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Contents

"Fine...I'll do it myself": Lessons from self-employment grants in a long recession period*

Stjepan Srhoj† Ivan Zilic‡

Abstract

This paper evaluates the effect of a self-employment grant scheme for unemployed individuals—designed to ease the first 12 months of business operation—on firm growth, survival, and labor market re-integration in Croatia in the 2010–2017 period. Grants offered a moderate amount of finances (up to 50% of average annual gross salary) and absorbed only 5% of funds allocated to active labor market policies, but accounted for 10% of new firms opened throughout the years. We use the universe of unemployment episodes and the universe of unlimited and limited liability firms to document the effect of self-employment grants both causally and descriptively. Exploiting longitudinal structure of unemployment episodes dataset, we find that individuals who finish their spell with a grant have a significantly lower probability of returning to unemployment. Also, we find that limited liability firms opened via a grant have lower growth potential and worse survival profile, while unlimited liability firms—even though a sizable portion of them closes after a required 12-month grant period—have a more favorable survival profile. While these results are in line with the rest of the empirical literature on the self-employment grants, we also find that the effectiveness of these grants has increased throughout the years, indicating towards the direction of institutional learning.

Keywords: self-employment grant, evaluation, unemployment, firm performance.

JEL classification: J68, M13, H25, H43.

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1. Introduction

Entrepreneurship is the backbone of economic growth and development and governmental policies can spur but also limit entrepreneurship momentum and activities (e.g. Bornhäll et al., 2015; Henrekson, 2005). To design policies that facilitate entrepreneurial behavior one must understand the heterogeneity of different entrepreneurship motives, processes and outcomes, especially during an economic downturn (e.g. Peric and Vitezic, 2016). The reasoning behind start-ups is often divided into two types of motives, the push and the pull factors (for overview see Simoes et al., 2016). Push factors encompass poor job prospects like unemployment, limited work flexibility or termination of unemployment benefits, which steer the decision towards self-employment, while pull factors encompass reasons such as wanting to be one's own boss or perceiving a business and/or lifestyle opportunity that directs an individual towards self-employment (Caliendo and Kritikos, 2010).

The past decade, with the experience of a deep recession, has provided a plethora of push factors materialized as high unemployment and all of the adverse ramifications that unemployment brings. Therefore, governments around the world spend considerable funds to tackle unemployment with traditional active labor market policies (ALMP), like job creation, training, and salary subsidies. For example, according to Eurostat, European Union member states spent almost 2% of their combined GDP in 2013 to support unemployed individuals to get paid jobs[1]. However, the effectiveness of these policies has been questioned as they yield ambiguous results (see, for example, Card et al., 2010, 2017).

Recently, a complementary measure to the traditional ALMPs—self-employment grants for unemployed individuals—has become increasingly popular. These grants aim to support unemployed individuals to start their own firms thus "turning unemployment into employment" (Caliendo, 2016), and are maybe particularly interesting for underpaid individuals, as well as for individuals with limited employment opportunities (less educated, minorities, youths and individuals with depreciated skills) (see, for example, Caliendo, 2016; Dvouletỳ and Lukeš, 2016). Grants for self-employment are also attractive to

[1] https://ec.europa.eu/eurostat/web/labour-market/labour-market-policy/database

policy-makers as self-employment might directly decrease unemployment, but also indirectly decrease unemployment via entrepreneurs' potential hiring (so-called *double dividend*), thus giving the self-employment grant not only a *social*, but also a *growth* role.

Previous research, mostly on developed countries, has shown that self-employment grants are a successful avenue of labor market integration, but that firms opened through self-employment grants have lower growth potential[2]. Heterogeneous effects show that they are most effective for individuals who would otherwise have no employment options, namely less educated, younger individuals and women (Caliendo and Künn, 2011, 2015).

This paper contributes to this literature by analyzing self-employment grants for unemployed individuals in Croatia in the period 2010–2017. The grant scheme was designed to ease the initial phase of a business start-up by financing salaries, contributions, basic work equipment, and training and seminars. While the amount of the grant was of moderate magnitude—going up to 4,750 euro on average in 2017—and the whole grant scheme accounted for only 5% of funds spent on ALMPs, more than 15,000 grants were awarded, which contributed to up to 10% of firm creation within a particular year. Potential users of the measure were unemployed individuals registered at the public unemployment office (CES), and who applied for a grant with a business plan. The public employment office evaluated the business proposal based on the feasibility of the idea, projected output in terms of employment potential and based on unemployment duration of an individual. If awarded the grant, an individual registered a business—in the form of limited or unlimited liability firm— and had to run it for 12 months, after which they had to file a report on the funds used.

Using the universe of unemployment episodes we identify a causal estimate of the grant receipt on the probability of re-entering unemployment. Exploiting the fact that the dataset contains multiple unemployment spells per individual, we rely on individual fixed effects to control unobserved heterogeneity which affects selection into the grant as well

[2]For example, analyzing firm survival Andersson and Wadensjö (2007); Désiage et al. (2010); Caliendo (2016) show a significant and positive effect; while Caliendo and Künn (2011) Wolff and Nivorozhkin (2012) also show positive labor market integration effects. However, Désiage et al. (2010) and Caliendo et al. (2015) found no significant effects of self-employment grants on employment growth, turnover growth, value-added, profitability, labor, and capital productivity; and Caliendo (2016) finds an indication of deadweight effect as his results suggest that 40–60% of subsidized firms would have been opened without the grant.

as, arguably, rich episode- and individual-based set of covariates. Multiple estimation models, specifications and sub-samples provide evidence that the self-employment grant significantly reduces the probability of re-entering unemployment. Comparing the most comprehensive specification within a particular model with the specification using individual-fixed effects points towards slightly *positive* selection into the grant (compared to other unemployed people in the dataset) as estimation with individual-fixed effect yields quantitatively smaller effects.

Furthermore, to descriptively document the effect of the self-employment grant on the firm performance, we match the dataset on grant recipients with the universe of limited liability firms and find that, on average, firms opened via self-employment grant exert lower growth of sales and employment, which is line with the well-documented interpretation of *necessity entrepreneurs*. In particular, individuals receiving self-employment grants are usually without other employment options (compared to other entrepreneurs), so the growth potential of their business is limited. The survival of these firms, although based on a crude yearly indicator, shows a negative significant difference compared to the no-grant counterparts.

However, matching the grant recipient dataset with the universe of unlimited liability firms, we are able to analyze the survival profile in more detail, and we find that—although a portion of firms was closed after the required 12 month grant period expired, which points to the direction of *cash and carry effect*—firms opened with a grant scheme have a much more favorable survival profile throughout the period. While this evidence is only descriptive, as we do not control for the selection into the grant, the direction of bias, due to the *necessity entrepreneurial* interpretation (compared to other entrepreneurs), makes these estimates a lower bound of the true effect. Lastly, we find compelling evidence that grant scheme is becoming more effective throughout the years, which might come from better selection screening, better self-selection of candidates, more business opportunities as the economy recovers, and, in general, from *institutional learning*.

While these results are somewhat in line with other literature on self-employment, we argue that we contribute to the literature in multiple ways. Firstly, self-employment grant assessment has been focusing on developed countries, so providing estimates for

Croatia—the most recent European Union member state, which is less developed than the European core and experienced a particularly deep recession with significant labor market challenges—might generalize previous results and help their external validity. Secondly, we use unique and, arguably, rich datasets that enable us to use various methods (linear and non-linear) to document the effect descriptively, but also causally. Lastly, given the socialist heritage of Croatia where the government was the main provider and organizer of economic activity, we also tangentially analyze whether governments can promote self-employment and entrepreneurial behavior in societies where proactive market behavior is not embedded in social norms and culture. The fact that we find clear evidence that there is *institutional learning* while administrating self-employment grants indicates that this task is indeed feasible.

The paper is structured as follows: in the next section, we explain the labor market context and self-employment grant in more detail, the third section covers the dataset and methods we use, as well as the results, while the last section concludes the paper.

2. Institutional setting

The Republic of Croatia, the most recent European Union member state, experienced a strong adverse economic developments during the Great Recession. The recession hit Croatia in 2009 causing a considerable number of private firms to go bankrupt, while many of those surviving faced strong sales decline and overall economic hardship (for more about industry dynamics and firm behaviour in Croatia see Vitezić et al., 2018; Srhoj et al., 2019a). The cumulative drop of Croatia's GDP reached 12% between 2009 and 2014, and the unemployment rate more than doubled (from 8.6% to 17.3%) (for more about labor market in Croatia see Botrić, 2017; Nikolic et al., 2017). Even after the recession, in the period 2015–2017, the GDP growth was rather modest, not reaching the 2008 pre-recession levels before 2017. While the unfavorable external economic conditions contributed to Croatia's economic slowdown, the Great Recession exposed structural problems with the Croatian economy and labor market (see Franičević, 2011; Nestić, 2015). To meliorate these alarming unemployment trends, Croatian government

engaged in a several active labor market policies (ALMP) to tackle the unemployment concerns, notably vocational training for work without commencing employment (Tomić and Zilic, 2018), and among others, the support for unemployed individuals who wanted to start a businesses and get self-employed.

The key self-employment policy—*Your initiative – your workplace*—has been active since 2010 as part of the Act on Employment Promotion[3]. The main goal of the policy, administrated by the Croatian Employment Service (CES), has been to promote self-employment of unemployed individuals by easing the initial phase of a business start-up—first 12 months at the market—with a lump sum grant. CES evaluation (HZZ, 2016, p. 42) suggests strong and positive effect of 38 to 46 percentage points of self-employment grants on the employment status.

Beneficiaries of the policy are unemployed individuals registered with the public employment office (CES) who apply for a self-employment grant[4]. The applications are evaluated by CES based on several criteria: being unemployed, various aspects of the business plan, including feasibility of the business idea, estimated number of employees and the applicants' duration of unemployment[5]. If awarded the grant, which could amount to up to 50% of Croatian average annual gross salary, individuals are obliged to register their proposed business (limited or unlimited liability firm[6]) and remain self-employed for 12 months[7].

[3]The measure for financially supporting self-employment out of unemployment is firstly noted in the Act for Employment Promotion 2009/2010. The funds for this measure were allocated from the national budget–division 05025, program 1671, activity A689027.

[4]The grant was not available to entrepreneurs who previously benefited from ALPMs for self-employment.

[5]A five-member committee of each regional CES office makes a joint assessment of each application. In 2016, an assessment form was introduced with 10 areas graded by each committee member on the basis of each of these elements, with the final decision being based on the average overall grade.

