How long and how much? Learning About the Design of Wage Subsidies from Policy Discontinuities[a]

by

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Abstract

Employment and wage subsidies are used to combat long-term unemployment, yet there is little research to guide the design of such programs. Discontinuities in the design and implementation of wage subsidies under the Swedish *New Start Jobs*-policy allow us to study effects of both subsidy rate and subsidy duration. We find that doubling of the subsidy rate has a substantial impact on job finding rates but that doubled subsidy duration has no such effect. We find the opposite pattern when we study the effects on the probability of staying employed for those who find subsidized employment. Interestingly the positive employment effect of doubling the subsidy duration persists after the expiry of the employment subsidies.

Keywords: Wage-subsidies, subsidy duration, duration, subsidy rate, policy design, long-term unemployment.
JEL-codes: J08, J64; J68.

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1   Introduction

The persistence of the present economic crisis is pushing long-term unemployment to the fore front of the economic policy agenda in many countries. With long-term unemployment making up a substantial share of the unemployed, even as the economy recovers, there is a risk that individuals who have been out of work for a long time or who never held a job, will still face difficulties reentering the labor market: Their skills may have depreciated along with their self-confidence, useful networks and sources of information about offers and opportunities.

In an overview of European studies Kluve (2010) finds that wage subsidies are effective in getting long-term unemployed back into employment.[1] This is supported by several recent studies (see e.g. Carling and Richardson, 2004; Sianesi, 2008; Bernhard et al. 2008), while the results in e.g. Schünemann et al. (2011) indicate insignificant employment effects of wage subsidies. Card et al. (2010) review studies from all parts of the world and find evidence suggesting that subsidized jobs in the private sector are more efficient than subsidized jobs in the public sector. Finally, Baumgartner and Caliendo (2008) and Caliendo and Künn (2011) find that self-employment subsidies lead to increased employment rates.

Although many studies investigate the overall effects of wage subsidies targeted at unemployed there exists very limited evidence on how wage subsidies are best designed. In particular, the literature does not provide an answer to how sensitive job finding rates are to the level of the subsidy, i.e. the subsidy rate. Nor is there much guidance in determining how long a subsidy ought to be in place.[2] Both rate and duration obviously affect the total costs of wage subsidy schemes. They might also affect both job-finding rates and employment prospects after the subsidy has expired, but little is known about how.

The purpose of this paper is to fill some of the gaps in our knowledge by making use of a new wage subsidy policy, *New Start Jobs*, which was introduced to the Swedish labor market in 2007. The policy was targeted towards individuals who had been

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1 Studies supporting this conclusion are e.g. Nätti et al. (2000), de Koning (1993), Zhang (2003), Forslund et al. (2004), Gerfin and Lechner (2000), Blundell et al. (2004) and Rosholm and Svarer (2008).

[2] The meta-analysis of Card et al 2009, for instance, finds no clear impact of program duration, but does not report separate estimates for different types of programs. In a related paper Gerfin et al. (2005) compares two subsidized employment programs, and conclude that subsidies for temporary work in the private and public sector are more efficient than a non-profit employment programs.

unemployed for at least a year and made them eligible for a subsidy covering the payroll tax (31.4 percent) for a duration equal to their time in unemployment. Two features of the *New Start Jobs*-policy allow us to study effects of both subsidy rate and subsidy duration. First, we make use of the fact that older workers (55+) were entitled to double-duration subsidies creating an age discontinuity that allows us to identify effects of duration. Second, we exploit a doubling of the subsidy rate in 2009 compared to the first two years of the scheme. In addition to providing evidence on how the effects on job-finding rates of being entitled to wage subsidies vary by subsidy duration and subsidy rate, an important contribution of this paper is that we are able to follow the job-finders and their less lucky peers for several years which allows us to analyze effects on the probability of staying employed after the subsidy expires.

Our main findings are that a doubling of the subsidy rate has a substantial impact on the probability of finding employment while increased subsidy duration has little impact on job finding rates. Subsidy duration instead matters for the probability of staying employed for those who find subsidized employment. We find that individuals are more likely to be employed for the duration of their wage subsidy, but interestingly individuals who were entitled to a long subsidy were also more likely to be employed after the expiry of the subsidy than individuals with short subsidy duration. In contrast, our analysis of subsidy rates suggests that the subsidy rate does not affect the probability of staying employed after subsidy expiry.

In what follows, we will first discuss possible general effects of wage subsidies and how we expect subsidy rate and duration to affect these. In section 3 we provide background information on the Swedish institutional framework and on the wage subsidy policy program studied in this paper. We also provide a description of the uptake of the new wage subsidy. Because the different parts of the analysis rest on different identification strategies, require different samples and estimation methods we present method, results and robustness checks of each part of the analysis in different subsections of section 4. First we analyze effects of subsidy duration and subsidy rate on the probability of leaving unemployment, we then address the issue of post-subsidy effects. We also consider the possibility of interaction effects between the duration and the subsidy rate before we conclude the analysis in section 5.

2   What should we expect to find?

Wage subsidies targeted at long-term unemployed are often motivated by the fact that those who have been away from the labor market for a long time often have particular difficulties finding employment. There are several reasons why this might be the case. Uncertainty about how the individual would fit for the job or function in the workplace is often perceived by potential employers as greater for those who have been out of work for a long time, but who have the same formal qualifications as a job-applicant who already has a job or only recently became unemployed. Long absences from the labor market may also mean that individual productivity is actually lower, perhaps because the individual lost in skills or has been unable to keep up with new developments. This has several implications for the possible effects of wage subsidies.

A first possible effect of wage subsidies is that job finding rates increase, and hence time in unemployment is reduced for the long-term unemployed as the subsidy increases their competitiveness on the job market. Moreover, it is reasonable to expect that job-finding rates increase with the subsidy rate since cost of employment is lower. Whether the subsidy duration can be expected to matter or not depends on the time horizon. If an individual is considered for a job opening with a contract shorter that the duration of the subsidy, extending the subsidy should have little impact on the probability of getting the job, but if job openings are typically for permanent contracts and the initial employment and training costs are substantial, it is plausible that individual with long subsidy durations are more attractive than individuals with shorter durations.

