by state and year, because of too few states in that sub-sample.

5 EMPIRICAL RESULTS

5.1 Overall effects of UI benefits on switching to self-employment

Table 4 shows the effects of UI benefits on starting a business. Column (1) uses $\log(\text{UI max benefit})$ as the key explanatory variable, and adds year and state fixed effects. As I mentioned before, changes in UI benefits are correlated with local economic conditions, and these economic conditions in turn affect unemployed people’s decisions to start a business. Hence, I also add the unemployment rates in the current month and in the previous three months as proxies for local economic conditions. The second column adds a few control variables at the individual level. After controlling for age, education, and family income, the coefficient on *Layoff* becomes significantly negative, meaning that laid off workers have a 0.239 percentage points less probability of starting a firm compared to unemployed people who quit their job and are then likely to be ineligible for UI benefits at the mean level of benefits. The third column includes the month fixed effects. The coefficients of maximum benefit in these three columns are negative but not statistically significant. However, this average insignificant effect might disguise the effect on the relevant sub-population.

Both columns (4) and (5) add the interaction of $\log(\text{max UI benefit})$ and *Layoff* to allow the different coefficients of $\log(\text{max UI benefit})$ by layoff status. As I mentioned in Section 2, people who quit their jobs are not eligible for UI benefits, so the change in UI benefits should not affect their decision of whether or not to start a firm. This group of people could therefore be used as the control group. Any observed differing impacts of UI benefits on these two groups should be caused by benefits per se and not by any other

factors.

Column (4) also adds the month fixed effects besides the state and year fixed effects to control for potentially different patterns of entrepreneurial activity across months. One concern is that a small part of the variation in UI benefits within a state comes from the inflation/CPI adjustment, although most variations come from policy changes. Column (5) adds year by month fixed effects, so that I focus only on the variation in benefits caused by policy changes. This is also my preferred specification.¹² The results in both columns (4) and (5) show that the increases in $\log(\max UI\ benefit)$ significantly lower the probability of becoming self-employed. The coefficient estimate on the interaction in column (5) is -0.876 , indicating that, for a 20% increase in the maximum UI benefit, the probability of switching from unemployment to self-employment declines by 0.175 ($0.876 \times 20/100$, because the dependent variable is scaled by 100) percentage points.

This magnitude is relatively smaller than what I obtain in column (2) of [Table A2](#) in the Online Appendix, where I use a dummy variable to indicate large changes in UI benefit (increase or decrease of more than 20%). The coefficient there shows that a 20% increase in maximum UI benefit reduces the probability of self-employment by 0.317 percentage points, and a 20% decrease in maximum UI benefit has an even bigger positive effect, of about 0.791 percentage points. The coefficient in column (5) of [Table 4](#) implies that a one-standard-deviation increase in $\log(\max UI\ benefit)$ (0.30) reduces the probability by 0.263 percentage points, or about 10.31% compared with the mean level (2.55%). Overall, consistent with Hypothesis 1, these results show that higher UI benefits reduce the probability of transition

¹²This specification is used for all the following tables except [Table 6](#), which uses two specifications: (1) with no fixed effects; (2) with state, year and month fixed effects. The reason I do not use state and year by month fixed effects is that the model does not converge with too many dummy variables.

from unemployment to self-employment.

The coefficients of demographic variables are also of interest. Unemployed people with a spouse who has a job are about 0.185 percentage points higher, or about 7.26% higher compared with the mean level, in the probability of switching to self-employment. The age pattern of switching from unemployment to self-employment is an inverted U-shape, with a peak around age 45. Generally, people who are male, married, or have a college degree are more likely to switch to self-employment after losing a job. Similar results have been found by [Woronkowicz and Noonan \(2019\)](#), who also use the CPS data but focus on the choice of one type of professionals—artists. Unemployed people at the highest family income level (above \$75,000) are more likely to start a business. A higher unemployment rate in the previous three months is positively related with the probability of starting a business, consistent with the finding of [Koellinger and Thurik \(2012\)](#) at the national level.

[INSERT TABLE 4 HERE]

5.2 Heterogeneous effects on two types of businesses

In [Table 5](#), I distinguish two types of businesses: unincorporated and incorporated. Starting an incorporated business is usually associated with a large and risky investment, so it is less sensitive to UI benefits. For example, when Michael Bloomberg was laid off from an investment bank, he started his own company. He said, “Nobody offered me a job; I was probably too proud to go look for one.” Bloomberg exemplifies the mindset of those who choose to start incorporated businesses: they are quite sure of what they want to do and expect to make a lot of profit. However, many others might plan to start unincorporated

business, which are usually small, and not that profitable. Starting this kind of business is more sensitive to changes in UI benefits, as discussed in [Section 3.2](#).

What if those profitable incorporated businesses come from unincorporated businesses—that is, the business’s legal form is based on ex post performance? If this is true, then I cannot say that incorporated businesses are more profitable than unincorporated businesses during the early stage. However, [Levine and Rubinstein \(2017\)](#) find that unincorporated businesses rarely incorporate, and incorporated ones rarely become unincorporated sole partnerships. Their results suggest that the choice of legal form is largely based on the ex ante nature of the business, rather than its ex post performance. Thus, an unemployed individual who decides to start an incorporated business is likely to have profitable projects and plans to undertake large and risky investments, and then is less likely to be affected by UI benefits.

The first two columns of [Table 5](#) use starting unincorporated businesses as the dependent variable—that is, it is equal to 100 if an unemployed person has switched from unemployment to starting an unincorporated business; otherwise, it equals zero. The last two columns use starting an incorporated business as the dependent variable. I first exclude the interaction to observe the overall effect of $\log(\max UI\ benefit)$ and then add the interaction of $\log(\max UI\ benefit)$ and *Layoff* to tease out the effect of UI benefits, using people who are ineligible for UI benefits as the control group.

The coefficient on $\log(\max UI\ benefit)$ is negative but statistically insignificant in column (1), but the interaction of UI benefit and Layoff has a significantly negative coefficient in column (2). The coefficient estimate on the interaction implies that a one-standard-deviation increase in $\log(\max UI\ benefit)$ (0.30) reduces the likelihood of starting an unincorporated business by 0.245 percentage points, or 10.63 percent compared with the mean (2.30%).

The coefficients of *Log(max UI benefit)* and the interaction are negative but not statistically significant in the last two columns, implying that generous UI benefits do not crowd out incorporated businesses, even among the sub-population who were laid off and thus eligible for the UI benefits. These results strongly support Hypothesis 2.

[INSERT TABLE 5 HERE]

For the covariates, I also see interesting patterns. Risk sharing within the family (i.e., spouse has a job) has a significantly positive effect on starting an unincorporated business, but almost zero effect on incorporated businesses. A higher unemployment rate in the previous three months has a significant positive effect on the decision to switch to unincorporated self-employment, but no significant effect on incorporated self-employment. This could be because during periods of economic downturn, it can be hard to find a job, so a difficult economic situation could push a person to start an unincorporated business. Getting married has a significantly positive effect on switching to incorporated self-employment, but no such effect on unincorporated self-employment.

The effect of family income on the creation of these two types of businesses is also quite different. For unincorporated businesses, families with the lowest and highest incomes have the highest likelihood (a U-shape), while for incorporated businesses, only the highest-income families have the highest likelihood. The effects of gender, age pattern, and education are similar for these two different types of businesses. Unemployed people who are male, middle-aged, and have a college degree are more likely to switch to either unincorporated or incorporated businesses.

One possible response to the profit deduction in the UI system is that unemployed people

could simply delay their decision to start a firm until they have collected all the benefits to which they are entitled. If so, the waiting period is expected to be longer, especially for those starting less profitable businesses. To test this possibility, I focus on individuals who achieved a successful transition from unemployment to self-employment to observe how UI benefits affect their waiting period. Using my preferred specification, column (1) in [Table A3](#) in the Online Appendix shows that overall higher UI benefits indeed lead to a longer waiting period. Columns (2) and (3) distinguish two types of businesses, showing that the positive impact on duration is mainly significant among those switching to unincorporated businesses, and not significant among those switching to incorporated businesses. These results are consistent with Hypothesis 3.