[6]If an unlimited liability firm (craft) is opened, an entrepreneur operates as a private individual and is legally responsible for the craft's potential unpaid costs towards suppliers or unpaid taxes with his/her real estates, movable property or his/her future wage at a new job. While opening an unlimited liability firm does seem risky, in 2017 about 39.5% of all firms in Croatia were crafts (HOK, 2017). There are several reasons why opening a craft is a desirable option. Firstly, there are lower costs and it is faster to register and close a craft. Secondly, there is a considerably lower taxation if annual revenue is less than approximately 20,000 euro (until 2015) and 40,000 euro (since 2015). Thirdly, there is simpler financial reporting regulated by the Income Tax Act (OG 177/2004). On the other hand, if an entrepreneur expects an income larger than the legally set threshold, registering a craft would not be the optimal solution due to higher taxation (see Budimir and Aralica, 2013).

[7]From 2013 onwards unemployed individuals could jointly open an unlimited or limited liability firm. This way one firm could receive several grants, that is, a grant for each previously unemployed individual, now entrepreneur, in the new firm.

The awarded funds could be used for wages and contributions, basic work equipment and education, training and seminars.[8] After the grant period, users have to submit a report documenting the expenses and performance and in case of any transgressions in the form of closing the business or unjustifiable expenses, the grant user is obliged to return the funds plus the interest rate to CES. The policy was completely funded from the national budget in the 2010–2014 period, while it was co-funded by the EU from 2015 onwards.

TABLE 1: Descriptive statistics on self-employment grants (in euro)

Year	# grants	# new unlim. liab. firms	# new lim. liab. firms	Mean amount	Median amount	Std. dev. of amount	Total amount
2010	282	6,539	19,074	4,061	3,983	491	1,145,272
2011	770	7,532	19,947	3,851	3,876	744	2,965,571
2012	838	7,372	19,984	2,614	2,467	304	2,190,132
2013	4,409	9,641	30,416	2,074	1,930	1,175	9,145,960
2014	2,938	7,816	22,168	3,321	3,263	1,038	9,757,121
2015	2,649	7,235	21,119	3,398	3,274	643	9,000,336
2016	2,162	7,652	23,337	3,415	3,308	809	7,384,163
2017	2,526	9,905	6,060*	4,749	4,658	1,269	11,995,409

Note: CES grants, unlimited and limited liability firms database. The monetary units are converted to euro from Croatian kuna on the basis of the medium exchange rate on the last day of a particular year given by the Croatian National Bank. The period 2009-2014 was a period of recession in the Republic of Croatia. *The firm-level database is truncated with March 29, 2017.

There are several insights available from table 1 which shows descriptive statistics on awarded grants. Firstly, the average amount of the grant is of a moderate magnitude. For example, in 2016 the average amount was 3,415 euro, which is around 4.3 average net salary in Croatia at the time[9]. Secondly, even if the amount was not high, the number

[8]The self-employment grant amount, in the period 2010–2013, could have been used exclusively for the purpose of covering the wage costs of a self-employed individual (beneficiaries registering a limited liability firm pay themselves 50% and receive the other 50% of the gross II wage costs from CES, unlimited liability firms received an amount that covered their full cost of contribution). Since 2014, the self-employment grants have been given in line with the Commission Regulation (EU) No. 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid. Beginning with the year 2014, grants could have been used for other purposes apart from salary costs, including the purchase of machinery, software, materials and resources needed for doing business, as well as costs of printing promotion materials, web site development, business premises rental and trainings related to conducting firm activities.

[9]Comparing the grant amount to unemployment benefits can indicate whether potential moral hazard motives into self-employment grant are possible. For example, in 2017, a person with 10 years of work experience could receive unemployment benefits of total value between (roughly) 2,600 and 4,150 euro a year, depending on the previous wage (http://www.hzz.hr/default.aspx?id=10292), while the mean

of grants was considerable (16,574 in the period 2010-2017). For example, 2,173 grants were available in 2016 compared to the total of 30,989 newly registered limited and unlimited liability firms in 2016, which implies that potentially 7% of newly registered businesses were supported through the self-employment grant[10]. Thirdly, there is an increase in the number of grants awarded and the total amount of the grant in the year when Croatia entered the European Union, which coincides with the year of local elections in Croatia (2013). From 2012 to 2013, the number of grants increased from 838 to 4,409 (526%), while the total amount increased from 2.2 million euro to 9.1 million euro (420%). Finally, the total value of grants subsidizing self-employment in the period 2010-2017 is 53.6 million euro. For example, in 2016, grants subsidizing self-employment accounted for 5% of the funds spent on ALMPs in Croatia.

3. Empirical analysis

3.1. Data

In order to document the causal effect of self-employment grants on labor market integration we use a dataset on the universe of all unemployment episodes which covers all spells starting from January 1, 2009, until November 23, 2017 (N = 2,637,860). These data include the ID of an individual in the episode, as well as personal characteristics (age, gender, education, etc.), information regarding the episode (start and end date of the episode, reason of entering and leaving unemployment, NACE industry codes of the previous employer and the next one, if applicable, etc.). Most importantly, it also includes an indicator of whether an episode ended with a self-employment grant, as well as grant start and end dates. As we observe individuals and their unemployment episodes through time, we can control for the selection into self-employment grant using the within-individual variation and establish a causal estimate.

In addition, we also use the universe of all limited liability firms in Croatia across the

grant amount in 2017 was 4,749 euro.

[10]During the 2010–2017 period a total of 11,132 unlimited liability firms received self-employment grants, with a mean amount of 3,039 euro. In the same period, 4,995 limited liability firms received on average 3,140 euro.

1993–2017 period (N = 1,908,831) containing firm ID, NACE industry codes, county of headquarters, year of incorporation and exit, complete balance sheets and profit and loss statements; and the universe of all unlimited liability firms in Croatia from October 8, 1991 to May 26, 2018 (N = 306,059); including the dates of incorporation and dates of exit, NACE industry codes, and a firm's headquarters county[11].

Using the unlimited liability firms (crafts), since information on the exact dates of firm opening and closure is available, we provide a detailed account of the firm's survival. We complement this analysis with the effect of grants on the newly founded firm's performance in terms of employment and sales growth using a limited liability firm database. It should be noted that the analysis of firm survival and growth is a descriptive one, as we are not able to control for the selection into the grant.

3.2. Individual unemployment re-entry

We use data on unemployment spells to analyze the pattern of employment integration, i.e. to determine if individuals who exit the unemployment via self-employment grant tend to stay longer out of unemployment. While the ideal setting would be the one in which we have access to employment data, the unemployment episodes dataset we use does not track individuals once they are out of unemployment. One of the key components of these data is that we observe an individual ID in an episode, which means that we potentially observe multiple spells per individual, so we can construct unemployment re-entry variables, but also base our identification strategy on fixed-effects estimation. From the universe of all unemployment episodes starting from January 1, 2009 until November 23, 2017, we exclude all unfinished spells as we model individual re-entry into unemployment—this reduces the sample from 2,637,860 to 2,463,498 observations. Also, we exclude all unemployment episodes that did not finish in employment, which additionally reduces the sample to 1,529,671 observations (episodes) and 735,273 distinct individuals (and 15,129 treated episodes)[12].

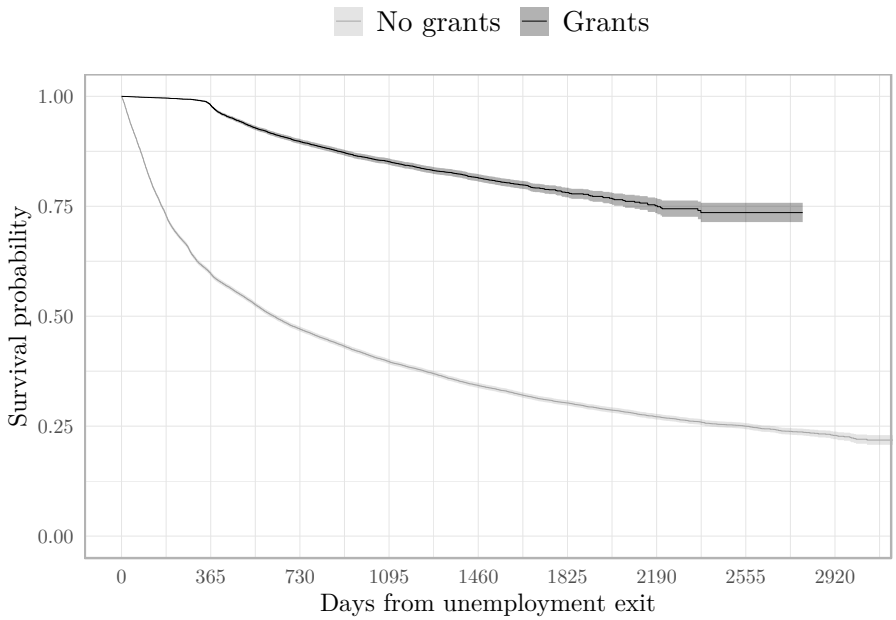
[11] We merge these datasets with grant recipients published by Croatian employment service (available at http://www.hzz.hr/default.aspx?id=19186)

[12] We also exclude unemployment episodes finishing in vocational education without commencing employment as this is a one-year active labor market policy (in total 82,473 episodes). For more details see Tomić and Zilic (2018).

In addition to this, to compare self-employment grant holders with individuals who were also entrepreneurs at some point and, therefore, define a better comparison group, we keep all unemployment episodes of individuals who exited unemployment because they opened a firm in *any* of the episodes—we refer to this as an entrepreneurial sample[13]. This reduces the dataset to 49,216 episodes and 29,226 individuals, 14,083 of which are treated. Table 2 displays the descriptive statistics of both of these datasets, while figure 1 shows Kaplan-Meier survival estimates (Kaplan and Meier, 1958) for entrepreneurial sample, where the dependent variable is time to re-entering unemployment.

Comparative survival profile indicates a strong positive effect of grants, and, while there is, to some extent, *cash and carry effect* as a portion of individuals returns to the unemployment office as soon as the required one-year time frame expires, very high survival rates of not returning to unemployment in the first year contrast the sharp decline in survival probability of unemployment episodes not ending with a self-employment grant.

FIGURE 1: Kaplan-Meier estimate of employment survival



We can see that there are some observable differences in sample composition which might affect the Kaplan-Meier survival results (table 2). In particular, among individuals who finished their unemployment episode with a self-employment grant, there is, on average,

[13]Note that this only changes the composition of the control group; we also present results using the full sample in the Appendix—conclusions are identical, but greater in magnitude.

a disproportionate number of men, they are middle-aged (from 30 to 50) and more educated. Also, they most likely spend up to a year at the employment office before getting a grant and 70% of them were employed before the unemployment spell, while a disproportionate number of them also came from inactivity. If they had been previously employed, most grant receivers lost their jobs because their contract expired or they were laid off due to economic, technological and organizational reasons. Finally, almost 60% of grant receivers opened an unlimited liability firm (or slightly more in the entrepreneurial sample)[14], and, as expected, they have a lower probability of returning to unemployment with a longer time period before re-entering unemployment.