If the aim of the wage subsides is to reduce overall unemployment, some of the subsidized job openings need to be job openings that would not have occurred absent the subsidy. In practice, it is likely that some new jobs are created as a response to the lower employment costs of the subsidized workers and that some jobs that would have opened also absent subsidies are now filled by subsidized workers that outcompete workers that are not eligible for a subsidy. In the latter case, the introduction of the subsidy has no effect on total unemployment, but only redistributes work from ineligible to eligible workers.

A second consequence of wage subsidies is, hence, that job openings that would have occurred and been filled by long-term unemployed applicants also absent the subsidy

are now filled with similar applicants eligible for the subsidy. Such a displacement of unsubsidized jobs reduces the subsidy's impact on the overall unemployment rate, though it can still cause a desirable redistribution of the burden of unemployment to the extent that the displaced workers are less disadvantaged than those who get the jobs.

Previous research shows that it is important to study what happens when the subsidy ends. At best, getting a subsidized job allows the individual to gain a foothold in the labor market and the possibility to retain the job even after the subsidy. This applies particularly to individuals who through a period of subsidized employment benefit from the opportunity to update their skills, show their productivity and gain access to a better network of contacts. For individuals who received a subsidized employment, but whose productivity is permanently low or whose skills do not recover sufficiently to motivate employment at the unsubsidized wage rate, however, either a downward adjustment of wages or some form of permanent wage subsidy is necessary if they are to stay employed as the initial subsidy ends. For this group, the employment rate likely goes down when the subsidy expires, which is a third possible outcome of wage subsidies.

Increasing the subsidy rate is likely to encourage employment of individuals with lower productivity. To the extent that this implies that it is less likely for these employees' skills to have recovered to motivate employment at the going wage rate by the time the subsidy expires, we should expect a greater fall in employment as the subsidy expired. Moreover, we might expect the subsidy duration to matter for long-term employment prospects for two reasons. First, individuals are more likely to be employed as long as they are entitled to the subsidy, and second, if learning new skills, recovery of old and the development of a functioning network of useful labor market contacts is a slow process, duration may matter for employment prospects after the end of the subsidy.

Finally, another consequence of introducing targeted wage subsidies for individuals who have been unemployed for at least a year is that it may affect the timing of job openings. An employer who considers employing someone who has been unemployed for eleven months has a clear incentive to delay employment until the prospective employee has gained eligibility for the subsidy. Hence, a fourth possible effect of introducing a wage subsidy is that the timing of employment is delayed for some groups of unemployed.

3   Swedish unemployment insurance and the wage subsidies

A person who becomes unemployed in Sweden is entitled to UI benefits if a set of conditions are fulfilled. First, the individual must have been member of a UI fund for at least 12 months and should have had a job for at least six months during the past 12 months. Second, the unemployed needs to register at the public employment service (PES) and prove able and willing to work at least three hours a day and at least 17 hours per week. Further, the unemployed must state to be actively searching for employment. Those who fulfill these conditions are entitled to UI benefits for a maximum of 300 days. In our observation window, the UI benefits amount to 80% of the average earnings during the latest six months of employment with a floor and a ceiling for the first 200 days in unemployment. Thereafter the replacement rate is 70%. After 300 days all unemployed are assigned to a general program with the possibility to collect benefits amounting to 65% of the pre-unemployment earnings. In practice, a majority of workers have earnings above the cap, which means that they are entitled to 80, 70 or 65 percent of SEK 18700 per month.[3] Individuals who have not been a member of an UI fund for at least 12 months may still qualify for Unemployment Assistance (UA), which is unrelated to previous earnings and its generosity is much lower than UI.

3.1   *New Start jobs*- the new wage subsidy policy

The wage subsidies considered in this paper, called *New Start jobs,* were introduced in January 2007 and replaced previous wage subsidy programs.[4] In this section we describe the main features of the *New Start jobs*.[5] The *New Start jobs*-policy made all individuals who had been absent from the labor market for at least 12 month during the last 15 months eligible for a subsidy equivalent to the payroll tax i.e. 31.42 percent of the gross salary for a time period equal to their time in unemployment, but at most 5 years. Hence, the *New Start job* subsidy does not require the individual to have been registered as unemployed. Poor health, incarceration or other reasons for absence from the labor market could also qualify. Moreover, an employer could apply for the subsidy for anyone qualifying according to the eligibility criteria, in contrast to many other

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[3] In 2013 90 percent of workers hit the ceiling. The fraction was somewhat lower during the time period studied.
[4] Previous programs included general and enhanced employment supports which were both targeted and selective.
[5] Lundin and Liljeberg (2008) and Sibbmark (2010) provide more detailed descriptions of the program.

programs which are assigned to unemployed workers by PES case workers.[6] Initially the subsidy was restricted to jobs in the private sector, but in 2008, the entire labor market was included. In 2009 the subsidy rate was doubled to 62.84 percent of the gross salary.

Already from the start, some special rules applied for certain groups. Youths in ages 20-25 have a shorter qualification period of 6 months of inactivity, and the maximum subsidy period is one year. Recent immigrants are automatically eligible for the subsidy for the first three years of residence. Individuals in ages 55-65 also have special rules. For this group of unemployed, subsidy duration is twice the time in unemployment, with a maximum of 10 years or until the individual turns 65. From July 2010, this age group could qualify for subsidies already after 6 months of unemployment.