To see the effects of UI benefits on different choices more clearly, I exploit a multinomial logit model in [Table 6](#). The dependent variable takes a value from 1 to 5. It equals 1 if an unemployed person has made a transition to unincorporated self-employment, 2 if he or she switches to incorporated self-employment, 3 if he or she finds a new job, 4 if he or she reports an exit from the labor force, and 5 if he or she remains unemployed during the whole sample period. The final group is used as the base group. The figures shown in this table are coefficients, not marginal effects.

The main conclusion this table conveys is that when UI benefits are high, unemployed people tend to stay unemployed and are less likely to exit to other options, like starting an unincorporated business, finding a new job, or leaving the labor market. Compared with staying unemployed, the effect of UI benefits on starting an incorporated business is not statistically significant. This is consistent with what I asserted earlier: those who have a profitable project will choose to start an incorporated business, and are not sensitive to

deductions of business profits from UI benefits. These results are robust with or without fixed effects.

The coefficient estimates of the interaction in columns (5)–(8) indicate that a one-standard-deviation increase in $\log(\text{Max UI benefit})$ reduces the probability of starting an unincorporated business, incorporated business, and dropping out of the labor force by 0.22, 0.02, and 0.53 percentage points (9.57%, 8.00%, and 1.32% compared to the mean), respectively, and increases the probability of staying unemployed and finding a new job by 0.63 and 0.14 percentage points (3.99% and 0.34% compared to the mean), respectively. Hence, the disincentive effect on the choice of switching to self-employment compared to the mean level is larger, relative to other choices.

[INSERT TABLE 6 HERE]

5.3 UI benefits and business performance

In [Section 3.2](#), I discuss that higher benefits should mainly screen out less profitable businesses due to the profit deduction requirement. The heterogeneous effects across unincorporated and incorporated businesses support this argument. To provide more evidence on this screening effect, I further test how business performance, as measured by profits and survival, is affected by UI benefits.

This section uses 2004, 2008, and 2014 panels of SIPP data, because they have more information about business profits and follow respondents for a longer period relative to CPS. I focus on businesses created by unemployed people and explore whether higher UI benefits dissuade the entry of the unemployed with lower human capital (who are likely to

have lower expected business profits). Thus, the average performance of those who do enter is likely to be better.

Table 7 presents the results of how business profits are influenced by UI benefits using my preferred specification. Columns (1)–(3) use the log of initial business profits as the dependent variables, while columns (4)–(6) use the log of average profits during the sample period. Columns (1) and (4) pool both types of businesses together, and columns (2) and (3) (columns (5) and (6)) break down the effect separately for unincorporated and incorporated businesses, respectively. The main focus is the coefficient before the interaction of *log (max UI benefit)* and “*Received UI benefits*”.

Overall, businesses created by unemployed people in state-periods with higher benefits tend to make more profit both in the first month and during all the sample period, though not significantly so, as shown in columns (1) and (4). After breaking down all businesses into unincorporated and incorporated, columns (2) and (5) show that unincorporated businesses in higher-benefit states tend to make significantly more profit both in the first month and over the whole sample period than those in other state-periods, while incorporated businesses do not have the same pattern (shown in columns (3) and (6)). These results provide strong evidence supporting the screening effect in Hypothesis 4—that unemployed people who do choose to start unincorporated businesses in higher-benefit states are of significantly higher quality than those in other states.¹³

¹³The coefficients of *log (max UI benefit)* are significant in all columns except column (4). They also have different signs for unincorporated vs. incorporated businesses. One possible reason is that unincorporated self-employment is counter-cyclical, incorporated self-employment is pro-cyclical, and UI benefits are usually counter-cyclical (Levine and Rubinstein, 2018; Fairlie and Fossen, 2018). During economic downturns, more lower-quality founders enter into unincorporated businesses and use them as a temporary cushion, which reduces average profits. However, fewer lower-quality founders choose to start incorporated businesses during downturns, as it involves more risk, which increases the profits of this type of business. Using people who are ineligible for UI benefits as the control group can absorb the effects of factors other than UI benefits, so

I further employ survival probability as an alternative measure of business performance. Using my preferred specification, in [Table A4](#) of the Online Appendix, I examine how UI benefits influence the probabilities of surviving for 12, 18, 24, or 36 months.¹⁴ The first four columns focus on the survival rate of unincorporated businesses, while the rest concentrate on incorporated businesses. In general, higher UI benefits are associated with higher survival probability of unincorporated businesses, but not significantly so among incorporated ones, consistent with Hypothesis 4.

[INSERT TABLE 7 HERE]

5.4 Heterogeneous effects across state-periods

To boost entrepreneurship among the unemployed, a few states have adopted the SEA program, which allows the unemployed to keep receiving the same amount of UI benefits even if they start a new business. In states with this program, I expect the negative effect of UI benefits on self-employment to be weaker. Starting by pooling two types of businesses together, columns (1)–(3) of [Table 8](#) show the effects of UI benefits on self-employment in all state-periods, state-periods without SEA, and state-periods with the SEA program, respectively. Columns (4)–(6) follow the same process but focus on the effects on unincorporated businesses, while columns (7)–(9) concentrate on incorporated businesses.

I find that the SEA program has a positive but not statistically significant coefficient in column (1) of [Table 8](#), meaning that the adoption of the SEA program increases the

we should just focus on the coefficient on the interaction of *log (max UI benefit)* and “*Received UI benefits*”.

¹⁴I use SIPP instead of CPS data to construct survival probability, because CPS data only follows respondents for up to 16 months, while SIPP data follows people for up to 64 months, which gives us a long enough window to observe business exits.

probability of starting a firm among the unemployed, although the increase is not significantly different from zero. This might be caused by the small size and selection criteria of the SEA program. For example, between January 2013 and June 2015, only 0.3% of UI recipients in New York and 1.0% of those in Oregon applied for the SEA program (Weigensberg et al., 2017). Also, the SEA target group is only a portion of UI recipients who are identified as likely to exhaust their benefits and interested in becoming self-employed.

Although the SEA program does not statistically increase the likelihood of starting a business directly, it does mitigate the negative effects of UI benefits in state-periods where such a program is available. In column (2), which focuses on state-periods where SEA is not available, the coefficient on the interaction of *log (max UI benefit)* and *Layoff* is significantly negative, while in column (3), which focuses on places where SEA is available, the coefficient estimate on the interaction is negative but much smaller and not significant. Results in columns (4)–(6) show a similar pattern: the negative effects of UI benefits on the probability of switching to unincorporated self-employment is smaller and not significant in state-periods with the SEA program. Column (9) presents that the effect of UI benefits on starting incorporated self-employment even becomes positive, though not statistically significant. These results are in line with Hypothesis 5.

[INSERT TABLE 8 HERE]

5.5 Heterogeneous effects over recent business cycles

Table 9 shows the results in two different periods, recession and non-recession. Based on the NBER definition, I define March–November 2001 and December 2007–June 2009 as recession

periods, and all other periods as non-recession periods. The first three columns present the results for the recession periods, and last three columns show results for the non-recession periods.

I find that the negative effect of UI benefits is much larger during recession periods; however, even during normal periods, the negative effect of UI benefits on starting businesses is still statistically significant and important in magnitude. Take the coefficients of the interaction in columns (1) and (4) as an example. The coefficient in column (1) implies that during recession periods, a one-standard-deviation increase in $\log(\max \text{ UI benefit})$ (0.26 during the recession) reduces the likelihood of starting businesses by 0.57 percentage points, or 22.86% compared with the mean level (2.49 percent during the recession).