To estimate the causal effect of the grant, we build our empirical strategy on the longitudinal nature of the dataset where we can observe an individual in different unemployment episodes, which enables us to eliminate the effect of fixed unobserved characteristics that might drive the results. Therefore, using repeated observations on treated individuals we arguably ameliorate concerns for selection into the grant, estimating the causal effect of receiving a self-employment grant on unemployment re-entry. We estimate linear and non-linear models that accommodate for the right censoring of the employment duration—linear version of our estimation takes the form:

$$y_{je} = \alpha + \beta\, grant_e + \boldsymbol{\gamma}' \boldsymbol{X}_j + \boldsymbol{\delta}' \boldsymbol{Z}_e + \boldsymbol{\xi}_i + \epsilon_{je} \tag{1}$$

where y_{je} is an indicator taking the value of 1 if a person j exiting an unemployment episode e stays out of unemployment for a certain time period (6, 12, 18, 24 and 36 months), $grant_e$ is an indicator if an unemployment episode e finished with self-employment grant, $\boldsymbol{Z}_e$ is a vector of episode-specific controls (duration of the episode, reason of unemployment entry, reason of unemployment exit, reason of employment exit, NACE 1-digit industry sector, year of unemployment entry and year of unemployment exit, all dummies discretized according to table 2), $\boldsymbol{X}_{je}$ is a vector of individual-specific variables (gender, age, education, tenure, all discretized according to table 2; we use only time-variant if we also use individual fixed effects), while $\boldsymbol{\xi}$ is an individual fixed effect that captures

[14]There is a portion of grant receivers who are coded for finding a job in a country, and while this should be viewed as a problem in the dataset, in the entrepreneurial sample, by definition, a portion of these individuals is almost zero.

TABLE 2: Descriptive statistics of unemployment spells which ended in employment

	Full sample				Entrepreneurial sample			
	Grant		No grant		Grant		No grant	
	Mean	Std.dev.	Mean	Std.dev.	Mean	Std.dev.	Mean	Std.dev.
Individual level variables								
Female	0.426	0.494	0.523	0.499	0.428	0.495	0.458	0.498
Age								
20 and less	0.027	0.163	0.104	0.305	0.027	0.163	0.051	0.221
20 to 30	0.305	0.46	0.386	0.487	0.302	0.459	0.354	0.478
30 to 40	0.376	0.484	0.236	0.425	0.377	0.485	0.315	0.464
40 to 50	0.203	0.402	0.173	0.378	0.204	0.403	0.192	0.394
50 and more	0.089	0.284	0.101	0.302	0.089	0.285	0.088	0.283
Education								
Elementary or less	0.057	0.232	0.152	0.359	0.058	0.233	0.088	0.284
High school	0.685	0.464	0.671	0.47	0.688	0.463	0.708	0.455
University or more	0.258	0.437	0.177	0.382	0.254	0.435	0.204	0.403
Tenure								
2 years or less	0.098	0.297	0.179	0.383	0.097	0.296	0.128	0.334
2 to 5 years	0.108	0.311	0.134	0.34	0.107	0.309	0.131	0.337
5 to 10 years	0.206	0.404	0.179	0.383	0.204	0.403	0.211	0.408
10 to 20 years	0.365	0.482	0.237	0.425	0.369	0.483	0.315	0.465
20 years and more	0.14	0.347	0.155	0.362	0.142	0.349	0.135	0.342
Unemployment episode variables								
Duration of unemployment episode								
30 days or less	0.016	0.126	0.108	0.31	0.016	0.125	0.092	0.289
30 to 90 days	0.223	0.416	0.252	0.434	0.224	0.417	0.247	0.431
90 to 180 days	0.294	0.456	0.254	0.435	0.3	0.458	0.263	0.44
180 days to 1 year	0.245	0.43	0.228	0.42	0.243	0.429	0.235	0.424
1 to 2 years	0.146	0.353	0.102	0.302	0.143	0.35	0.11	0.313
2 to 3 years	0.043	0.203	0.031	0.173	0.043	0.203	0.032	0.175
3 years and more	0.032	0.176	0.025	0.158	0.032	0.175	0.021	0.145
Status before unemployment								
Employment	0.702	0.457	0.757	0.429	0.704	0.456	0.763	0.425
Education	0.036	0.185	0.083	0.275	0.034	0.182	0.047	0.211
Inactivity	0.241	0.428	0.128	0.334	0.239	0.427	0.17	0.376
Vocational training	0.008	0.092	0.02	0.138	0.009	0.092	0.008	0.09
Other	0.013	0.113	0.013	0.112	0.013	0.115	0.012	0.108
Employment exit reason								
Not applicable	0.299	0.458	0.245	0.43	0.296	0.457	0.239	0.426
Expiration of contract	0.226	0.418	0.446	0.497	0.225	0.418	0.309	0.462
Expiration of seasonal contract	0.012	0.11	0.068	0.251	0.012	0.11	0.044	0.205
Dismissal (econ., tech., and org. reasons)	0.309	0.462	0.16	0.367	0.311	0.463	0.272	0.445
Dismissal	0.022	0.147	0.012	0.107	0.023	0.149	0.018	0.133
Worker resigned	0.03	0.171	0.016	0.125	0.03	0.171	0.017	0.131
Consensual resignation	0.085	0.279	0.043	0.203	0.084	0.278	0.054	0.227
Firm closure	0.015	0.121	0.009	0.097	0.016	0.124	0.043	0.203
Other	0.003	0.054	0.002	0.043	0.003	0.056	0.003	0.051
Unemployment exit reason								
Job in country	0.069	0.254	0.953	0.211	0.001	0.025	0.532	0.499
Job abroad	0	0	0.017	0.128	0	0	0.007	0.085
Opening of limited liability firm	0.337	0.473	0.003	0.056	0.362	0.481	0.135	0.341
Opening of unlimited liability firm	0.593	0.491	0.007	0.084	0.637	0.481	0.31	0.462
Other	0	0.016	0.02	0.139	0	0	0.016	0.126
Individual-based spell variables								
Unemployment re-entry	0.129	0.336	0.661	0.473	0.13	0.336	0.602	0.489
Days to unemployment re-entry	976.68	621.54	555.73	681.740	962.59	612.40	699.48	718.49
Sample size	15,129		1,514,542		14,086		35,125	

Note: Full sample consists of all unemployment episodes from January 1, 2009 until November 23, 2017, and finished in employment. The entrepreneurial sample is a subset of the full sample containing all episodes of individuals who exited unemployment due to entrepreneurial reasons at least once. Year of entry and exit, NACE sectors of entry are omitted for brevity reasons.

fixed intrinsic characteristics which might affect entrepreneurial motives (for example, Caliendo et al., 2014).

In order to fully accommodate the right-censoring of the data and estimate the differences in survival we use the Cox proportional hazard model (see, for example, Cox, 1972; Cox and Oakes, 1984). In particular, we estimate:

$$l_{je}(r \mid grant, \boldsymbol{X}, \boldsymbol{Z}) = l_0(r)\, exp\{\theta\, grant_e + \boldsymbol{\gamma}' \boldsymbol{X}_j + \boldsymbol{\delta}' \boldsymbol{Z}_e\} \tag{2}$$

where r is duration in days to individual unemployment re-entry, while $grant_e$, $\boldsymbol{X}_j$ and $\boldsymbol{Z}_e$ represent the same variables as in equation 1, while the $l_0(r)$ is unrestricted baseline hazard. The parameter of interest is θ which measures the change in probability of unemployment re-entry at a specific time (measured in days) associated with the receiving self-employment grant, and the corresponding hazard ratio ($exp(\theta)$).

Apart from the Cox proportional hazard model, we also estimate the Weibull parametric survival model and the Cox mixed-effects model (Hancock et al., 2010). While the first two methods do not exploit the fact that the dataset is constructed on the repeated entries of individuals, the Cox mixed effect model estimates baseline hazard for unemployment re-entry for every individual and then estimates the multiplicative part based on the covariates. These three models, one fully parametric (Weibull), one semi-parametric with unrestricted common baseline hazard (Cox PH), and one semi-parametric with unrestricted baseline hazard function separate for every individual (COX ME) serve as an embedded robustness check to one another.

We present the results of the estimation of the aforementioned models in table 3 (linear models) and table 4 (non-linear models). All of the results presented in table 3 indicate a clear significant positive effect of self-employment grant on the probability of staying out of the unemployment in a certain time frame. For example, estimation including individual fixed-effects (column 4) shows that individuals who finished their unemployment episodes with self-employment grant have 6.4 percentage points higher probability of staying out of unemployment 18 months after the grant receipt than no-grant individuals, which constitutes 11.1% of the sample mean.

TABLE 3: Results, unemployment re-entry: linear models

	Entrepreneurial sample					
	Sample mean	(1)	(2)	(3)	(4)	N
Not unemployed after:						
6 months	0.768	0.197***	0.191***	0.023***	0.020	48,259
		(0.004)	(0.004)	(0.003)	(0.015)	
12 months	0.652	0.335***	0.326***	0.066***	0.086***	45,692
		(0.004)	(0.004)	(0.004)	(0.017)	
18 months	0.577	0.353***	0.343***	0.052***	0.064***	43,406
		(0.005)	(0.005)	(0.005)	(0.020)	
24 months	0.515	0.381***	0.371***	0.057***	0.080***	40,508
		(0.005)	(0.005)	(0.005)	(0.022)	
36 months	0.416	0.354***	0.342***	0.020***	0.073***	34,530
		(0.006)	(0.006)	(0.006)	(0.024)	
Individual based covariates		No	Yes	Yes	Yes	-
Episode based covariates		No	No	Yes	Yes	-
Individual fixed-effects		No	No	No	Yes	-

Note: Entrepreneurial sample is a subset of a full sample containing all episodes of individuals who exited unemployment due to entrepreneurial reasons at least once. Individual-based covariates are gender, age, education, tenure, all discretized according to table 2. Episode-based covariates include duration of the episode, reason of unemployment entry, reason of unemployment exit, reason of employment exit, NACE 1-digit industry sector, year of unemployment entry and year of unemployment exit, all dummies discretized according to table 2. Standard errors clustered at the individual level are in the parenthesis.