Since the introduction in 2007, the number of *New Start jobs* has grown steadily. This is shown in Figure 2. In 2011 there were about 45 000 individuals who were employed with a *New Start job*-subsidy. These figures could be compared to the number of long term unemployed. At the end of 2010, there were about 135 000 people who had been unemployed for more than 6 months (SCB, 2011).
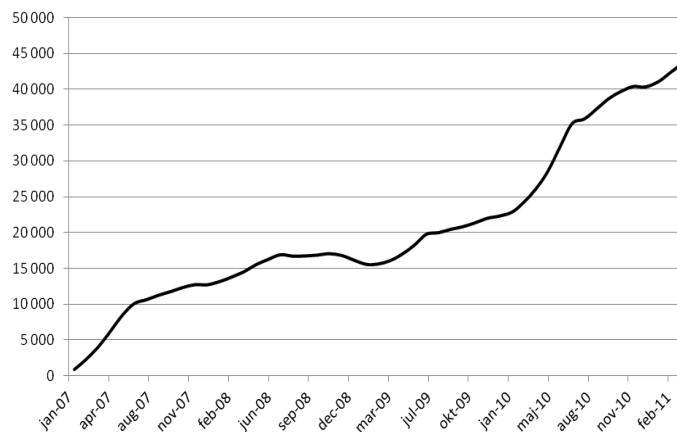

Figure 1: Number of participants in the New start jobs wage subsidy program by calendar time (own calculations using PES data)

We next describe how the inflow into the wage subsidy program varies with time in unemployment. As described above is an unemployed eligible for the subsidy if (s)he has been non-employed for at least 12 months during the last 15 months. Non-

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[6] The individual however needs to be able to document the absence from the labor market such that the subsidy can be granted by the PES.

employment includes unemployment, but also any other non-employment such as sickness absence and time in prison. In this paper we, however, focus solely on qualification through unemployment, since we lack recent and detailed data on other types of non-employment. This means that we regard all unemployed that have been unemployed for at least 12 months as eligible for the subsidy. In Figure 1, which displays the monthly inflow into the subsidy program, we confirm that this definition is associated with low measurement error as the probability of entering the program increases sharply at the 12-month unemployment qualification period. Figure 1 also shows that after 12 months the transition rate into the program slowly declines.
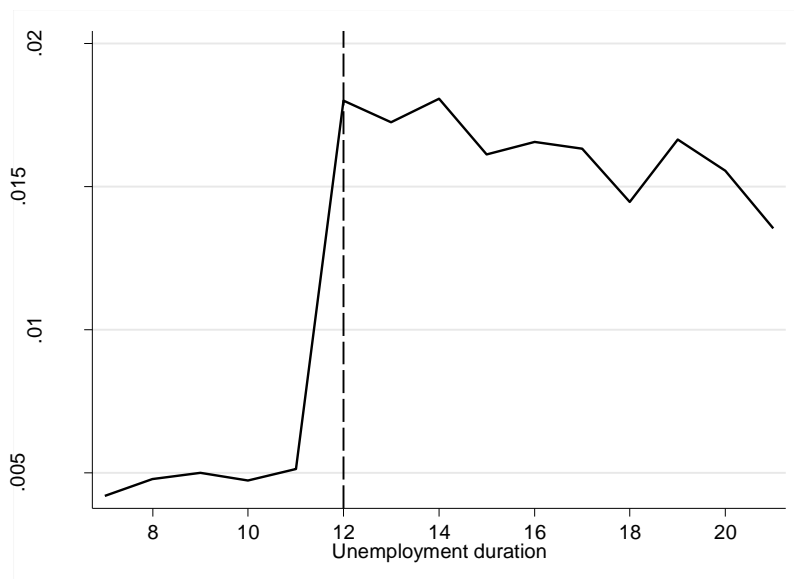

Figure 2: Monthly hazard rate into subsidized employment (2008-2010)

4   Effects of subsidy duration and rate on job-finding rates and post subsidy employment

We want to determine the effects of two different policy dimension on two different outcomes, namely the effect of 1) duration and 2) subsidy rate on a) the probability of finding a job and b) the probability of employment during and after the expiry of the subsidy. Because the different parts of the analysis rest on different identifying assumptions and require different sampling and estimation methods we will provide a detailed description of the methodology used for each part of the analysis before we present the results of that analysis. However, it is useful to recall the two features of the New Start job-policy that are used for identification. We identify the effects of subsidy

duration by making use of the fact that individuals 55 or older at the beginning of the calendar year are eligible for a subsidy twice the duration compared to individuals who had not turned 55 at the beginning of the year. In determining the effects of changing the subsidy rate we exploit that the subsidy rate was doubled in January 2009.

In all analyses we use register data from the Swedish public employment service (PES), which include information on all unemployed registered at the PES. The register contains details of when each unemployment spell begins, if the unemployed participate in any labor market program, and if and when the unemployed finds a job. Especially important for our study is that the registry contains information on uptake of all wage subsidies, including start and end dates, and when and if a subsidized job is transformed into unsubsidized employment. It also includes a number of personal characteristics recorded at the beginning of the unemployment spell.

4.1 Subsidy design and job-finding rates

4.1.1 Subsidy duration

In this section, we examine how access to longer wage subsidies affects the job-finding rate and time in unemployment. We utilize the fact that individuals above 55 years of age at the beginning of the year are entitled to double subsidy duration. Specifically, 54-year olds are entitled to a subsidy equal to their time out of employment, and 55-year olds are entitled to the double their time out of employment. It is important to note that the subsidy duration depends on the age on the 1st of January the year the subsidized employment starts, and not the actual age at the start of the subsidized employment. The implication of this is that individuals just below 55 on 1st of January have to wait an entire calendar year before becoming eligible for the double subsidy duration.

In order to exploit this discontinuity we initially sample individuals that have been unemployed for 10 months in October in any of the years 2006-2009. The analysis is further restricted to individuals aged 45-60 in January the following year. Because of the 12 month unemployment rule for being eligible for the subsidy all these individuals will be eligible for the subsidy if they stay unemployed for two additional months. However, only those older than 55 (in January) are eligible for the double subsidy, and all younger than 55 have to wait at least one year before becoming eligible for the double subsidy. We regard being eligible for a double subsidy duration an entire year

earlier as a substantial treatment. Note that this means that we here investigate the effect of being eligible for double subsidy duration and not the effect of actual take-up of longer subsidies. A similar approach is taken by e.g. Schünemann et al. (2011), even if they focus on the overall effects of wage subsidies for unemployed.