During non-recession periods, the magnitude is smaller, about 0.19 percentage points, or about a 7.2% decrease compared with the mean level based on the coefficient estimate in column (4). The effects on unincorporated and incorporated businesses during both periods are similar to what is shown in [Table 5](#): most negative effects of UI benefits are on unincorporated businesses during recession periods, and not statistically significant on incorporated businesses in either recession or non-recession periods. In sum, the negative effects of UI benefits on entrepreneurship are more severe when the economy is in a downturn, strongly supporting Hypothesis 6.

In column (2), the coefficient estimate on $\log(\max \text{ UI benefit})$ is positively significant at the 10% level. This means that unemployed individuals who are ineligible for UI benefits (“*Layoff*”=0) are more likely to transition from unemployment to unincorporated self-employment when UI benefits are higher. This could be because both unincorporated self-employment and UI benefits are counter-cyclical ([Levine and Rubinstein, 2018](#); [Fairlie and](#)

Fossen, 2018), while my controls of unemployment rates may not fully absorb the effect of economic situations. This result reveals the advantage of my specification: by using people who are ineligible for UI benefits as the control group, I can filter out the effects of macroeconomic shocks and other policies that generate the same impacts on both control and treatment (unemployed individuals who are eligible for UI benefits) groups. Hence, the coefficient estimate on the interaction of $\log(\max \text{ UI benefit})$ and *Layoff* represents the impact of UI benefits on the outcomes of interest.

[INSERT TABLE 9 HERE]

6 DISCUSSION AND CONCLUSION

6.1 Summary of results

This paper explores the effect of generosity of UI benefits on the decision of an unemployed person to start a business. In an attempt to understand the policy in practice, I distributed a short survey to the Labor Departments of each U.S. state via email. I found that most states deduct business profits from UI benefits, except for a few states that have adopted the SEA program. My empirical results show that high UI benefits deter laid-off workers from starting a business. A one-standard-deviation increase in log UI benefits reduces the probability of starting businesses by 0.263 percentage points. The average switching rate is 2.55%, which translates to a substantial 10.31% decline in the transition rate. Through distinguishing two types of businesses, incorporated and unincorporated, I find that most negative effects happen with respect to unincorporated businesses—that is, high UI benefits

mainly crowd out unincorporated businesses. Unemployed people who have switched to self-employment tend to wait longer before starting businesses when UI benefits are higher, especially when they start unincorporated businesses. Businesses created in state-periods with higher benefits tend to perform better in terms of profits and survival than those created in other state-periods.

For state-periods that offer the SEA program, which allows unemployed people to receive full UI benefits without deduction, I find that the effect of UI benefits on switching to self-employment becomes smaller and statistically insignificant. This is consistent with the conjecture that UI benefits could help reduce downside risk and soothe the borrowing constraint for unemployed people looking to start a business, which could offset substitution and liquidity effects (both lead to a lower transition rate to self-employment). The negative effect is more severe during recession periods, when the expected profits of businesses are lower.

6.2 The screening effect

One of the key contributions of my paper is to show that higher UI benefits have a screening effect on business creation by unemployed people. Due to the profit deduction requirement in the UI system, the total income of individuals with less profitable projects will be bounded by the total amount of UI benefits, even after they start businesses. Hence, they earn zero marginal profit from effort, and are likely to be dissuaded from starting businesses. For businesses with higher expected profits, total income will exceed the total amount of benefits, and they will then earn positive marginal profits. Hence, in these cases, the negative impact

of UI benefits on the decision to start businesses will be much smaller. By distinguishing unincorporated (less profitable) from incorporated (more profitable) businesses, I find that the negative effects of UI benefits mainly concentrate on the creation of unincorporated businesses.

The screening effect also implies that only the left tail of the profit distribution will be truncated, but the upper tail will be largely unaffected. My results on the profits of new businesses are consistent with this implication: unincorporated businesses created by unemployed people in higher-benefit state-periods tend to make more profit. Furthermore, I employ survival rate as an alternative measure of firm performance, showing that unincorporated businesses do indeed have a higher survival rate in state-periods providing more generous UI benefits. Together, these results strongly support a screening effect of UI benefits. In fact, prior literature has found similar screening effects in different contexts. For example, [Starr et al. \(2018\)](#) show that the enforceability of noncompete covenants screens the formation of within-industry spinouts (WSOs) relative to non-WSOs by dissuading founders with lower human capital. Similarly, [Ganco et al. \(2015\)](#) find that patent enforcement helps to retain more stars, but does not seem to prevent the brightest inventors from leaving.

6.3 Policy implications

Transition from unemployment into self-employment is a highly prevalent phenomenon in the developing world and in developed countries. Such transitions provide a cushion for unemployed people and act as automatic stabilizers for the whole economy, especially during economic downturns when the labor market is slack. My results provide important policy

implications. The reduction in business formation caused by high UI benefits may induce potential welfare losses. If individuals do not have rational expectations about their entrepreneurial abilities, higher UI benefits disable the opportunity of skilled but risk-averse individuals to experiment and learn about their ability (as in [Manso \(2011\)](#)). However, because high UI benefits mainly screen out lower-quality entrants based on my results, a more definite determination will require a careful examination with a general equilibrium framework. I leave this for future research.

Although policymakers have realized the distortionary effect of UI benefits on the transition into self-employment and have promoted the SEA program recently by providing grants to each state, the program has been adopted by only eight states and program sizes in these states are quite small ([Weigensberg et al., 2017](#)). Given my results—that the negative impacts of UI benefits on business formation by unemployed people are greater in states without the SEA program than those with it, and that impacts are greater during periods of recession than in periods of non-recession—policies like the SEA program that attempt to smooth the transition from unemployment to self-employment are especially needed during economic downturns.

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TABLE 1 Summary statistics

	Observations	Mean	SD	p25	Median	p75
A. Labor Market Status						
Different outcomes for the unemployed (%)						
Switch to unincorporated self-employment	252,791	2.30	14.98	0.00	0.00	0.00
Switch to incorporated self-employment	252,791	0.25	5.01	0.00	0.00	0.00
Find a new job	252,791	41.73	49.31	0.00	0.00	100.00
Drop out of labor force	252,791	40.07	49.00	0.00	0.00	100.00
Stay unemployed	252,791	15.79	36.47	0.00	0.00	0.00
Dummy: Layoff	252,791	0.46	0.50	0.00	0.00	1.00
Having SEA program	252,791	0.15	0.36	0.00	0.00	0.00
Unemployment rate in the current month (%)	252,791	4.86	2.15	3.30	4.40	6.13
Unemployment rate in the previous 3 months (%)	252,791	4.79	2.11	3.27	4.29	6.02
B. Unemployment Insurance Benefits						
Max UI benefit (adjusted for inflation)	252,791	7,535	2,385	6,045	7,321	8,769
Log (max UI benefit)	252,791	8.88	0.30	8.71	8.90	9.08
Dummy – max UI benefits increase by more than 20%	252,791	0.23	0.42	0.00	0.00	0.00
Dummy – max UI benefits decrease by more than 20%	252,791	0.03	0.17	0.00	0.00	0.00
C. Demographics						
Age	252,791	37.33	13.07	26.00	35.00	47.00
Female	252,791	0.49	0.50	0.00	0.00	1.00
Have College Degree or Above	252,791	0.25	0.43	0.00	0.00	1.00
Married, Spouse Present	252,791	0.39	0.49	0.00	0.00	1.00
Spouse has a job	252,791	0.32	0.47	0.00	0.00	1.00
Annual family income below \$20,000	252,791	0.30	0.46	0.00	0.00	1.00
Annual family income between \$20,000 and \$50,000	252,791	0.33	0.47	0.00	0.00	1.00
Annual family income between \$50,000 and \$75,000	252,791	0.13	0.34	0.00	0.00	0.00
Annual family income above \$75,000	252,791	0.14	0.35	0.00	0.00	0.00
Annual family income is missing	252,791	0.10	0.30	0.00	0.00	0.00