*p<0.1; **p<0.05; ***p<0.01

TABLE 4: Results, unemployment re-entry: survival models

	Entrepreneurial sample					
	COX proportional hazard		*Parametric Weibull*		*COX mixed effects*	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Survival	–0.443***	0.642	0.501***	0.640	-0.447***	0.640
	(0.030)	[0.606, 0.680]	(0.033)	[0.599, 0.683]	(0.030)	[0.603, 0.679]
Observations	49,211		49,211		49,211	
Ind. covariates	Yes		Yes		Yes	
Epis. covariates	Yes		Yes		Yes	

Note: Entrepreneurial sample is a subset of a full sample containing all episodes of individuals who exited unemployment due to entrepreneurial reasons at least once. All estimates include individual-based covariates—gender, age, education, tenure; and episode-based covariates include duration of the episode, reason of unemployment entry, reason of unemployment exit, reason of employment exit, NACE 1-digit industry sector, year of unemployment entry and year of unemployment exit, all dummies discretized according to table 2. Parenthesis contain robust standard errors, while brackets contain 95-percent confidence interval of hazard ratio.

*p<0.1; **p<0.05; ***p<0.01

Comparing specifications within the sample and the same outcome, we see that including individual-based covariates does not change the magnitude of the effect dramatically (column 1 versus column 2), but including episode-based covariates does significantly reduce the magnitude of the effect, implying that situation before the episode is more important in explaining the selection into self-employment grant than the individual-level variables.

Comparing columns 3 and 4—estimations without and with individual fixed effects—offers insights in the selection for the self-employment grant based on the unobservables. As the control group is based on individuals who were entrepreneurs at least once in the dataset, the fact that the fixed-effects estimation is quantitatively higher than the estimation without fixed effects is not surprising. Intuitively, if we compare grant-recipients to unemployed individuals who became employed and were entrepreneurs at some point, they tend to be slightly less able to stay out of unemployment[15].

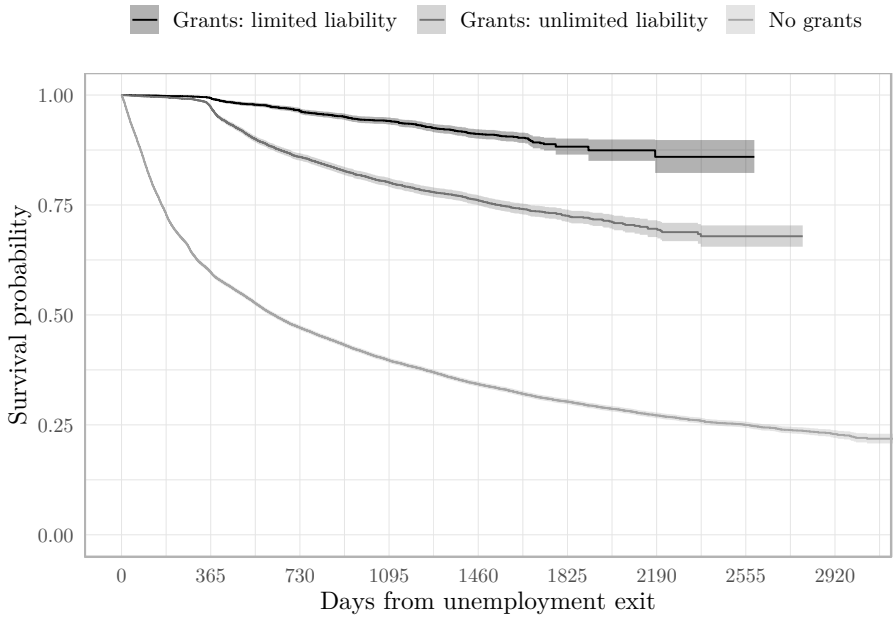
Results of the estimation of survival models presented in table 4 offer similar evidence regarding the effectiveness of self-employment grants. All estimation approaches indicate that grants significantly improve the probability of not returning to unemployment: the self-employment grant improves the chance of staying out of unemployment for around 36%. The estimates within the sample are quantitatively very similar, therefore no additional information, in terms of the magnitude of self-employment grant effect, is obtained by estimating baseline hazards for every individual. Like in the linear models, the entrepreneurial sample gives a smaller magnitude of effects than the full sample, due to the composition of the control group. While the causal evidence of the effectiveness of self-employment grants is still rather scarce (Caliendo, 2016), our findings are in line with most of the evaluation studies (Caliendo and Künn, 2011; Wolff and Nivorozhkin, 2012; Caliendo and Künn, 2015), which find the positive causal effect of grants on the probability of being employed.

[15]Note that the opposite is true if we estimate the same specification in the full sample—when compared to (non-entrepreneurial) unemployed individuals who became employed, self-employment grant recipients tend to be slightly more able to stay out of unemployment (see the Appendix).

3.2.1. Heterogeneous effects on unemployment re-entry

To document heterogeneous effects, we first show Kaplan-Meier survivals across legal form of firms that opened via a grant (limited and unlimited liability)—figure 2. We can see that limited liability is a more successful legal form in terms of survival, which is expected given the possibility to close the craft cheaper and faster.

Figure 2: Kaplan-Meier estimate of employment survival by legal form



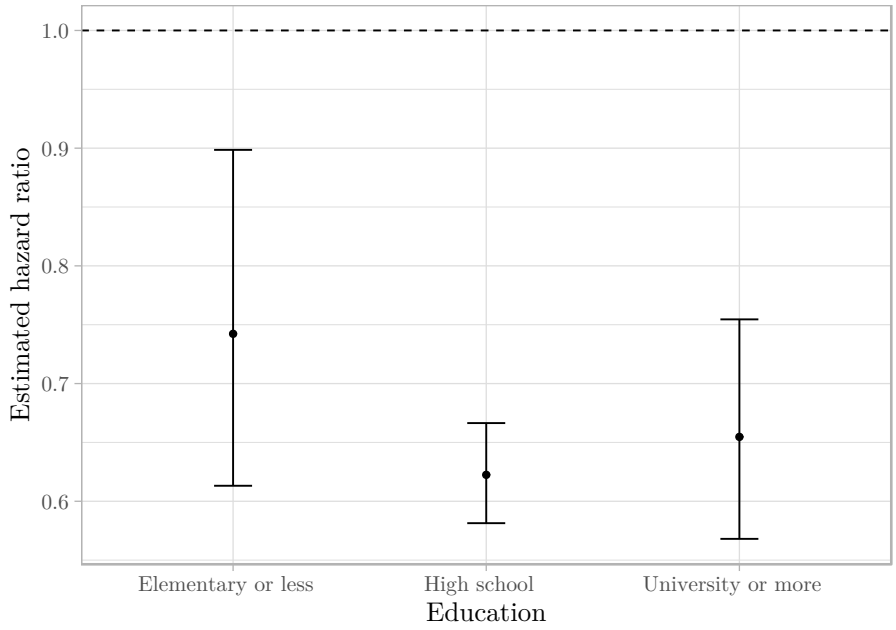
To document heterogeneous effects in more detail, we use the Cox proportional hazard model[16] and re-run the estimation within the categories of discrete covariates we use, controlling for the rest of variables. For example, we estimate the COX PH model only for episodes including individuals with aged 20 or less, controlling for all other covariates presented in specifications above. Table 8 in Appendix presents these results. Concentrating only on the entrepreneurial sample, we see that there is no great heterogeneity in terms of significance of the effects as the self-employment grant significantly reduces the risk of returning to unemployment for most of the subsamples.

The self-employment grant is more effective for individuals who are 20 to 50 years old[17],

[16] We use COX PH model as it gives almost identical estimates as other methods, computationally is faster than the COX ME, and also enables clearer filtering of observations, since we do not need repeated individual entries.

[17] The most successful age-group is 40–50, which contrasts findings from Caliendo and Künn (2011),

FIGURE 3: Heterogeneous effects: education



in contrast to younger and older individuals. It is also more effective for men, although it is also rather successful for women as it reduces their probability of unemployment re-entry for 38.5%. As for the status before unemployment, the self-employment grant is the most effective for people coming from inactivity into unemployment as it reduces the probability of unemployment re-entry for 41.7%. While this seems like a very successful strategy of activating individuals, note that we cannot discard the possibility that an individual could return into inactivity after the grant-period expires[18]. The grant receipt is not effective for individuals coming into unemployment straight from education and vocational training, which does not imply that these individuals will not have long-term positive effects due to the capacity building gained from entrepreneurial experience.

As for educational attainment, the grant is the most effective in terms of labor market reintegration for individuals who finished high school and least effective for individuals who finished elementary school as the highest educational achievement[19]. While heterogeneous point estimates of self-employment grants go in the direction of U-shaped re-

who found that individuals below the age of 30 responded the best to the grant.

[18]Note that grant receivers and no-grant individuals who came from inactivity spend similar amount of time at the unemployment office.

[19]University graduates are also quite successful in using grant funds, which somewhat contrasts findings from Caliendo and Künn (2011).

lationship between educational attainment and self-employment (Poschke, 2013), due to wide confidence intervals, the U-shaped heterogeneous effects of self-employment grants across educational level cannot be claimed.

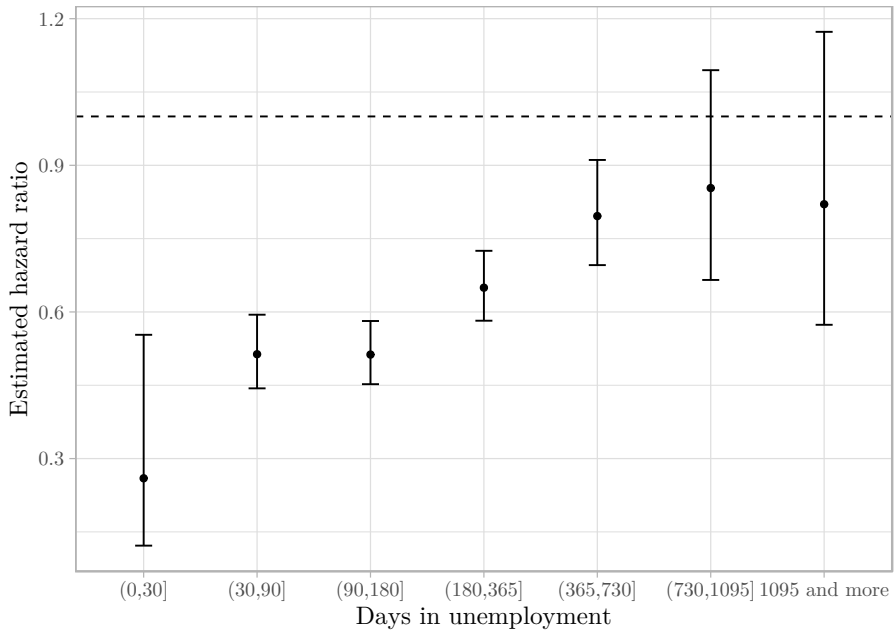
Analyzing heterogeneous effects across employment exit reasons (if applicable) carries a dose of ambiguity as unemployment exit reasons are hard to differentiate (employees might affect official category of resignation). Nonetheless, we record a very strong improvement in the survival if an individual becomes unemployed because of a firm's closure, as the probability of not re-entering unemployment is 63.4%, indicating that self-employment is a good career solution for individuals with know-how, but without a place to work.