We use standard regression discontinuity design methods (see e.g. Hahn, Todd and van der Klaauw, 2011; Imbens and Lemieux, 2008; Lee and Lemeiux, 2010). The key identifying assumption is that individuals with the same unemployment duration who are 54 years and 11 months are equally likely of finding a job as those who have just turned 55. We regard this as a reasonable assumption in this context. The only concern is that we systematically compare individuals born in December to individuals born in January the following year. Since, being born in January instead of December affects school starting age, military service enrolment and thus, possibly, other outcomes later in life we examine the regression discontinuity assumption in several ways. We: i) explore if there is a December-January birth month discontinuities at age 55 age in the fraction with university education, ii) perform placebo analyses for years before the wage subsidy program was introduced.

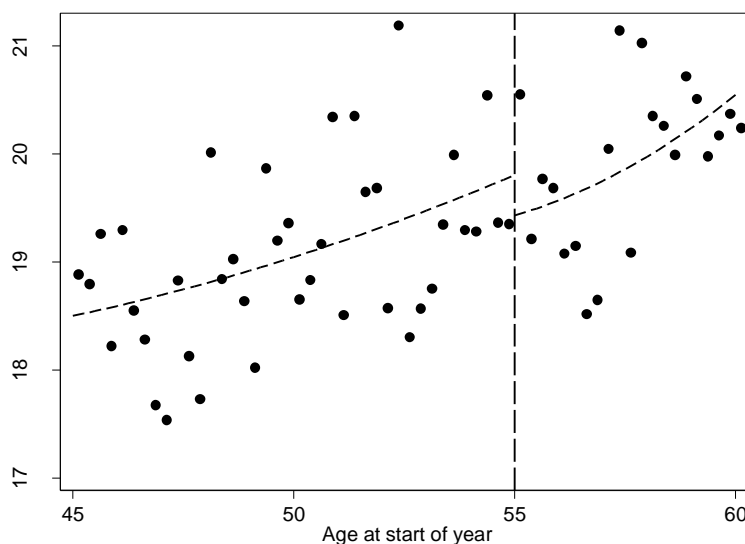Figure 3 Months in registered unemployment by age at the start of the year (Local averages and quadratic parametric fit. Discontinuity = -0.374; with std. err. = 0.683)

Initially we examine the impact on time as registered unemployed. Figure 2 presents the average unemployment duration by age in quarters and parametric fit using quadratic functions. From the figure we see that, as expected, unemployment duration

increases with age. Moreover, there is no evident shift at 55, and the RD-estimate of the effect at the threshold is insignificant. We have also explored other specifications of the control function with very similar estimates. This gives a first indication that there are no important effects of the double subsidy duration on time in unemployment.

This analysis, however, ignores the fact that unemployment durations occasionally ends for other reasons than re-employment. For that reason we employ RD-models within in a duration framework. Specifically, we use the same sample as above, but create a month by month panel for each month an individual is unemployed.[7] Each observation contains information on how long the individual has been unemployed, if (s)he is qualified for a *New Start job*, if (s)he gets a subsidized *New Start job* or unsubsidized employment[8], if the unemployment spell is censored, the month and year observation refers to, as well as background information on age, education and gender, etc. Using this panel, we specify standard RD-models for the probability of getting a job in a certain month. We use parametric control functions and vary the order of the polynomial as well as the bandwidth. We have also tested for optimal order of the polynomial using the Akaike information criteria (see e.g. Lee and Lemeiux, 2010). We examine the transition rate into subsidized jobs and all jobs, where the latter includes both subsidized and unsubsidized employment. As robustness analysis we have also performed similar analyses using logit and Cox-regression models.

The main results from this exercise are presented in Panel A of Table 1. In neither one of the specifications do we find a significant effect of the double subsidy duration. This is also supported by Figure 4 and Figure 5, which report average transition rates by age in quarters and quadratic parametric fits. This confirms the results from the previous analysis using time in registered unemployment as the outcome.

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[7] The spells are only followed up until 24 months, since at this time point those formerly 54 and still unemployed also gain access to the double subsidy duration.
[8] An individual is regarded as re-employed if the employment (full-time or part-time) is retained for at least 30 days.

Table 1: Effect of double subsidy duration on monthly re-employment rate into subsidized jobs and all jobs

Panel A: *Main estimates of effect of double subsidy duration*

	(1) Sub. jobs Ages 45-60	(2) Sub. jobs Ages 50-60	(3) Sub. jobs Ages 53-57	(4) All jobs Ages 45-60	(5) All jobs Ages 50-60	(6) All jobs Ages 53-57
Bandwidth:						
Pol. of order						
One	0.0000564	-0.000335	0.00193	0.00101	-0.00161	-0.00147
	(0.00172)	(0.00209)	(0.00305)	(0.00344)	(0.00413)	(0.00615)
Two	-0.00289	-0.00381	0.00602	-0.00135	-0.00264	0.0128
	(0.00251)	(0.00310)	(0.00533)	(0.00503)	(0.00620)	(0.0103)
Three	-0.00159	0.00291	-0.00861	-0.00674	0.00512	-0.0133
	(0.00324)	(0.00425)	(0.00882)	(0.00658)	(0.00855)	(0.0172)
Four	-0.00162	0.00370	-0.0219	-0.000216	0.00168	-0.0289
	(0.00397)	(0.00582)	(0.0163)	(0.00801)	(0.0115)	(0.0321)
Optimal order	2	3	3	4	1	4
# ind.	8814	5323	2980	8814	5323	2980
# obs.	71,027	43,685	21,736	71,027	43,685	21,736
Mean	0.0116	0.0115	0.0119	0.0437	0.0383	0.0352

Panel B: *Estimates by time in unemployment (ages 45-60)*

	(1) Sub. Jobs Month 11	(2) Sub. Jobs Months 12-13	(3) Sub. Jobs Months 14-15	(4) All jobs Months 11	(5) All jobs Months 12-13	(6) All jobs Months 14-15
Double duration	-0.000764	-0.0143*	0.00971	-0.00466	-0.00898	-0.00129
	(0.00318)	(0.00845)	(0.00847)	(0.0106)	(0.0156)	(0.0117)
Pol. order	1	4	3	1	4	2
# ind.	6331	7773	6942	6331	7773	6942
# obs.	6352	13,388	13,378	6352	13,388	13,378
Mean	0.00394	0.0122	0.0142	0.0441	0.0462	0.0478