The main sample comes from 1995 to 2016 Current Population Survey (CPS) monthly data. The sample only includes people who were unemployed during at least one period of the sample, and not self-employed before losing a job, so that they would be eligible for UI benefits. The age restriction is between 20 and 70. I also set a restriction that unemployed people who do not switch to self-employment have to stay in the sample for at least three months after losing a job, to ensure reasonably long periods to observe their choice (results are robust without this restriction, but a little smaller in magnitude). I keep one observation for each individual, because UI benefits will not change once unemployed people start to receive them. All UI benefits are those of months when the unemployed lost their jobs. I use a dummy variable for a switch to self-employment that equals 1 if an unemployed person makes a transition out of unemployment to self-employment in the sample period. In CPS, respondents are interviewed for four consecutive months, left alone for eight months, and then re-interviewed for another four months, so I assume an unemployed person transitions from unemployment to self-employment, if he or she is unemployed in the last month of the first four consecutive interviews, and self-employed in the first month of the second four consecutive interviews. *Layoff* is a dummy variable indicating the unemployed person falls into the categories “Job loser/On layoff” or “Other job loser,” instead of “Temporary job ended,” “Job leaver,” “Re-entrant,” or “New entrant,” so *Layoff* likely represents the group of people who are eligible for UI benefits and thus might be affected by changes in UI benefits. Finally, family incomes and other demographic variables represent the values before losing the job.

TABLE 2 Unemployment insurance generosity and state payments, 1995–2016 (semiannually)

	log (UI benefit payment)	log (social security benefit payment)	log (health insurance payment)	log (other transfer)
	(1)	(2)	(3)	(4)
log (max UI benefit)	0.879*** (0.113)	−0.051 (0.041)	0.054 (0.051)	−0.085 (0.058)
Observations	2,244	2,244	2,244	2,244
Adjusted R^2	0.979	0.998	0.996	0.994
State fixed effects	YES	YES	YES	YES
Year by Month fixed effects	YES	YES	YES	YES

This table shows the relation between the log of the generosity of state unemployment insurance (UI) benefit and state total UI benefit payments, state social security benefits, health insurance payment (combining Medicare and Medicaid benefits), and all other personal transfers after controlling for state and year fixed effects. All standard errors are clustered at the state level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

TABLE 3 Unemployment insurance generosity and economic conditions, 1995–2016 (semiannually)

	Max Benefit		
	(1)	(2)	(3)
Unemployment rate (%)	−0.750 (0.789)		
Average wage (monthly)		0.931 (0.774)	
Employment (in thousand)			−0.078 (0.494)
Observations	2,244	2,244	2,244
Adjusted R^2	0.886	0.889	0.886
State fixed effects	YES	YES	YES
Year by Month fixed effects	YES	YES	YES

This table provides the relation between the generosity of state unemployment insurance (UI) benefit (measured by the product of maximum benefits and duration) and economic conditions after controlling for state and year fixed effects. All standard errors are clustered at the state level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

TABLE 4 Effects of UI benefits on self-employment (linear probability model)

	Switch from unemployment to self-employment				
	(1)	(2)	(3)	(4)	(5)
log (max UI benefit)	-0.458 (0.364)	-0.426 (0.368)	-0.455 (0.371)	-0.080 (0.396)	-0.011 (0.415)
log (max UI benefit) $\times$ Layoff				-0.886*** (0.226)	-0.876*** (0.227)
Layoff	0.329*** (0.091)	-0.239*** (0.089)	-0.237*** (0.088)	-0.234*** (0.083)	-0.233*** (0.084)
Current unemployment rate	0.009 (0.043)	-0.001 (0.044)	-0.018 (0.045)	-0.018 (0.045)	-0.005 (0.051)
Unemployment rate in the previous 3 months	0.132** (0.054)	0.138** (0.056)	0.143** (0.056)	0.143** (0.056)	0.124** (0.059)
Female		-1.877*** (0.106)	-1.874*** (0.105)	-1.874*** (0.105)	-1.872*** (0.105)
Age		0.307*** (0.022)	0.307*** (0.022)	0.307*** (0.022)	0.307*** (0.021)
$Age^2/100$		-0.339*** (0.025)	-0.339*** (0.025)	-0.339*** (0.025)	-0.339*** (0.024)
Having College Degree		0.837*** (0.071)	0.842*** (0.071)	0.842*** (0.071)	0.844*** (0.071)
Married		0.225** (0.089)	0.226** (0.089)	0.226** (0.089)	0.229** (0.090)
Spouse has a job		0.186** (0.090)	0.185** (0.090)	0.187** (0.090)	0.185** (0.089)
Annual family income below \$20,000		-0.002 (0.105)	-0.002 (0.105)	-0.003 (0.105)	-0.003 (0.105)
Annual family income between \$20,000 and \$50,000		-0.311** (0.125)	-0.312** (0.125)	-0.313** (0.125)	-0.310** (0.125)
Annual family income between \$50,000 and \$75,000		-0.412*** (0.128)	-0.415*** (0.127)	-0.413*** (0.127)	-0.416*** (0.128)
State fixed effects	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	NA
Month fixed effects	NO	NO	YES	YES	NA
Year by Month fixed effects	NO	NO	NO	NO	YES
Number of observations	252,791	252,791	252,791	252,791	252,791
Adjusted R^2	0.001	0.007	0.007	0.007	0.009

This table uses CPS monthly data from 1995 to 2016. I follow the same sample selection criterion as before. $\text{Log}(\text{max UI benefit})$ is demeaned (with respect to the mean for the entire sample) before it is interacted with *Layoff*, so the coefficient on *Layoff* in column (4) measures the change in the probability of switching to self-employment associated with being laid off in a state with average UI generosity. The base group of family income is those whose annual family income is above \$75,000. I do not report the coefficient for the group whose family income is missing. All coefficients are from the linear probability model. All benefits are in 1995 dollars. All standard errors are clustered at the state level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

TABLE 5 Effects of UI benefits on different types of businesses (linear probability model)

	Unincorporated self-employment		Incorporated self-employment	
	(1)	(2)	(3)	(4)
log (max UI benefit)	-0.277 (0.396)	0.067 (0.408)	-0.104 (0.092)	-0.078 (0.097)
log (max UI benefit) $\times$ Layoff		-0.815*** (0.194)		-0.061 (0.083)
Layoff	-0.261*** (0.077)	-0.259*** (0.073)	0.026 (0.029)	0.026 (0.029)
Married	0.063 (0.082)	0.063 (0.082)	0.166*** (0.030)	0.166*** (0.030)
Spouse has a job	0.185** (0.078)	0.187** (0.078)	-0.002 (0.035)	-0.002 (0.035)
Annual family income below \$20,000	0.220** (0.106)	0.219** (0.106)	-0.222*** (0.038)	-0.222*** (0.038)
Annual family income between \$20,000 and \$50,000	-0.111 (0.111)	-0.112 (0.111)	-0.198*** (0.038)	-0.198*** (0.038)
Annual family income between \$50,000 and \$75,000	-0.284** (0.113)	-0.283** (0.113)	-0.133*** (0.047)	-0.133*** (0.046)
Control for unemployment rates and demographic characteristics	YES	YES	YES	YES
State fixed effects	YES	YES	YES	YES
Year by Month fixed effects	YES	YES	YES	YES
Number of observations	252,791	252,791	252,791	252,791
Adjusted R2	0.008	0.008	0.002	0.002