While effects across the potential tenure give a rather balanced profile, heterogeneous effects across unemployment duration provide interesting insights—the longer the duration of the unemployment episode, the less effective the self-employment grant. This profile is even extreme, as individuals who spent little time at the unemployment office utilize the self-employment grant the best (a striking 74% reduction in the probability of returning to unemployment), which might indicate the *bogus employment* status[20]. Nonetheless, even with this outlier, the linearity of the effects across unemployment duration holds, which raises a question regarding the effectiveness of the policy towards the individuals who spent more time at the unemployment office (and who should be targeted with the ALMP). In particular, in our entrepreneurial sample, receiving a self-employment grant does not increase the probability of staying out of unemployment if the grant was received at the end of the episode that was longer than two years. Several other reasons might be behind a negative relationship between unemployment duration and self-employment grant effect, including a lack of financial resources needed for running the business or human capital decay and skill loss (Ortego-Marti, 2016), which make it difficult for individuals to withstand the minimum efficiency scale on the market.

Finally, in regard to the heterogeneous effects, we further investigate two groups of unemployed individuals to shed light on potential bogus self-employment (Thörnqvist, 2014).

[20]Individuals might resign from work, apply to the unemployment office and receive a self-employment grant, and then work almost exclusively for the firm they resigned from in the first place. For more on bogus employment see Thörnqvist (2014).

FIGURE 4: Heterogeneous effects: time spent at the unemployment office



In particular, we define potentially bogus self-employed as a group of individuals who completed a university-level education and spent short time (up to 90 days) at the unemployment office. This group closer resembles the potential bogus self-employment in gig economy, as individuals have higher education and short unemployment duration[21]. Results in figure 5 show considerably stronger positive effects among the second group, which raises questions in regard to how large is the portion of bogus self-employment within the second group of publicly supported individuals? This being said, we encourage researchers to investigate effectiveness of self-employment grants with more detailed datasets, which could reliably identify publicly supported bogus self-employment.

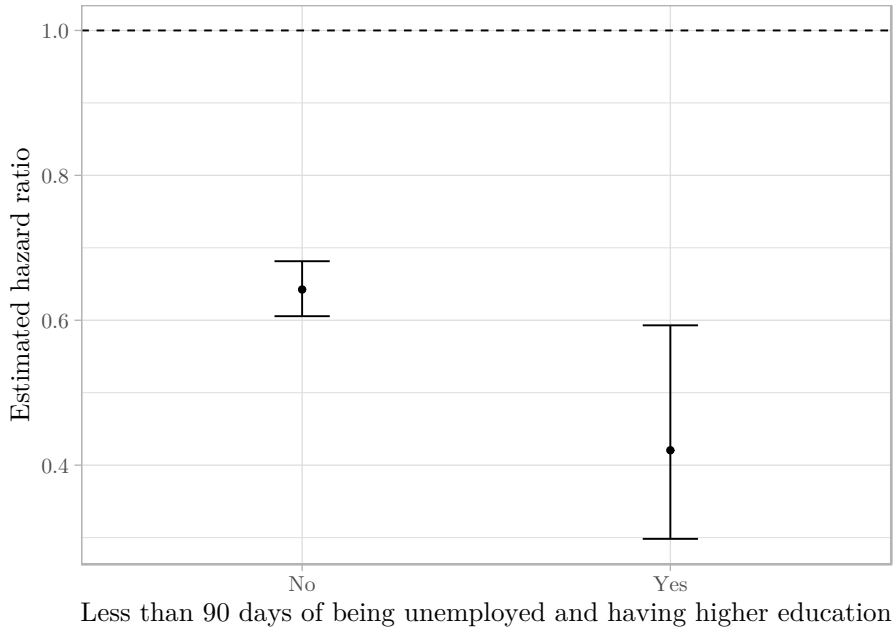
3.3. FIRM SURVIVAL AND GROWTH

3.3.1. FIRM SURVIVAL

Next we turn to firm performance in terms of survival and growth. Our analysis in this regard is limited by availability of information in two datasets: unlimited liability firms dataset, from which we infer survival, and limited liability dataset, from which we infer

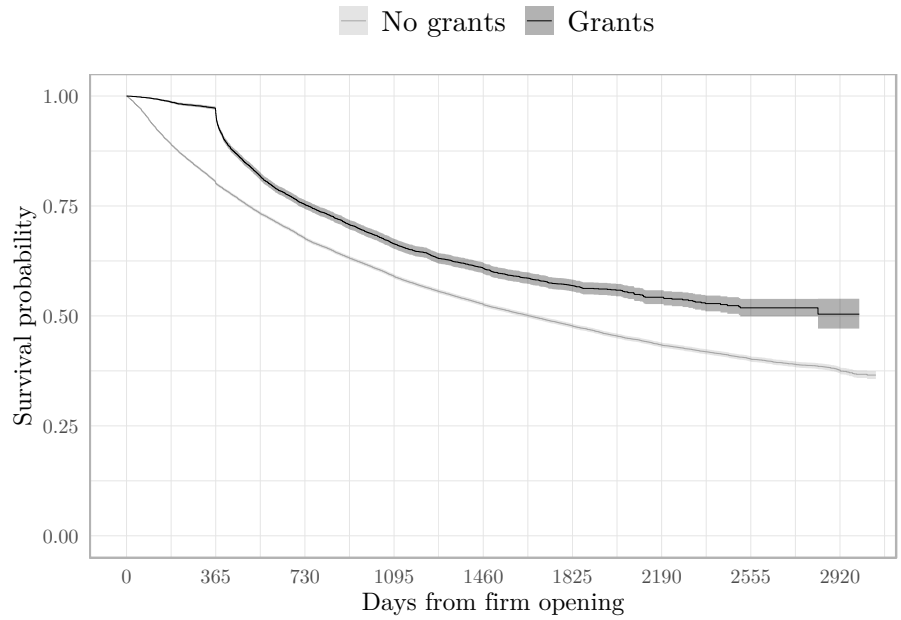
[21] It would be ideal to also know whether individuals starting a new firm are continuing to work for their previous employer. Unfortunately, such data was not available.

FIGURE 5: Heterogeneous effects: potentially bogus employment



growth.

FIGURE 6: Kaplan-Meier firm survival estimates

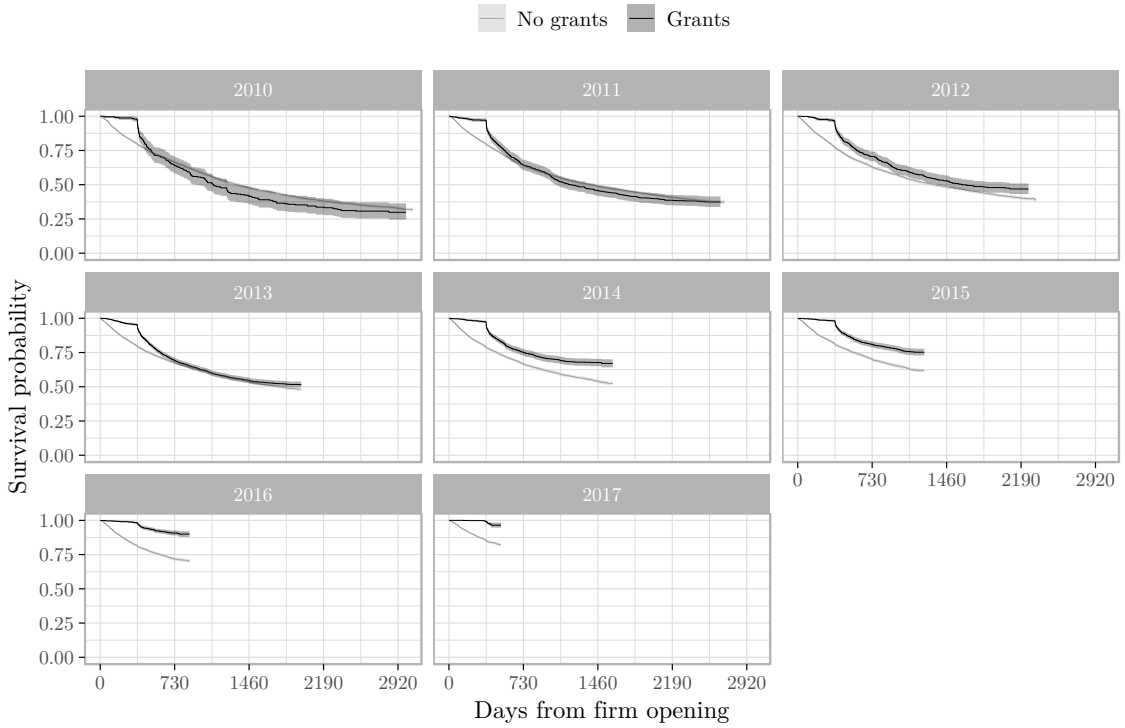


We can offer several conclusions from Kaplan-Meier estimates in figure 6. Firstly, we can observe that unlimited liability firms opened via self-employment grants have significantly higher survival probability than no-grant counterparts. Secondly, grant-firms have very high survival in the first year, as expected, since grant agreement required that a firm

must remain open for at least one year. After that, we observe a sharp decline in survival probability implying that firm closure after the required one-year activity was common among grant-recipients. Nevertheless, survival of firms opened with grants is consistently higher throughout the period. For example, 95.1%, 75.3% and 66.4% of firms initiated with a self-employment grant are still open after one, two and three years respectively, while 80.1%, 67.6% and 60.0% no-grant firms are still operating after one, two and three years respectively. Note that survival profiles using this dataset reflect the results from unemployment episodes datasets (see for example figure 2). Indeed, these descriptive conclusions are corroborated by the results of linear probability and Cox proportional hazard models—survival of unlimited liability firms opened via the grant is 23.8% more favorable than the no-grant counterparts (table 9 in Appendix).

Apart from these baseline results, we also show the effect through time (figure 7), where we can see improvement in the effectiveness of the grant every year. These improvements, evident particularly during the recession period (2010–2013), can be attributed to better self-selection of applicants, improved screening of business ideas, more efficient controls and, consequently, to institutional learning.