Panel C: *Robustness analysis (all jobs)*

	(1) Level of education Ages 45-60	(2) Level of education Ages 50-60	(3) Level of education Ages 53-57	(4) Pre-period (2004-06) Ages 45-60	(5) Pre-period (2004-06) Ages 50-60	(6) Pre-period (2004-06) Ages 53-57
Bandwidth:						
Double duration	-0.0508	0.00894	0.0741	-0.000216	-0.00161	-0.0289
	(0.0577)	(0.0829)	(0.229)	(0.00801)	(0.00413)	(0.0321)
Pol. order	4	4	4	4	1	4
# ind.	8814	5323	2980	8814	5323	2980
# obs.	71,027	43,685	21,736	71,027	43,685	21,736
Mean	0.310	0.307	0.316	0.0475	0.0445	0.0453

Notes: RD-estimates using unemployed in specified age groups. In Panel A and B the outcome is monthly re-employment rate into subsidized/all jobs. Panel C reports placebo estimates using an indicator of university education as outcome respectively re-employment rate in the time period before the subsidized jobs. Optimal polynomial order selected using the Akaike information criteria (see e.g. Lee and Lemieux, 2010). Mean is the mean at the cut-off. Standard errors are clustered on individual level in parentheses. *, ** and *** denote significance at the 10, 5 and 1 percent levels.
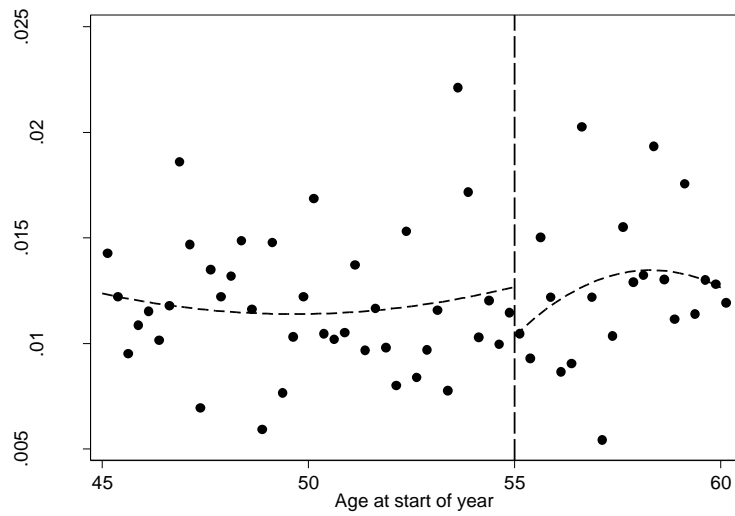
Figure 4 Monthly transition rate into subsidized employment by age at the start of the year (Local averages and quadratic parametric fit)
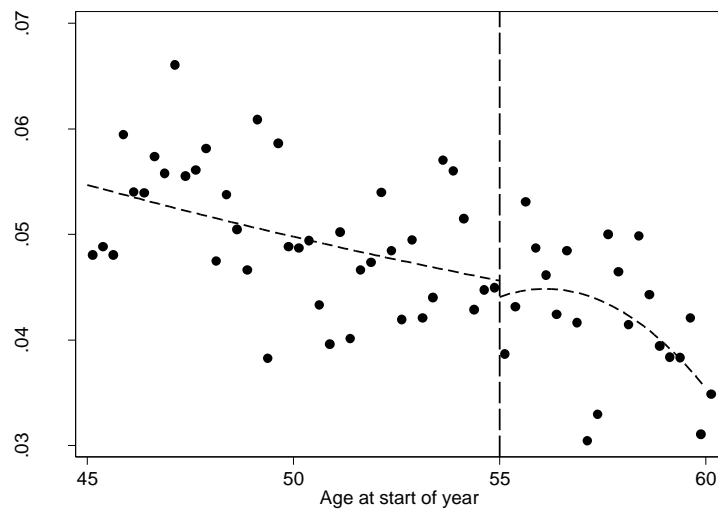

Figure 5 Monthly transition rate into all jobs by age at the start of the year (Local averages and quadratic parametric fit.)

In the above analysis we examined the overall impact throughout the entire unemployment spell (conditional on 10 months of unemployment). It is possible that this hides important effects close to the subsidy eligibility threshold at 12 months. For that reason we also use the month by month panel and focus explicitly on the transition rates around the 12 months threshold. Panel B in Table 1 provides estimates for grouped unemployment durations and Figure 6 gives estimates for each separate month. For

neither one of the unemployment durations do we find significant differences between individuals with double and single subsidy duration. Note that the results in Table 1 are for the optimal order of the polynomial. We conclude that subsidy duration has little impact on time in unemployment.
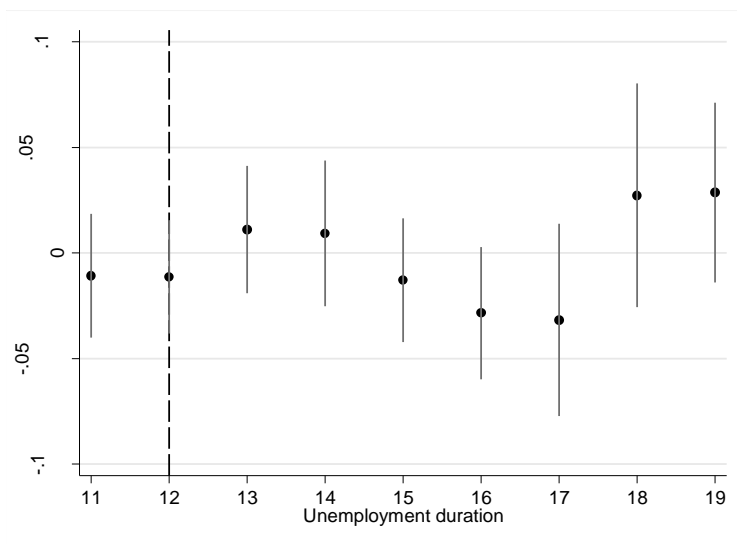

Figure 6 RD-estimates of the effect of double subsidy duration on monthly transition rate into all jobs. By time in unemployment

Even though we find no support for any important effect of doubling the subsidy duration we report estimate from several robustness analyses in Panel C of Table 1. We examine the 55-years of age discontinuity using level of education as an alternative outcome. We also estimate placebo models using data from before the introduction of wage subsidies (2006). None of these placebo estimates are significant, which lends credibility to the age discontinuity that we utilize for identification.