This table distinguishes two types of businesses: unincorporated and incorporated. Incorporated business owners face additional fees and regulations, but take limited liability, and the company is a separate legal identity, while unincorporated businesses are not legal identities. Unincorporated businesses rarely incorporate, and incorporated businesses rarely become unincorporated (Levine and Rubinstein, 2017). In the first two columns, the dependent variable is equal to 100 if the unemployed person has switched from unemployment to unincorporated self-employment; otherwise, it equals zero. In the last two columns, transition to incorporated self-employment is the dependent variable. The definition is similar to that for unincorporated business. All benefits are in 1995 dollars. The same demographic variables: gender, age and education, and unemployment rates are controlled for as in Table 4. I do not report these coefficients to save space. All standard errors are clustered at state level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

TABLE 6 Effects of UI benefits on different choices using multinomial logit regression

	Different choices after being unemployed							
	Unincorporated	Incorporated	Finding a new job	Finding a new market	Unincorporated	Incorporated	Finding a new job	Out of labor market
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log (max UI benefit)	-0.097 (0.122)	0.021 (0.207)	0.019 (0.068)	0.031 (0.059)	0.073 (0.216)	-0.172 (0.415)	0.079 (0.097)	0.061 (0.081)
log (max UI benefit) $\times$ Layoff	-0.486*** (0.092)	-0.374 (0.283)	-0.144*** (0.055)	-0.198*** (0.049)	-0.466*** (0.090)	-0.352 (0.259)	-0.125*** (0.052)	-0.184*** (0.043)
Layoff	-0.303*** (0.033)	-0.071 (0.110)	0.121*** (0.019)	-0.636*** (0.014)	-0.260*** (0.033)	-0.056 (0.112)	0.149*** (0.017)	-0.616*** (0.013)
Married	0.298*** (0.040)	0.785*** (0.108)	0.307*** (0.018)	0.231*** (0.020)	0.265*** (0.039)	0.797*** (0.109)	0.287*** (0.019)	0.220*** (0.020)
Spouse has a job	0.123*** (0.040)	0.017 (0.117)	0.037* (0.021)	0.050** (0.019)	0.128*** (0.038)	0.004 (0.122)	0.035* (0.021)	0.062*** (0.019)
Annual family income below \$20,000	-0.124** (0.059)	-1.086*** (0.157)	-0.482*** (0.034)	-0.019 (0.023)	-0.181*** (0.059)	-1.058*** (0.163)	-0.527*** (0.036)	-0.032 (0.023)
Annual family income between \$20,000 and \$50,000	-0.139** (0.057)	-0.630*** (0.115)	-0.187*** (0.024)	-0.032 (0.021)	-0.177*** (0.053)	-0.619*** (0.118)	-0.220*** (0.025)	-0.040* (0.021)
Annual family income between \$50,000 and \$75,000	-0.141** (0.062)	-0.297** (0.121)	-0.034 (0.027)	0.010 (0.026)	-0.159** (0.062)	-0.297** (0.125)	-0.054* (0.028)	0.008 (0.027)
Control for unemployment rates and demographic characteristics	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effects	NO	NO	NO	NO	YES	YES	YES	YES
State fixed effects	NO	NO	NO	NO	YES	YES	YES	YES
Month fixed effects	NO	NO	NO	NO	YES	YES	YES	YES
Number of observations	252,791	252,791	252,791	252,791	252,791	252,791	252,791	252,791

This table uses CPS monthly data from 1995 to 2016. The dependent variable takes on a value from 1 to 5. It equals 1 if an unemployed person has made a transition to unincorporated self-employment; 2 if the person switches to incorporated self-employment; 3 if the person finds a new job; 4 if the person reports an exit from the labor force; and 5 if the person remains unemployed during the whole sample period. The last group is used as the base group. I follow the same sample selection criterion as before. *Log(max UI benefit)* is demeaned (with respect to the mean for the entire sample). The figures in this table are just coefficients, not the marginal effects. All benefits are in 1995 dollars. The same demographic variables: gender, age and education, and unemployment rates are controlled for as in the Table 4. I do not report these coefficients to save space. All standard errors are clustered at state level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

TABLE 7 UI benefits and business profits using SIPP data

Dependent variable:	Log (business profits in the first month)			Log (average business profits)		
	All busi- nesses (1)	Unincorporated businesses (2)	Incorporated businesses (3)	All busi- nesses (4)	Unincorporated businesses (5)	Incorporated businesses (6)
log (max UI benefit)	-2.516* (1.310)	-3.482** (1.305)	8.135** (3.172)	-1.911 (1.387)	-2.811** (1.396)	7.616** (3.400)
log (max UI benefit) $\times$ Received UI benefits	1.970 (1.284)	3.087** (1.306)	-3.502 (2.184)	2.060 (1.325)	3.090** (1.346)	-4.002 (2.391)
Received UI benefits	-0.493 (0.460)	-0.101 (0.617)	-0.300 (0.433)	-0.599 (0.466)	-0.193 (0.604)	-0.581 (0.446)
Female	0.252 (0.276)	-0.040 (0.291)	0.698 (0.552)	0.212 (0.288)	-0.138 (0.296)	0.671 (0.597)
Age	-0.181** (0.088)	-0.031 (0.097)	0.022 (0.298)	-0.176** (0.085)	-0.026 (0.091)	0.044 (0.285)
$Age^2/100$	0.178 (0.109)	-0.007 (0.122)	-0.001 (0.352)	0.176 (0.106)	-0.011 (0.115)	-0.028 (0.342)
Having college degree	-0.019 (0.402)	-0.050 (0.487)	0.734 (0.651)	-0.092 (0.428)	-0.061 (0.503)	0.778 (0.628)
Married	0.022 (0.388)	0.242 (0.359)	-0.235 (0.379)	0.047 (0.419)	0.302 (0.371)	-0.029 (0.587)
Annual family income below \$20,000	-0.438 (0.374)	-0.991** (0.433)	1.035 (0.724)	-0.422 (0.349)	-0.979** (0.406)	1.230* (0.722)
Annual family income between \$20,000 and \$50,000	-0.426 (0.444)	-0.725 (0.497)	-1.444** (0.532)	-0.439 (0.384)	-0.774* (0.404)	-1.069 (0.762)
Annual family income between \$50,000 and \$75,000	0.040 (0.456)	-0.012 (0.518)	-0.976 (1.662)	-0.116 (0.448)	-0.199 (0.500)	-0.929 (1.687)
Current unemployment rate	0.034 (0.146)	0.158 (0.181)	-0.376 (0.413)	0.078 (0.155)	0.187 (0.199)	-0.360 (0.384)
Unemployment rate in the previous 3 months	-0.107 (0.173)	-0.302 (0.214)	0.328 (0.429)	-0.092 (0.162)	-0.298 (0.202)	0.404 (0.410)
State fixed effects	YES	YES	YES	YES	YES	YES
Year by Month fixed effects	YES	YES	YES	YES	YES	YES
Number of observations	1,737	1,464	229	1,737	1,464	229
Adjusted R2	0.090	0.096	0.377	0.085	0.091	0.348

This table uses 2004, 2008 and 2014 panels of SIPP data. The sample only includes people who were unemployed in at least one period of the sample. The age restriction is between 20 and 70. The processes of cleaning the data and generating variables are similar to those with CPS data. I keep one observation for each individual, because according to the survey results I collected, UI benefits will not change once unemployed people start to receive them, which means there is no variation in UI benefit for each unemployment episode. I also set a restriction that unemployed people who do not switch to self-employment have to stay in the sample for at least three months after losing a job, to ensure reasonably long periods to observe their choice. The first three columns present the results with the log of profits during the first month of business creation as the dependent variables, while the rest use the log of average business profits during the sample period as the dependent variable. Because of the advantage of SIPP data, which provide information about whether the respondent received UI benefits, I directly use people who received UI benefits right before starting businesses as the treatment group (represented by the dummy variable “*Received UI benefits*”). This group of people is likely to be affected by changes in UI benefits. *Log(max UI benefit)* is demeaned (with respect to the mean for the entire sample) before it is interacted with “*Received UI Benefits*”. The base group of family income is those whose annual family income is above \$75,000. All standard errors are clustered at the state. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