FIGURE 7: Kaplan-Meier firm survival estimates by years



Summing up the results presented in the figures above, we find that unlimited liability firms display a sharp decline in the survival probability after one year, which points in the direction of the *cash and carry effect* (see, for example, Pfeiffer and Reize, 2000), because as soon as the required one year of operating expires a sizable portion of firms opened through a grant scheme closes. However, increase in firm closures after a year does not necessarily imply an adverse effect because the grants curve does not cross the no grant curve, which is why *cash and carry effect* cannot be confirmed, and because individuals might have re-integrated into a labor market differently—as we see in the part with unemployment re-entry. In other words, we find evidence supporting more favorable survival profile, which is in line with the previous empirical findings (see, for example, Andersson and Wadensjö, 2007; Désiage et al., 2010; Caliendo, 2016). While our results presented in this section are descriptive in nature, as we disregard the issues of unobserved characteristics, which might affect both selections in self-employment grant and firm survival, bearing in mind that the self-employment grant is targeted at unemployed individuals, we argue that these positive survival estimates are certainly not upward biased. In particular, even firms opened by *necessity entrepreneurs* show more favorable survival potential.

3.3.2. Firm growth

Limited liability firms dataset contains broad coverage of financial records for all firms from 1993–2017. We construct growth measures in terms of employment and sales. While firm survival is also tractable, it is contained to yearly variables (whether or not a firm exists next year). In order to analyze firm growth, we restrict our analysis to newly registered firms and pre-clean the data. We drop firms with more than 50 employees, firms with more than half a million euro in sales in the year of firm registration and firms with more than half a million euro of registered capital, as we do not consider them comparable to firms opened via the self-employment grant[22]. We are left with newly registered limited

[22]This leads to cleaning 874 grant non-receivers and 0 grant receivers. These firms are closer to the concept of high-growth firms in the right side of the firm growth distribution (Vitezić et al., 2018) and are not comparable to regular start-ups.

liability firms—with and without the self-employment grant—in the period 2010–2016[23]. Descriptive statistics are shown in table 10 in the Appendix.

We estimate two regressions, the ordinary least squares regression (OLS) for continuous outcomes and probit regression for binary outcomes. In the models, $\boldsymbol{Y}_i$ is a dummy for survival, a dummy for having at least one or two employees (probit) or value of sales or number of employees (OLS). Our key covariate of interest is $grant_i$, which takes the value of 1 if the firm i received a self-employment grant and 0 otherwise, while $\boldsymbol{X}_i$ is a vector of firm-level covariates.

The results shown in table 5 convey similar messages to descriptive statistics (table 10) in regard to the differences between a firm receiving a grant and regular start-ups. Firms receiving a grant, on average, have lower sales. For example, in the first year of doing business firms have 9,467 euro lower annual sales. This negative difference in annual sales increases as much as four times in two years after registering a firm. Furthermore, firms receiving the grant for self-employment have on average 0.436 employees less one year after the firm was registered, which increases to 0.579 two years later. Breaking down the employment patterns in detail, columns 3 and 4 show that grant-receiving firms have, on average, higher probability of having only one employee, as the effect of a grant on having at least one employee is positive and significant, while the effect on having two or more employees, although insignificant, is negative. Finally, we see a statistically significant negative difference in survival between firms receiving grants for self-employment and regular start-ups.

The difference in survival estimates between crafts and limited liability firms can be explained with tax regimes and market selection (Jovanovic, 1982). Namely, taxation is more favorable for entrepreneurs who start a craft and have a turnover below 300,000 kuna (approx. 40,000 euros), while if an entrepreneur runs a craft above this threshold, taxation sharply increases and it is no longer favorable in comparison to limited liability firms. Thus, unemployed individuals start limited liability firms when they assume the turnover will be above this threshold. However, as elaborated by Jovanovic (1982), entrepreneurs do not know their true productivity level until they arrive on the market,

[23]We focus on the period 2010–2016, as the dataset does not include all balance sheets and profit and loss statements for the year 2017.

TABLE 5: Regression results for limited liability firms

	Sales	Employment	Employees (at least) One	Two	Survival	
	(1)	(2)	(3)	(4)	(5)	N
Time horizon:						
End of firm registration year (t)	–9,467***	–0.023	0.332***	–0.040***		46,336
	(1,173)	(0.070)	(0.006)	(0.006)		
Year later (t+1)	–36,214***	–0.436***	0.217***	–0.074***	–0.018***	34,300
	(5,217)	(0.097)	(0.007)	(0.010)	(0.006)	
Two years later (t+2)	–35,921***	–0.579***	0.136***	–0.045***	–0.037***	24,804
	(5,946)	(0.131)	(0.010)	(0.012)	(0.009)	

Note: Models 1 & 2 are OLS regression estimates, while models 3, 4 & 5 are marginal effects from probit regressions. All estimates include NACE 2-digit industry dummies, county of firm headquarters, year of firm registration, type of a firm's legal form, number of months a firm was officially open during the year (all dummies), the value of capital owner registered and other types of grants as covariates (used in Srhoj et al., 2019a,b). Standard errors clustered at NACE 2-digit level are in the parenthesis. Sample sizes of probit regressions on survival are 37,625 (t+1) and 30,330 (t+2).

*p<0.1; **p<0.05; ***p<0.01

therefore, a negative link of self-employment grants and firm survival might be explained with this interpretation.

Summing up the descriptive results presented in tables 5 and 10, we find that limited liability firms initiated via self-employment subsidy are on average smaller in terms of capital, sales and employment, and exert smaller growth potential than their no-grant counterparts, while their survival profile is worse. These conclusions, although descriptive, corroborate the interpretation of *necessity entrepreneurs*. In particular, unemployed individuals wanting to start a firm are more likely to be *necessity entrepreneurs* as they start businesses due to a lack of employment opportunities, in contrast to individuals who become entrepreneurs because of identified business opportunities (Block and Sandner, 2009). While the self-employment grant does serve as an ALMP and, thus, helps unemployed individuals to re-integrate into the labor market, firms opened with these grants have limited contribution to the economic growth (Shane, 2009; Caliendo, 2016), and results presented in tables above support these conclusions.

4. Conclusions

This paper evaluates the effectiveness of active labor market policy—self-employment grant— in Croatia in the period 2010–2017. The government provided start-up grants for unemployed individuals to ease challenges during the first 12 months of business opening and thus: *i*) directly decreasing unemployment via self-employment, and *ii*) indirectly decreasing unemployment by potential hiring of new entrepreneurs. Grant beneficiaries could open limited or unlimited liability firms and use the funds—which could go up to 50% of average Croatian gross annual salary—on entrepreneurs' salaries and contributions, basic equipment and training. While the funds allocated to this policy accounted for only around 5% of annual ALMPs funds, firms opened via this grant scheme accounted for up to 10% of newly opened firms throughout the years, giving this policy not only *labor market activation*, but also *growth* role.

Using four different and, arguably, rich datasets, we analyze whether these grants positively affect firm survival, firm growth and individual employment possibilities. Results show that limited liability firms initiated through a grant have lower sales and employment growth, while the survival analysis, based on annual reports, reveals a worse survival profile. On the other hand, using much more detailed firm demography data, we find that unlimited liability firms have higher survival compared to no-grant counterparts, even if a sizable portion of them closes after the required one-year period. Finally, using a quasi-longitudinal dataset of unemployment episodes, we find robust causal evidence that individuals which exit unemployment with a self-employment grant have better chances of staying out of unemployment. While heterogeneous effects indicate that a self-employment grant is particularly effective for individuals who became unemployed after inactivity and lost their job due to a firm's closure—which indicated favorable activation potential of this policy, they also indicate that the longer the unemployment duration, the less effective the grant. Furthermore, the grant is more effective for individuals who would otherwise have access to labor market opportunities (men, more educated, prime-age workers, previously employed).

While this paper attempts to document the effect of self-employment grants on firm per-

formance and labor market re-integration in detail, a lot still needs to be understood, in this empirical setting, as well as in others. For example, the effects of variation in funds, the use of funds and duration of the measure all relate to the question of optimal design of the grant. Furthermore, the question of political economy of grants still remains an important one, since self-employment grants, as also shown in this piece of research, have an intrinsic tension between *social* and *growth* components.