4.1.2 Subsidy rate

We now study the relationship between the subsidy rate and time in unemployment. To this end we utilize the doubling of the subsidy rate in January 2009, which increased the subsidy from 31 to 62 percent of the pre-tax wage. Specifically, we compare the transition rates in periods 2007-2008 (single subsidy) and and 2009-2010 (double subsidy) with the pre-period 2006. If the transition rate increases around month 12 in the two treatment periods but not in the pre period and if this increase is larger during the double subsidy rate period we view this as evidence of that the subsidy rate is important for time in unemployment. We study individuals in ages 26-55 at the start of the unemployment period. We exclude younger individuals because there are special

rules regarding labor market programs for youths. The oldest age group is excluded since it is eligible for the double subsidy duration.

Before proceeding to our formal model we explore the patterns in the data graphically. Figure 7 displays the average transition rate into subsidized jobs for the single and double subsidy rate period, respectively. In both periods there is a clear increase in the fraction employed with the subsidy after 12 months of unemployment.[9] The increase is, however, much sharper in the double subsidy rate period (2009-2010) and the fraction leaving unemployment for a subsidized job remains much higher throughout the entire unemployment spell.
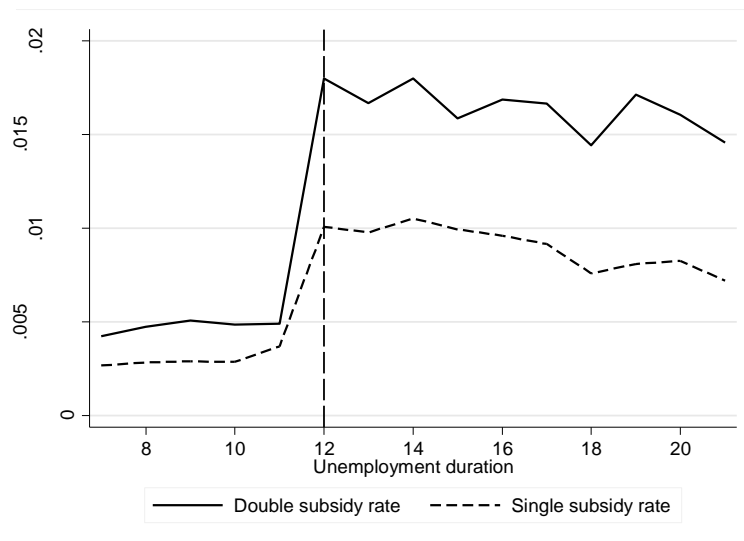

Figure 7 Monthly transition rates into subsidized jobs for single (2007-8) and double subsidy rate periods (2009-10)

In Figure 8 we examine if this increased outflow into subsidized jobs is reflected in an increase in total outflow to employment, or if the outflow into subsidized jobs is offset by an equally large decline in unsubsidized job. The figure displays the average transitions rates into any job for the two treatment periods in comparison with the same transition rate in the period before the *New Start Job* subsidies were introduced. First, the figure shows that the average transition rate differs substantially already several months before the 12 months eligibility threshold. This likely reflects differences in general economic conditions, with e.g. longer unemployment durations in the years 2009-2010 following the latest financial crisis. Second, as expected, in all three periods,

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[9] Remember that other types of non-employment such as long-term sickness absence also qualify for the wage subsidies and this explains why a small fraction finds a subsidized job already before 12 months.

the average transition rate decreases with time in unemployment. Third, in both the single subsidy rate and double subsidy rate period there is an increased job finding rate at the 12 month threshold. Moreover, the increase is both sharper and much more persistent in the double subsidy rate period. This gives a first clear indication that doubling the subsidy rate leads to higher job-finding rates and shorter time in unemployment.
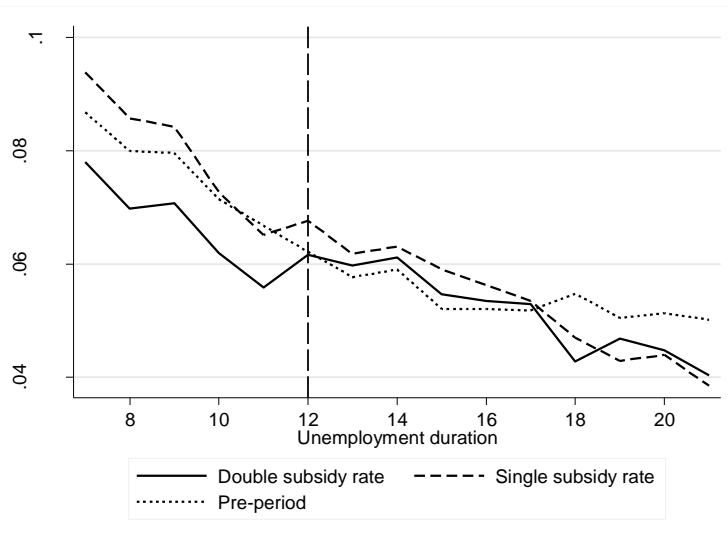

Figure 8 Monthly transition rates into all jobs for single (2007-8) and double subsidy rate periods (2009-10) and pre-period (2006)

We now turn to our formal econometric model. As in the previous subsection we construct a month by month panel for each month that an individual is unemployed, including information on exits to subsidized and unsubsidized employment, censoring status, time in unemployment and a set of individual characteristics. We specify linear Difference-in-Differences (DID) models for the probability of exiting unemployment in a certain month m. As an illustration, consider the model for the comparison between the double subsidy rate period and the pre-period

$$y_{im} = \lambda_m + \beta D_{double} + \sum_{m \geq 12} \gamma_m D_{double} + \varepsilon_{im}$$

Here, D_{double} is a dummy variable taking the value one in the double subsidy rate period, which controls for any fixed differences across the time periods. The model also includes duration months fixed effects (λ_m), which accounts for duration dependence. These effects are captured by the effects γ_m, providing separate effect estimates for each

unemployment duration. We also specify similar DID models for the comparison between the single rate period and the pre-period and the comparison between the single rate and double rate period.