TABLE 8 Heterogeneous effects across states having the SEA program or not (linear probability model)

	Self-employment			Unincorporated self-employment			Incorporated self-employment		
	Whole	Non-SEA	SEA	Whole	Non-SEA	SEA	Whole	Non-SEA	SEA
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
log (max UI benefit)	-0.001 (0.415)	0.031 (0.426)	-1.130 (0.898)	0.071 (0.410)	0.127 (0.418)	-1.350 (0.831)	-0.072 (0.095)	-0.097 (0.107)	0.220 (0.371)
log (max UI benefit) $\times$ Layoff	-0.877*** (0.227)	-0.842*** (0.251)	-0.117 (0.706)	-0.815*** (0.194)	-0.757*** (0.211)	-0.409 (0.600)	-0.062 (0.083)	-0.085 (0.089)	0.292 (0.274)
Having SEA program	0.155 (0.370)			0.065 (0.346)			0.090 (0.082)		
Layoff	-0.233*** (0.083)	-0.163* (0.083)	-0.674*** (0.194)	-0.259*** (0.072)	-0.205*** (0.073)	-0.566*** (0.174)	0.026 (0.029)	0.041 (0.033)	-0.107 (0.071)
Married	0.229** (0.090)	0.262*** (0.091)	0.044 (0.216)	0.063 (0.082)	0.113 (0.084)	-0.222 (0.203)	0.166*** (0.030)	0.149*** (0.031)	0.265*** (0.073)
Spouse has a job	0.185** (0.089)	0.167* (0.093)	0.301 (0.219)	0.187** (0.078)	0.159* (0.081)	0.359* (0.206)	-0.002 (0.035)	0.009 (0.039)	-0.058 (0.080)
Annual family income below \$20,000	-0.003 (0.105)	-0.006 (0.110)	0.010 (0.254)	0.219** (0.106)	0.213* (0.115)	0.240 (0.235)	-0.222*** (0.038)	-0.219*** (0.041)	-0.231*** (0.085)
Annual family income between \$20,000 and \$50,000	-0.310** (0.126)	-0.333** (0.135)	-0.196 (0.225)	-0.112 (0.111)	-0.125 (0.123)	-0.050 (0.201)	-0.198*** (0.038)	-0.208*** (0.038)	-0.146 (0.092)
Annual family income between \$50,000 and \$75,000	-0.416*** (0.128)	-0.445*** (0.126)	-0.261 (0.264)	-0.283** (0.113)	-0.320*** (0.111)	-0.100 (0.243)	-0.133*** (0.047)	-0.125** (0.053)	-0.161* (0.094)
Control for unemployment rates and demographic characteristics	YES	YES	YES	YES	YES	YES	YES	YES	YES
State fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year by Month fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of observations	252,791	210,877	41,913	252,791	210,877	41,913	252,791	210,877	41,913
Adjusted R2	0.009	0.009	0.008	0.008	0.008	0.006	0.002	0.002	0.002

This table explores the impacts of the Self-Employment Assistance (SEA) program, and whether this program mitigates the negative effects of UI benefits. The SEA program allows unemployed people to receive UI benefits without deduction. Eight states reported having this program in 2016 (based on the information provided by [Kugler \(2015\)](#) and [Messenger et al. \(2002\)](#)). The same demographic variables: gender, age and education, and unemployment rates are controlled for as in the [Table 4](#). I do not report these coefficients to save space. All standard errors are clustered at state level except columns (3), (6), and (9), which cluster the standard errors by state and year, because there would be too few clusters, otherwise. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

TABLE 9 Effects of UI benefits on different types of businesses in recession and non-recession periods

	Recession Periods			Non-recession Periods		
	Self-employment	Unincorporated	Incorporated	Self-employment	Unincorporated	Incorporated
	(1)	(2)	(3)	(4)	(5)	(6)
log (max UI benefit)	1.343 (0.819)	1.092* (0.588)	0.251 (0.296)	-0.109 (0.458)	0.032 (0.434)	-0.141 (0.101)
log (max UI benefit) $\times$ Layoff	-2.195*** (0.689)	-2.085*** (0.541)	-0.110 (0.235)	-0.668*** (0.203)	-0.619*** (0.181)	-0.049 (0.074)
Layoff	-0.117 (0.164)	-0.160 (0.141)	0.043 (0.065)	-0.249*** (0.091)	-0.270*** (0.080)	0.021 (0.029)
Married	0.378* (0.202)	0.128 (0.191)	0.250*** (0.066)	0.200** (0.095)	0.051 (0.090)	0.149*** (0.031)
Spouse has a job	0.062 (0.233)	0.081 (0.215)	-0.019 (0.086)	0.209** (0.096)	0.207** (0.085)	0.002 (0.037)
Annual family income below \$20,000	0.263 (0.297)	0.398 (0.260)	-0.134 (0.103)	-0.052 (0.105)	0.188* (0.107)	-0.239*** (0.045)
Annual family income between \$20,000 and \$50,000	-0.192 (0.254)	-0.049 (0.239)	-0.143 (0.100)	-0.335** (0.142)	-0.126 (0.122)	-0.209*** (0.043)
Annual family income between \$50,000 and \$75,000	-0.597** (0.266)	-0.671*** (0.239)	0.073 (0.138)	-0.378*** (0.134)	-0.205 (0.123)	-0.173*** (0.047)
Control for unemployment rates and demographic characteristics	YES	YES	YES	YES	YES	YES
State fixed effects	YES	YES	YES	YES	YES	YES
Year by Month fixed effects	YES	YES	YES	YES	YES	YES
Number of observations	39,514	39,514	39,514	213,277	213,277	213,277
Adjusted R2	0.007	0.006	0.003	0.009	0.009	0.002

This table distinguishes between two types of economic conditions: recession and non-recession periods. Based on the NBER definition, I define March–November 2001 and December 2007–June 2009 as recession periods. The sample selection and definitions of dependent variables are the same as before. The same demographic variables, gender, age and education, and unemployment rates are controlled for as in the [Table 4](#). I do not report these coefficients to save space. All standard errors are clustered at state level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Supplementary Online Appendix

A Additional Figures and Tables

TABLE A1 Validate the accuracy of the proxy for UI eligibility (“*Layoff*”)

	Laid-off (“ <i>Layoff</i> ”=1)	Quit (“ <i>Layoff</i> ”=0)	Total
Received unemployment benefits	1,235 (45.5%)	314 (11.6%)	1,549 (57.0%)
Not receive unemployment benefits	648 (23.9%)	519 (19.1%)	1,167 (43.0%)
Total	1,883 (69.3%)	833 (30.7%)	2,716 (100%)

This table validates the accuracy of the proxy for UI eligibility by embedding the information from the Displaced Worker Supplement about whether individuals “received unemployment insurance benefits after that job ended.” Overall, the quality of this proxy is good. About 46% of the matched sample who are in the “Laid-off” group do receive UI benefits, and 19% of the sample who are in the “Quit” group do not. In total, this proxy has the right measure for about 65% of respondents for their eligibility for UI benefits.