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6. Appendix

6.1. Unemployment re-entry

Figure 8: Number of appearances of individuals in the entrepreneurial sample

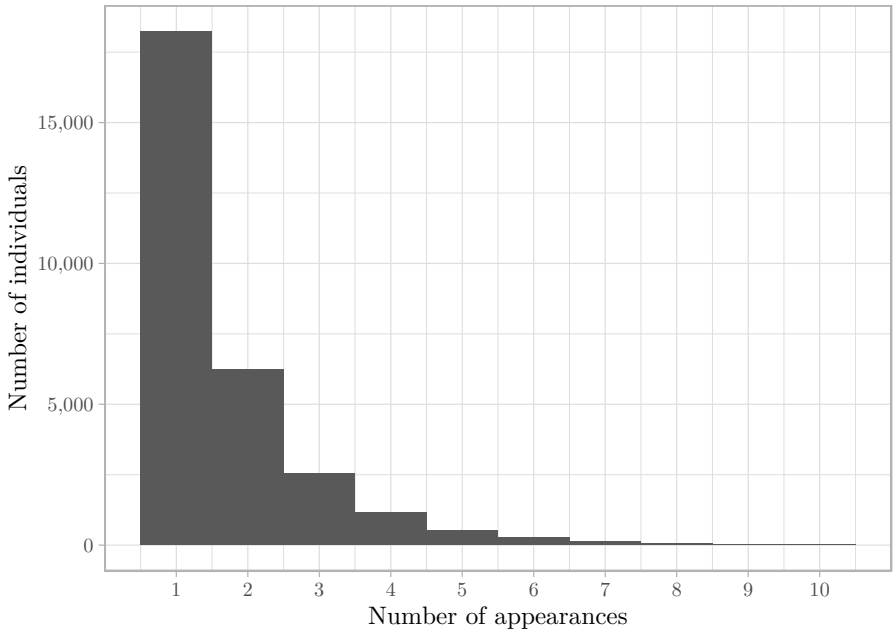


Figure 9: Kaplan-Meier estimates of employment survival: full sample

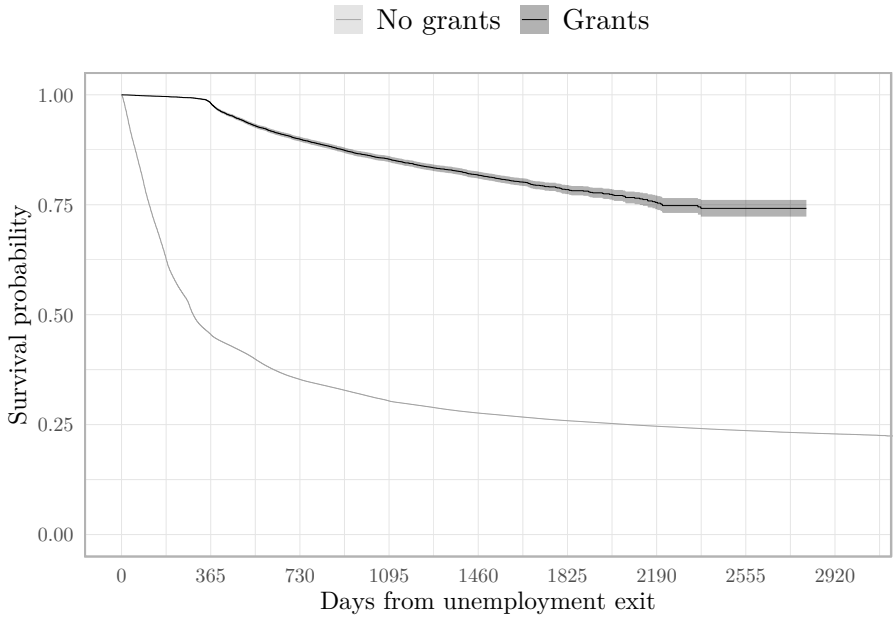


TABLE 6: Results, unemployment re-entry: full sample

	Full sample					
	Sample mean	(1)	(2)	(3)	(4)	N
Not unemployed after:						
6 months	0.617	0.297***	0.273***	0.052***	0.013	1,497,186
		(0.002)	(0.002)	(0.003)	(0.013)	
12 months	0.428	0.474***	0.448***	0.112***	0.095***	1,424,800
		(0.003)	(0.003)	(0.004)	(0.015)	
18 months	0.371	0.471***	0.445***	0.103***	0.077***	1,338,826
		(0.003)	(0.003)	(0.005)	(0.017)	
24 months	0.314	0.490***	0.464***	0.111***	0.104***	1,255,829
		(0.004)	(0.004)	(0.005)	(0.018)	
36 months	0.251	0.442***	0.419***	0.087***	0.112***	1,066,772
		(0.005)	(0.005)	(0.006)	(0.020)	
Individual-based covariates		No	Yes	Yes	Yes	-
Episode-based covariates		No	No	Yes	Yes	-
Individual fixed-effects		No	No	No	Yes	-

Note: The full sample consists of all unemployment episodes from January 1, 2009 until November 23, 2017 and finishing in employment. Individual-based covariates are gender, age, education, tenure, all discretized according to table 2. Episode-based covariates include duration of the episode, reason of entering unemployment, reason of exiting unemployment, reason of employment exit, NACE 1-digit industry sector, year of entering unemployment and year of exiting unemployment, all dummies discretized according to table 2. Standard errors clustered at the individual level are in the parenthesis.

*p<0.1; **p<0.05; ***p<0.01

TABLE 7: Results, unemployment re-entry: episodes by individuals with at least two appearances in the dataset

	Panel A: Full sample					
	Sample mean	(1)	(2)	(3)	(4)	N
Not unemployed after:						
6 months	0.550	0.348***	0.319***	0.087***	0.013	1,127,780
		(0.004)	(0.004)	(0.006)	(0.012)	
12 months	0.325	0.541***	0.513***	0.166***	0.095***	1,073,749
		(0.005)	(0.005)	(0.007)	(0.013)	
18 months	0.262	0.497***	0.471***	0.135***	0.077***	1,011,130
		(0.006)	(0.006)	(0.009)	(0.015)	
24 months	0.200	0.494***	0.471***	0.143***	0.104***	946,819
		(0.007)	(0.007)	(0.010)	(0.016)	
36 months	0.135	0.393***	0.375***	0.111***	0.112***	802,001
		(0.009)	(0.009)	(0.011)	(0.018)	
Individual-based covariates		No	Yes	Yes	Yes	-
Episode-based covariates		No	No	Yes	Yes	-
Individual fixed-effects		No	No	No	Yes	-
	Panel B: Entrepreneurial sample					
	Sample mean	(1)	(2)	(3)	(4)	N
Not unemployed after:						
6 months	0.671	0.269***	0.261***	0.065***	0.020*	30,436
		(0.006)	(0.006)	(0.006)	(0.012)	
12 months	0.503	0.424***	0.417***	0.132***	0.086***	29,021
		(0.006)	(0.006)	(0.007)	(0.014)	
18 months	0.407	0.410***	0.401***	0.100***	0.064***	27,565
		(0.007)	(0.008)	(0.009)	(0.016)	
24 months	0.330	0.421***	0.414***	0.107***	0.080***	25,855
		(0.008)	(0.008)	(0.010)	(0.017)	
36 months	0.217	0.348***	0.343***	0.076***	0.073***	22,228
		(0.010)	(0.010)	(0.012)	(0.019)	
Individual-based covariates		No	Yes	Yes	Yes	-
Episode-based covariates		No	No	Yes	Yes	-
Individual fixed-effects		No	No	No	Yes	-

Note: The full sample consists of all unemployment episodes from January 1, 2009 until November 23, 2017 and finishing in employment. Entrepreneurial sample is a subset of a full sample containing all episodes of individuals who exited unemployment due to entrepreneurial reasons at least once. Individual-based covariates are gender, age, education, tenure, all discretized according to table 2. Episode-based covariates include duration of the episode, reason of entering unemployment, reason of exiting unemployment, reason of employment exit, NACE 1-digit industry sector, year of entering unemployment and year of exiting unemployment, all dummies discretized according to table 2. Standard errors clustered at the individual level are in the parenthesis.

*p<0.1; **p<0.05; ***p<0.01

TABLE 8: Heterogeneous effects: COX PH model with the most comprehensive specification

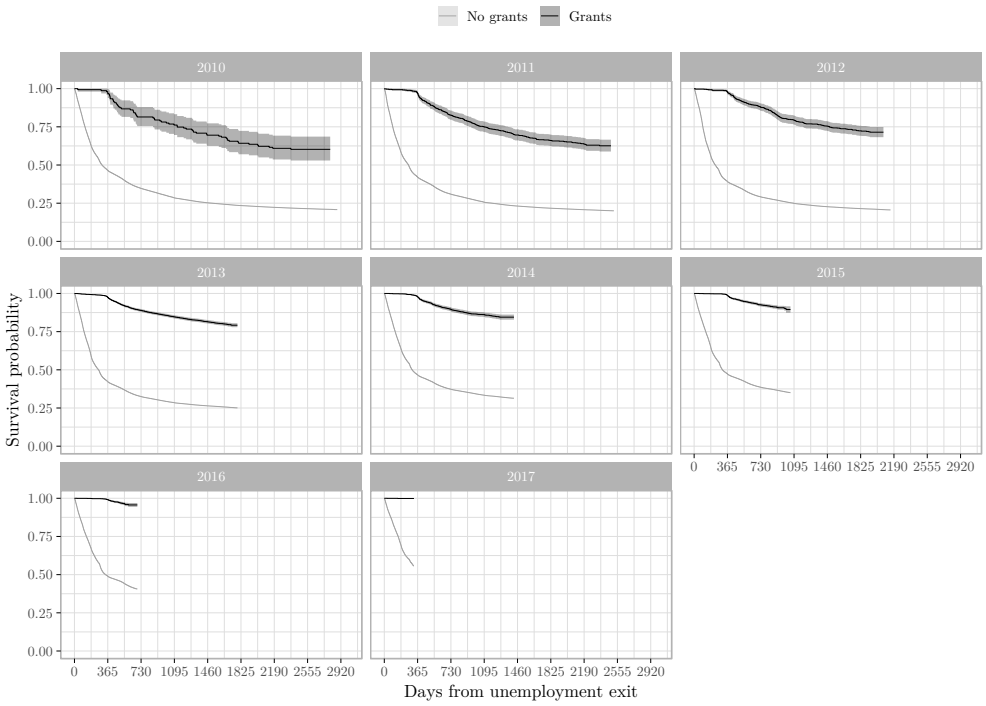
	Full sample			*Entrepreneurial sample*		
	Hazard ratio	Hazard ratio low	Hazard ratio high	Hazard ratio	Hazard ratio low	Hazard ratio high
	(1)	(2)	(3)	(4)	(5)	(6)
Age						
20 and less	0.645	0.518	0.803	0.870	0.672	1.127
20 to 30	0.426	0.389	0.466	0.611	0.550	0.679
30 to 40	0.434	0.397	0.475	0.662	0.596	0.737
40 to 50	0.450	0.405	0.501	0.594	0.524	0.673
50 and more	0.533	0.459	0.619	0.718	0.599	0.860
Gender						
Female	0.474	0.440	0.510	0.670	0.615	0.730
Male	0.438	0.409	0.469	0.621	0.573	0.673
Education						
Elementary or less	0.608	0.515	0.717	0.742	0.613	0.899
High school	0.450	0.424	0.477	0.622	0.581	0.666
University or more	0.399	0.354	0.449	0.655	0.568	0.755
Potential tenure						
2 years or less	0.431	0.368	0.504	0.635	0.529	0.764
2 to 5 years	0.430	0.369	0.502	0.654	0.545	0.783
5 to 10 years	0.429	0.383	0.480	0.651	0.569	0.744
10 to 20 years	0.431	0.394	0.471	0.604	0.544	0.670
20 years and more	0.510	0.454	0.573	0.670	0.584	0.769
Not applicable	0.532	0.454	0.624	0.751	0.620	0.909
Unemployment duration						
30 days or less	0.150	0.071	0.315	0.260	0.122	0.553
30 to 90 days	0.356	0.314	0.404	0.514	0.444	0.594
90 to 180 days	0.382	0.342	0.426	0.513	0.452	0.581
180 days to 1 year	0.455	0.415	0.499	0.649	0.582	0.725
1 to 2 years	0.551	0.494	0.614	0.796	0.696	0.911
2 to 3 years	0.636	0.523	0.773	0.853	0.665	1.095
3 years and more	0.576	0.443	0.748	0.820	0.574	1.173
Status before unemployment						
Working	0.446	0.419	0.473	0.641	0.597	0.688
Education	0.613	0.507	0.741	0.853	0.674	1.078
Inactivity	0.400	0.361	0.443	0.583	0.515	0.660
Vocational training	0.592	0.324	1.083	1.390	0.592	3.260
Other	0.416	0.269	0.641	0.423	0.260	0.688
Employment exit reason						
Not applicable	0.440	0.403	0.480	0.614	0.553	0.682
Expiration of contract	0.472	0.427	0.521	0.659	0.586	0.741
Expiration of seasonal contract	0.458	0.327	0.640	0.703	0.480	1.029
Dismissal (econ., tech., and org. reasons)	0.501	0.456	0.551	0.684	0.612	0.764
Dismissal	0.687	0.486	0.971	0.989	0.640	1.529
Worker resigned	0.407	0.286	0.580	0.539	0.343	0.845
Consensual resignation	0.339	0.271	0.424	0.516	0.395	0.674
Firm closure	0.358	0.249	0.515	0.366	0.246	0.545
Other	0.387	0.106	1.414	0.358	0.022	5.809
Year of exit						
2010	0.535	0.415	0.691	1.079	0.780	1.494
2011	0.606	0.527	0.697	0.847	0.717	1.000
2012	0.500	0.430	0.581	0.692	0.582	0.822
2013	0.461	0.422	0.503	0.705	0.628	0.791
2014	0.508	0.448	0.577	0.691	0.598	0.798
2015	0.451	0.386	0.526	0.577	0.483	0.688
2016	0.189	0.144	0.248	0.292	0.217	0.393
2017	0.023	0.006	0.091	0.037	0.009	0.151