These estimates are reported in Table 2. Columns 1 and 2 present estimates contrasting the single and the double rate periods with the pre-period. From both models we obtain a significant effect at the start of subsidy eligibility, but in the single rate period this effect quickly dies out. In the double rate period the effect lasts for several months. The estimates are confirmed in Columns 3 and 4, which directly compares the double rate period with the single rate period for both outflow into subsidized jobs and outflow from unemployment to any type of job. Columns 5 presents estimates from a "placebo" model were we also estimate effects before the unemployed actually are eligible for the subsidy. The latter would be significant if the unemployed choose to delay job start until they are eligible for the subsidy. Any significant placebo estimates might also reflect problems with the identification strategy, for instance due to the fact that the business cycle differences have differential impact over the unemployment spell. We find no significant placebo effects, and the estimates from the start of the subsidy are also very similar to the effects estimated in the model without the pre-eligibility placebo effects. This supports that our main results are robust.

The magnitude of the estimates (in column 5) ranging from 0.0076-0.012, suggests that the doubling of the subsidy rate increased monthly transition rates to employment by between 12 and 19 percent compared to the mean transition rate.

Table 2: Effects of double subsidy rate on monthly re-employment rate into subsidized jobs and all jobs

	(1) *All jobs* Single rate vs. pre-period	(2) *All jobs* Double rate vs. pre-period	(3) *Sub. Jobs* Double vs. single rate	(4) *All jobs* Double vs. single rate	(5) *All jobs* Double vs. single rate
Subsidy start – 4 months					-0.0012
					(0.0010)
Subsidy start – 3 months					0.000045
					(0.0011)
Subsidy start – 2 months					0.0010
					(0.0011)
Subsidy start – 1 months					0.00094
					(0.0011)
Subsidy start	0.0048**	0.012**	0.0093***	0.0076**	0.0077**
	(0.0015)	(0.0014)	(0.00042)	(0.00093)	(0.0011)
Subsidy start + 1 months	0.0030	0.014**	0.0081***	0.011**	0.011**
	(0.0016)	(0.0014)	(0.00044)	(0.00097)	(0.0012)
Subsidy start + 2 months	-0.00064	0.011**	0.0089***	0.012**	0.012**
	(0.0018)	(0.0016)	(0.00049)	(0.0010)	(0.0012)
Subsidy start + 3 months	0.00093	0.0100**	0.0069***	0.012**	0.012**
	(0.0019)	(0.0017)	(0.00051)	(0.0011)	(0.0012)
Subsidy start + 4 months	-0.0022	0.0085**	0.0073***	0.011**	0.011**
	(0.0020)	(0.0019)	(0.00058)	(0.0011)	(0.0013)
Subsidy start + 5 months	-0.0017	0.011**	0.0067***	0.011**	0.011**
	(0.0022)	(0.0020)	(0.00064)	(0.0012)	(0.0014)
Subsidy start + 6 months	-0.0094**	-0.000089	0.0045***	-0.0015	-0.0014
	(0.0024)	(0.0022)	(0.00067)	(0.0013)	(0.0014)
Subsidy start + 7 months	-0.012**	0.0056*	0.0076***	0.0067**	0.0067**
	(0.0027)	(0.0026)	(0.00081)	(0.0014)	(0.0016)
Subsidy start + 8 months	-0.0087**	0.0056	0.0060***	0.0034*	0.0034*
	(0.0031)	(0.0029)	(0.00090)	(0.0016)	(0.0017)
Subsidy start + 9 months	-0.018**	-0.0022	0.0038***	0.00034	0.00041
	(0.0037)	(0.0035)	(0.0010)	(0.0018)	(0.0019)
# ind.	432,190	505,418	524,731	524,731	524,731
# obs.	1,539,736	2,122,58	4,786,994	4,786,994	4,786,994
Mean	0.074	0.067	0.0058	0.064	0.064

Notes: DID estimates with controls for unemployment duration month and group fixed effects using unemployed in ages 26-55. The outcome is monthly re-employment rate into subsidized/all jobs. Column 1 and 2 compare the double and single rate periods with the pre-period. Columns 3-5 compare the double rate period with the single rate period. Standard errors clustered on individual level are in parentheses. *, ** and *** denote significance at the 10, 5 and 1 percent levels.

4.2   Post-subsidy employment effects

So far we have documented that increased subsidy duration and increased subsidy rate have very different impact on job finding rates and hence time in unemployment. We now examine how subsidy rate and subsidy duration affect employment rates for those who get subsidized jobs. Specifically, we study in detail what happens around the end of the subsidy. It is of course important from both a theoretical and policy perspective to

examine to what extent individuals with subsidized jobs are able to retain employment also after the subsidy has expired. In theory, employment behavior after expiry could reveal if the subsidies primarily reach individuals with permanently low productivity or if the individuals who find subsidized jobs are able to accumulate skills and experience which lead to permanently improved opportunities on the labor market.

Before presenting the analyses it is important to note that that all regular labor laws apply to the subsidized jobs, the only difference is that the employer receives a subsidy in the form of a tax reduction. For instance, after 24 months of employment with a given employer, short or fixed term contracts in practice turn into permanent employment contracts. One implication is that many subsidized jobs will be terminated before the end of the eligibility period and eligible individuals may either find a new job or again become unemployed.

4.2.1 Subsidy duration

We use the age discontinuity in order to study the impact of double subsidy duration. We sample all workers who get a subsidized job and who were between 52 and 58 years old in January the year they start their subsidized employment. We select those that start their subsidized employment sometimes during 2007-2009, since we want to follow them at least one year after they start working in their subsidized job. We then contrast the evolution of the employment rates of individuals with "short" subsidies (52-54 years) and long subsidies (55-57 years) in order to compare how employment rates change around the end of the short and long subsidies.