TABLE A2 Effects of large changes of UI benefits on self-employment (linear probability model)

	Switch from unemployment to self-employment			
	Max UI benefits increased by more than 20%		Decreased by more than 20%	
	(1)	(2)	(3)	(4)
Dummy - Big change of max UI benefit	-0.217 (0.171)	-0.071 (0.190)	0.434 (0.259)	0.093 (0.308)
Big change of max UI benefit $\times$ Layoff		-0.317* (0.174)		0.791* (0.452)
Layoff	-0.237** (0.089)	-0.173* (0.091)	-0.236** (0.089)	-0.253*** (0.090)
Married	0.229** (0.090)	0.230** (0.090)	0.229** (0.090)	0.228** (0.090)
Spouse has a job	0.183** (0.089)	0.183** (0.089)	0.183** (0.089)	0.184** (0.089)
Annual family income below \$20,000	-0.001 (0.104)	-0.002 (0.104)	-0.001 (0.105)	-0.001 (0.105)
Annual family income between \$20,000 and \$50,000	-0.308** (0.125)	-0.309** (0.126)	-0.309** (0.125)	-0.309** (0.125)
Annual family income between \$50,000 and \$75,000	-0.417*** (0.128)	-0.418*** (0.128)	-0.418*** (0.128)	-0.417*** (0.128)
Control for unemployment rates and demographic characteristics	YES	YES	YES	YES
State fixed effects	YES	YES	YES	YES
Year by Month fixed effects	YES	YES	YES	YES
Number of observations	252,791	252,791	252,791	252,791
Adjusted R2	0.009	0.009	0.009	0.009

This table uses CPS monthly data from 1995 to 2016. The sample only includes people who were unemployed in at least one period of the sample, and not self-employed before losing a job, so that they could be eligible for UI benefits during the unemployment period. The age restriction is between 20 and 70. I also set a restriction that unemployed people who do not switch to self-employment have to stay in the sample for at least three months after losing a job, to ensure reasonably long periods to observe their choice (results are robust without this restriction, but a little smaller in magnitude). I keep one observation for each individual, because according to the survey results I collected, UI benefits will not change once unemployed people start to receive them, which means there is no variation in UI benefit for each unemployment period. The dependent variable is equal to 100 (scaled by 100 so that the coefficients can be seen more clearly) if the unemployed person switches from unemployment to self-employment, and equal to zero if the person switches from unemployment to another option except self-employment in the sample period. *Layoff* is a dummy variable indicating that unemployed persons fall into the categories “Job loser/On layoff” or “Other job loser,” instead of “Temporary job ended,” “Job leaver,” “Re-entrant,” or “New entrant,” so *Layoff* represents the group of people who are eligible for UI benefits and thus might be affected by changes in UI benefits. Instead of using the continuous variable $\log(\max \text{ UI benefit})$, I separated the changes of UI benefits into two dummies: (1) max UI benefit has increased by more than 20% (including 20%), and (2) max UI benefit has decreased by more than 20% (including 20%). I then look at the effects of these substantial changes of UI benefits on transitions to self-employment. All coefficients are from the linear probability model. All benefits are in 1995 dollars. The same demographic variables, gender, age and education, and unemployment rates, are controlled for as in Table 4 of the main text. I do not report these coefficients to save space. All standard errors are clustered at state level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

TABLE A3 Effects of UI benefits on the duration before switching to self-employment

	Self-employment	Unincorporated	Incorporated
	(1)	(2)	(3)
log (max UI benefit)	−0.755 (0.833)	−0.838 (0.885)	0.704 (3.752)
log (max UI benefit) × Layoff	1.448* (0.800)	1.597* (0.818)	−0.807 (2.643)
Layoff	−0.364 (0.238)	−0.546** (0.253)	−0.017 (0.629)
Married	−0.675*** (0.188)	−0.728*** (0.184)	0.403 (0.930)
Spouse has a job	0.158 (0.211)	0.148 (0.219)	0.154 (0.699)
Annual family income below \$20,000	2.410*** (0.419)	2.387*** (0.448)	4.423*** (1.370)
Annual family income between \$20,000 and \$50,000	1.182*** (0.368)	1.184** (0.444)	2.204** (0.955)
Annual family income between \$50,000 and \$75,000	0.996*** (0.364)	1.083** (0.449)	2.138* (1.185)
Controls	YES	YES	YES
State fixed effects	YES	YES	YES
Year by Month fixed effects	YES	YES	YES
Number of observations	6,421	5,901	604
Adjusted R2	0.085	0.087	0.055

This table uses the number of months before the transition to self-employment as the dependent variable. The sample only includes those who made the transition from unemployment to self-employment. Columns (2)–(3) focus on the duration before switching to unincorporated and incorporated self-employment, respectively. The same demographic variables, gender, age and education, and unemployment rates, are controlled for as in [Table 4](#). I do not report these coefficients to save space. All standard errors are clustered at state level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

TABLE A4 UI benefits and business survival using SIPP data

	Unincorporated businesses				Incorporated businesses			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Survive 12 months	Survive 18 months	Survive 24 months	Survive 36 months	Survive 12 months	Survive 18 months	Survive 24 months	Survive 36 months
$\log(\max \text{ UI benefit}) \times \text{Received UI benefits}$	0.138 (0.130)	0.265** (0.114)	0.190* (0.110)	0.054 (0.145)	0.178 (0.482)	0.119 (0.377)	-0.132 (0.320)	-0.808** (0.320)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
State fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Year by Month fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Number of observations	1,112	1,053	958	864	139	134	111	90
Adjusted R2	0.169	0.146	0.148	0.108	0.288	0.189	0.374	0.470

This table uses 2004, 2008 and 2014 panels of SIPP data. The sample only includes people who were unemployed in at least one period of the sample. The age restriction is between 20 and 70. The processes of cleaning the data and generating variables are similar to those with CPS data. I keep one observation for each individual, because according to the survey results I collected, UI benefits will not change once unemployed people start to receive them, which means there is no variation in UI benefit for each unemployment episode. I also set a restriction that unemployed people who do not switch to self-employment have to stay in the sample for at least three months after losing a job, to ensure reasonably long periods to observe their choice. The dependent variables are dummies for surviving 12, 18, 24, or 36 months. These variables are constructed as follows: if the business has survived for more than 12 months, the dummy variable “Survive 12 months” will be equal to 1; it is equal to zero if the business has exited and has not survived 12 months; the value is missing, if it has not survived 12 months but is still alive at the end of the sample period. The same process applies to the other three dummies. The different sample sizes across columns are due to different numbers of missing values based on this process. The first four columns focus on the survival of unincorporated businesses, while the rest focus on incorporated businesses. Similar to before, I directly use people who received UI benefits right before starting businesses as the treatment group (represented by the dummy variable “*Received UI benefits*”). This group of people should be affected by changes in UI benefits. $\log(\max \text{ UI benefit})$ is demeaned (with respect to the mean for the entire sample) before it is interacted with “*Received UI benefits*”. All columns include $\log(\max \text{ UI benefit})$, received UI benefits, female, age, $\text{age}^2/100$, having college degree, married, annual family income below \$20,000, annual family income between \$20,000 and \$50,000, annual family income between \$50,000 and \$75,000, current unemployment rate, and unemployment rate in the previous three months. All standard errors are clustered at the state. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

TABLE A5 Heterogeneous effects across different search requirements (linear probability model)