Note: he full sample consists of all unemployment episodes from January 1, 2009 until November 23, 2017 and finishing in employment. Entrepreneurial sample is a subset of a full sample containing all episodes of individuals who exited unemployment due to entrepreneurial reasons at least once. All estimates include individual-based covariates are gender, age, education, tenure; and episode-based covariates include duration of the episode, reason of entering unemployment, reason exiting unemployment, reason of employment exit, NACE 1-digit industry sector, year of entering unemployment and year of exiting unemployment, all dummies discretized according to table 2 (excluding a covariate we use to partition the dataset). Hazard ratio low and hazard ration high represent the 95-percent confidence interval.

*p<0.1; **p<0.05; ***p<0.01

FIGURE 10: Kaplan-Meier estimates of employment survival by years

(A) Full sample



(B) Entrepreneurial sample

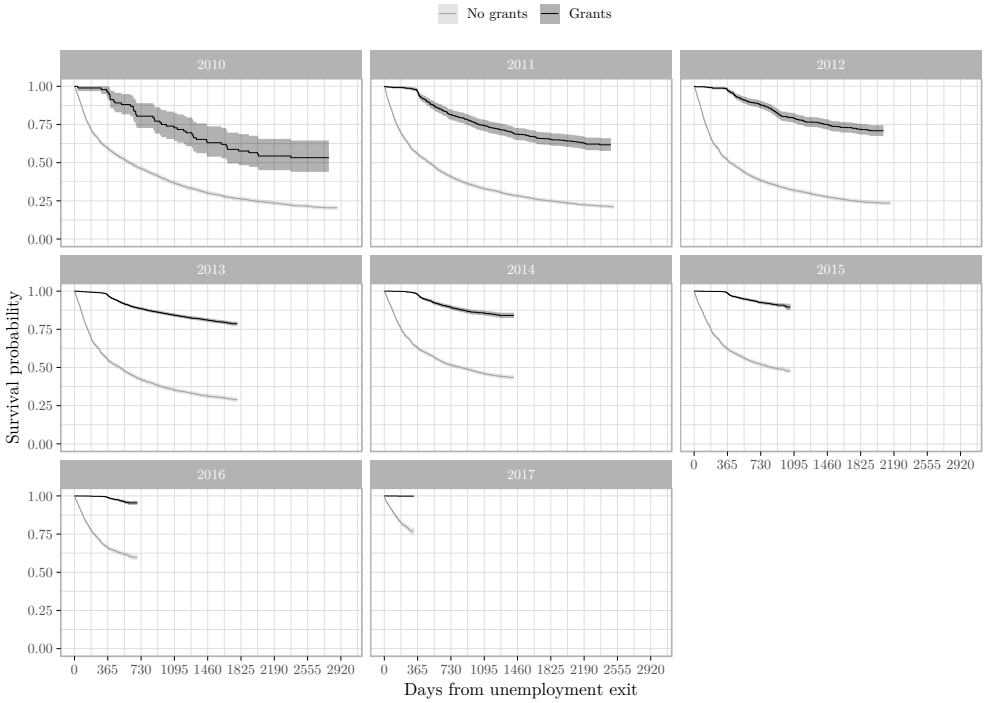


FIGURE 11: Heterogeneous effects: age

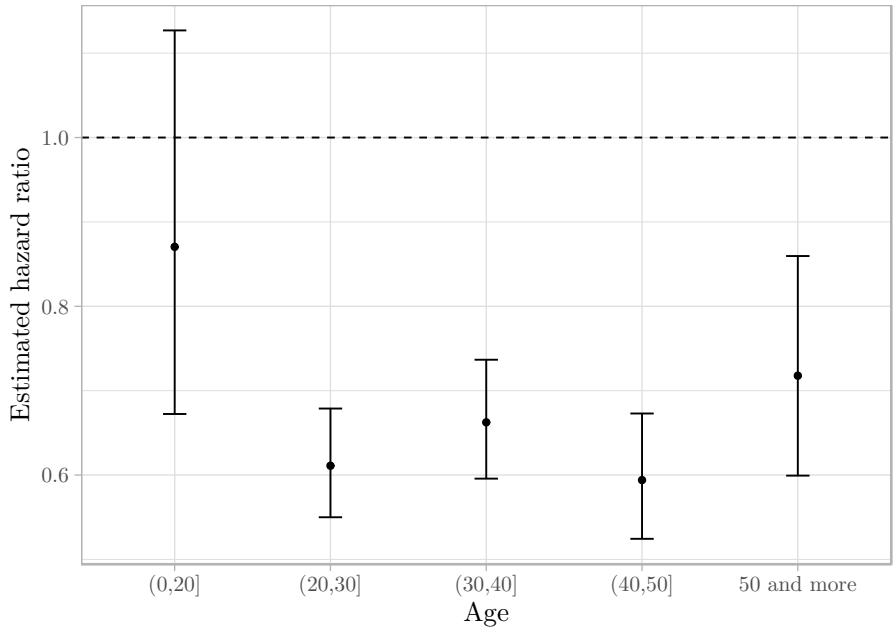
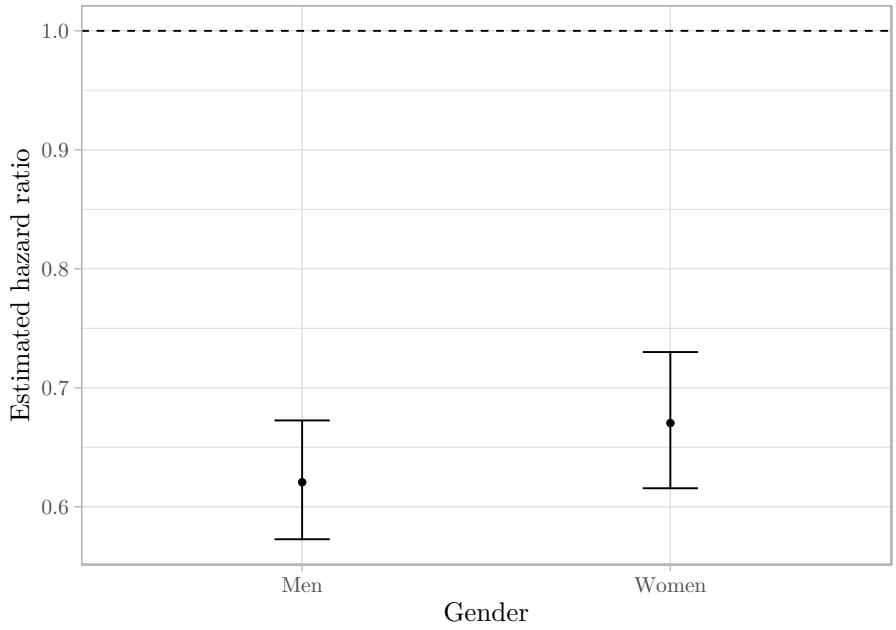


FIGURE 12: Heterogeneous effects: gender



6.2. Unlimited liability firms

Table 9: OLS and Cox proportional hazard estimates of firm survival (unlimited liability firms)

	Dependent variable (method):						
	firms survives (OLS):					*survival (COX PH):*	
	6 months	12 months	18 months	24 months	36 months	Coefficient	Hazard ratio
Grant received	0.089***	0.148***	0.069***	0.049***	0.015	−0.272***	0.762
	(0.006)	(0.007)	(0.009)	(0.010)	(0.013)	(0.021)	[0.696, 0.835]
Observations	61,241	56,384	51,758	48,029	40,997	61,953	
R^2	0.030	0.045	0.036	0.042	0.047	0.054	

Note: The first five columns present the OLS estimate of the received grant effect on corresponding indicator of firm survival (with an according sample truncation). The sixth and seventh columns present results of the estimation of the Cox proportional hazard model of the received grant effect on survival probability (the sixth column is coefficient, while the seventh is hazard ratio). All estimates include dummies for NACE 2-digit industry sector of the firm, dummies for county of firm's headquarters, and dummies for the year of firm opening. Parenthesis contain standard errors clustered at the NACE 2-digit level, while brackets contain 95-percent confidence interval of hazard ratio (last column).

*p<0.1; **p<0.05; ***p<0.01

6.3. Limited liability firms

Table 10: Descriptive statistics of limited liability firms

	Grant			No grant		
	Mean	Median	St.dev.	Mean	Median	St.dev
Registered capita (in euro)	1,444	1.333	7,178	6,166	2,667	29,202
Sales (in euro)						
t	13,225	5,245	27,698	26,134	5,383	56,868
t+1	35,641	16,234	71,016	103,409	24,615	522,825
t+2	45,859	19,620	108,306	137,826	28,229	816,707
Number of employees						
t	1.321	1.000	1.230	1.341	1.000	2.689
t+1	1.529	1.000	1.629	2.201	1.000	6.154
t+2	1.633	1.000	1.784	2.618	1.000	9.596
At least one employee						
t	0.917			0.542		
t+1	0.906			0.649		
t+2	0.843			0.664		
At least two employees						
t	0.234			0.259		
t+1	0.301			0.369		
t+2	0.363			0.406		
Firm survives						
t+1	0.883			0.915		
t+2	0.759			0.824		
Year of firm registration						
2010	0.005			0.106		
2011	0.023			0.108		
2012	0.033			0.115		
2013	0.369			0.171		
2014	0.137			0.164		
2015	0.223			0.151		
2016	0.210			0.186		
Sample size		4,154			42,182	

Note: The sample consists of all new limited liability firms registered from January 1, 2010 until December 31, 2016. For brevity, we do not show NACE 2-digit industry dummies, dummies for county of the firm's headquarters, dummies for types of firm legal forms and dummies for the number of months that a firm was officially open.

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