Search requirement:	Self-employment			Unincorporated self-employment			Incorporated self-employment		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
log (max UI benefit)	-0.404 (0.832)	-2.508*** (0.836)	2.404 (1.475)	-0.273 (0.549)	-2.523*** (0.807)	2.593 (1.545)	-0.131 (0.399)	0.015 (0.349)	-0.189 (1.011)
log (max UI benefit) $\times$ Layoff	-1.322*** (0.434)	-0.629 (0.787)	-0.454 (0.730)	-1.318*** (0.303)	-0.334 (0.790)	-0.595 (0.570)	-0.003 (0.169)	-0.296 (0.203)	0.142 (0.223)
Layoff	-0.353** (0.143)	0.164 (0.158)	-0.555** (0.251)	-0.403*** (0.117)	0.170 (0.142)	-0.544** (0.198)	0.049 (0.054)	-0.005 (0.048)	-0.011 (0.128)
Married	0.128 (0.145)	0.242 (0.199)	0.642 (0.445)	-0.109 (0.129)	0.108 (0.129)	0.163 (0.393)	0.237*** (0.057)	0.134* (0.076)	0.479*** (0.149)
Spouse has a job	0.075 (0.173)	0.326** (0.137)	-0.008 (0.408)	0.154 (0.150)	0.289* (0.146)	0.279 (0.336)	-0.079 (0.059)	0.037 (0.046)	-0.287** (0.124)
Annual family income below \$20,000	0.153 (0.219)	-0.068 (0.282)	-0.326 (0.403)	0.334 (0.239)	0.068 (0.274)	-0.091 (0.329)	-0.181*** (0.058)	-0.136* (0.071)	-0.235 (0.142)
Annual family income between \$20,000 and \$50,000	-0.347** (0.159)	-0.219 (0.264)	0.073 (0.333)	-0.164 (0.138)	-0.092 (0.246)	0.193 (0.248)	-0.182** (0.070)	-0.127* (0.072)	-0.121 (0.157)
Annual family income between \$50,000 and \$75,000	-0.375* (0.200)	-0.461** (0.212)	-0.139 (0.446)	-0.260 (0.179)	-0.442** (0.195)	-0.057 (0.398)	-0.115 (0.084)	-0.019 (0.087)	-0.083 (0.163)
Control for unemployment rates and demographic characteristics	YES	YES	YES	YES	YES	YES	YES	YES	YES
State fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year by Month fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of observations	83,236	49,304	24,073	83,236	49,304	24,073	83,236	49,304	24,073
Adjusted R2	0.007	0.007	0.008	0.006	0.006	0.007	0.002	0.001	0.002

Following the information on the number of required weekly employer contacts provided by Toohey (2015), I group state-periods into three groups: not indicating an exact number of employer contacts, low search requirements (0–2 contacts per week), and high search requirements (3 or more contacts per week). I drop six states that provide job search requirements that are in some way individualized for claimants, following the suggestions by Toohey (2015). Of all the state-periods, 60% do not indicate an exact number of employer contacts to be eligible for the UI benefits, 25% require 0–2 contacts per week, and 15% need 3 or more contacts per week. Columns (1)–(3), (4)–(6), and (7)–(9) focus on switching to self-employment, unincorporated self-employment, and incorporated self-employment, respectively. For each dependent variable, there are three columns, representing the results of using three subgroups: state-periods that have non-specific search requirements, 0–2 contacts per week, and 3 or more contacts per week, respectively. The sample selection and definitions of dependent variables are the same as before. The same demographic variables, gender, age and education, and unemployment rates, are controlled for as in Table 4. I do not report these coefficients to save space. All standard errors are clustered at state level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

TABLE A6 Questionnaire

Question 1. Suppose an unemployed worker satisfies all of the eligibility requirements (e.g., having sufficient work history and covered earnings in the previous year) to receive UI benefits. If this person starts his/her own business, would s/he still be eligible for unemployment benefits?
Question 2. If this unemployed person can receive benefits while starting a business in your state, would s/he still need to satisfy the job search requirements?
Question 3. If this unemployed person is receiving unemployment benefits while starting a business, would the gross revenue or profit from the business affect his/her unemployment benefits? If so, how will the revenue or profit change the unemployment benefits in your state?
Question 4. If there is a change in the maximum weekly benefits or maximum duration of receiving benefits in your state, would it only apply to new claimants or also apply to people who claimed benefits before the change and are still receiving benefits? For example, suppose I lost my job in December of 2009, and started to receive the maximum weekly benefit in that month. In January of 2010, the maximum benefits rose. Will the benefits I receive in January increase (assuming my previous earnings were high enough)?
Question 5. If there is an increase in the maximum weekly benefit in your state, would the benefits of an unemployed worker whose benefit is below the maximum weekly benefits also increase at the same time?
Question 6. Has there been any change in the eligibility requirements discussed in question 1 since 1995 (that you are aware of)? If yes, could you briefly explain the change?

TABLE A7 Variable explanation

Variables	Explanation
A. Labor Market Status and Business Performance	
Switch from unemployment to self-employment	It is equal to 1 if this unemployed person has become self-employed during the sample period, and 0 otherwise. In all the regressions, it is scaled by 100.
Switch from unemployment to unincorporated self-employment (%)	It is equal to 1 if this unemployed person has started an unincorporated business during the sample period, and 0 otherwise. In all the regressions, it is scaled by 100.
Switch from unemployment to incorporated self-employment (%)	It is equal to 1 if this unemployed person has started an incorporated business during the sample period, and 0 otherwise. In all the regressions, it is scaled by 100.
Dummy: Layoff	It is equal to 1, if respondents report the reason as “Job loser/ on layoff ”, or “Other job loser”; and equal to 0 if the reason is “Temporary job ended”, “Job leaver ”, “Re-entrant”, or “New-entrant”.
Dummy: Received UI benefits	It is equal to 1, if respondents report that they received UI benefits in the period right before they start businesses; otherwise, equal to 0. This variable is constructed using SIPP data.
Business profits in the first month	The amount of profit/loss in the first month of business creation. This variable is constructed using SIPP data.
Average business profits	The average amount of profit/loss over all the surviving months. This variable is constructed using SIPP data.
Dummies: survive 12, 18, 24, or 36 months	If the business has survived for more than 12/18/24/26 months, the corresponding dummy variable “Survive 12/18/24/36 months” will be equal to 1; the dummy variable is equal to zero if the business has exited and has not survived 12/18/24/36 months; the value is missing, if it has not survived 12/18/24/36 months but is still alive at the end of the sample period.
Having a SEA program	It is equal to 1, if a state in that month of year has this SEA program, otherwise, it equals 0.
Unemployment rate in the current month (%)	Unemployment rate in the month that the employed lost their job.
Unemployment rate in the previous 3 months (%)	Average of the unemployment rate in the previous three months before the employed lost their job.
Nonspecific work-search requirements	It equals 1, if a state does not indicate the search requirements, otherwise, it equals to 0.
Low work-search requirements	It equals 1, if a state requires 0-2 employer contacts per week; it equals 0, otherwise.
High work-search requirements	It equals 1, if a state requires 3 or more employer contacts per week; it equals 0, otherwise.
B. Unemployment Insurance Benefits	
Max UI benefit (adjusted for inflation)	It is the product of the maximum weekly benefit and the maximum duration adjusted by the monthly inflation rate.
Log (max UI benefit)	Log of the product of the maximum weekly benefit and the maximum duration adjusted by the monthly inflation rate.
Dummy - max UI benefits increase by more than 20%	It is equal to 1 if maximum UI benefit has increased by more than 20% in that year and that state; otherwise, it equals 0.
Dummy - max UI benefits decrease by more than 20%	It is equal to 1 if maximum UI benefit has decreased by more than 20% in that year and that state; otherwise, it equals 0.
C. Demographics	
Age	Respondent’s age
Female	Respondent’s gender
Have College Degree or Above	It equals 1 if the respondent has college degree or above; it equals 0, otherwise.
Married, Spouse Present	It equals 1 if the respondent has gotten married and their spouse is present; it equals 0, otherwise.
Spouse has a job	It equals 1 if the respondent’s spouse has a job; and 0, otherwise.
Annual family income below \$20,000	It is equal to 1 if the family annual income is below \$20,000; otherwise, equal to 0.
Annual family income between \$20,000 and \$50,000	It is equal to 1 if the family annual income is between \$20,000 and \$50,000; otherwise, equal to 0.
Annual family income between \$50,000 and \$75,000	It is equal to 1 if the family annual income is between \$50,000 and \$75,000; otherwise, equal to 0.
Annual family income above \$75,000	It is equal to 1 if the family annual income is above \$75,000; otherwise, equal to 0.
Annual family income is missing	It is equal to 1 if the family annual income is missing; otherwise, equal to 0.