For each individual in our sample we construct monthly information on employment, providing a panel dataset containing monthly indicators of employment for each month after the start of the subsidized job. To this end we use information from the employment office and define any individual not being registered at the employment office as employed. This should not be very restrictive, since the sample consists of individuals who quite recently obtained subsidized employment and, thus, are quite tightly attached to the labor market.

Before presenting the formal model we perform graphical analyses. Figure 9 displays the average employment rates 12 months before and 12 months after the end of the short subsidy for individuals with long (55 years) and short (54 years) subsidies. For the former group this is the actual end of the subsidy, and for the latter group it is the time

when the subsidy would have ended, had they instead been eligible only for the short subsidy. Note that for both groups, the single subsidy duration equals the duration of the proceeding unemployment spell. As expected, the employment rates in the two groups are very similar several months before the end of the single subsidy. This confirms that the two groups are comparable. This should come as no surprise, as the previous analysis showed that doubling of the subsidy duration had no effects on job finding rates. The figure also reveals that a striking employment gap opens between the two groups about one month after the expiry of the single subsidy. A couple of months later the employment rate is considerably higher in the group that still has access to the subsidy.
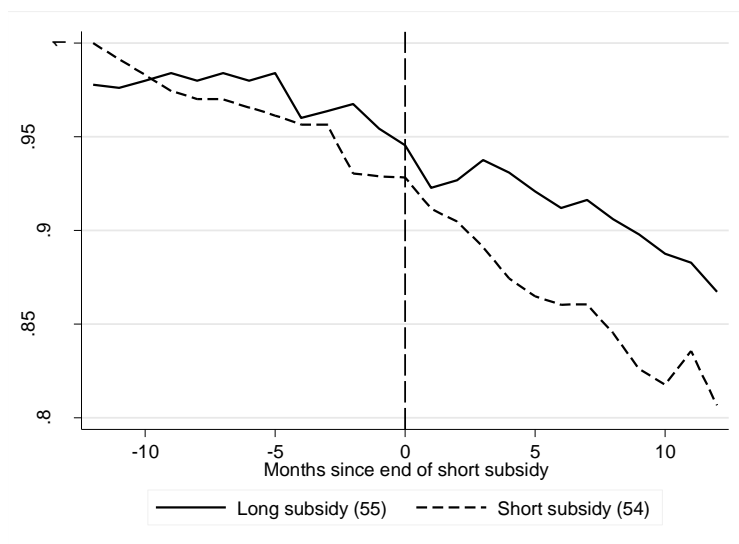

Figure 9: Employment rates around end of single subsidy. Individuals with long and short subsidies

One potential concern, although unlikely, is that this gap in employment is due to some kind of time-varying selection due to the one year age difference between the groups. We test for this by comparing employment rates for 54 and 53-year olds, who all have short subsidies, so that any differences could be attributed to time-varying selection due to the one year age difference. We also perform a similar placebo comparison for 56 and 55-year olds. These placebo comparisons, presented Figure 10 and Figure 11, show no notable differences between the groups. If anything the employment rate is higher in the younger group in both of the placebo comparisons. This is in stark contrast to the pattern observed in Figure 9 where the employment rates are higher in the older group which is eligible for long subsidies.
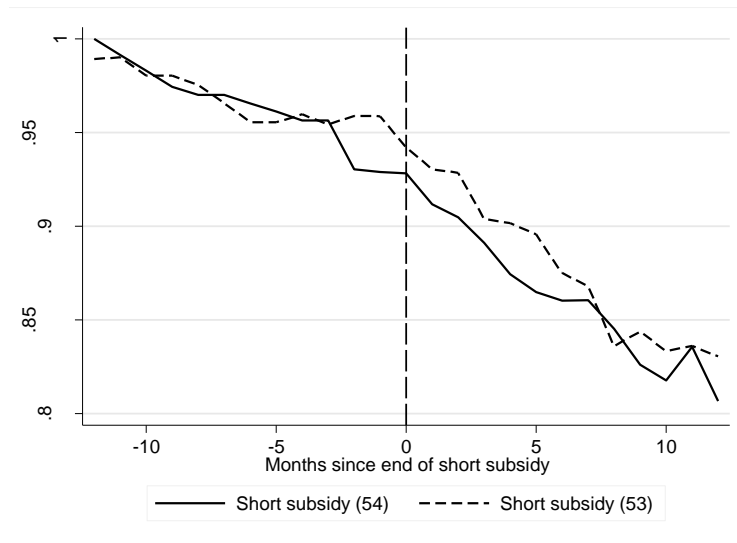
Figure 10: Placebo comparison. Employment rates around end of single subsidy for two groups with short subsidies
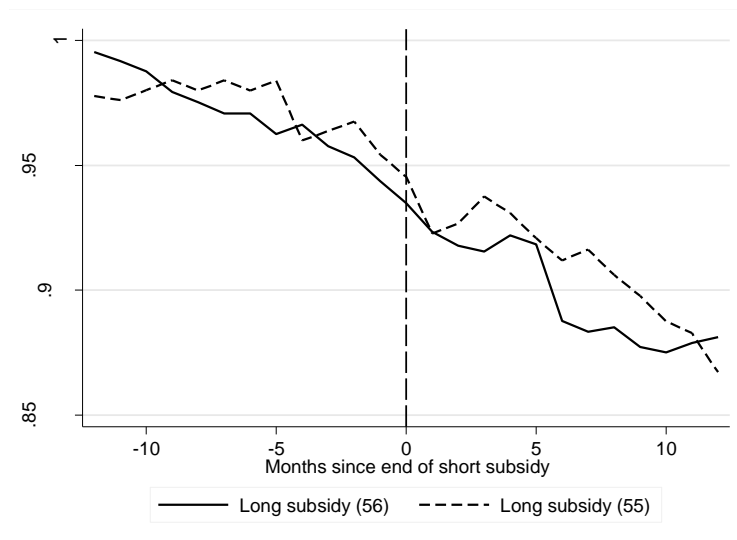
Figure 11: Placebo comparison. Employment rates around end of single subsidy for two groups with long subsidies

We now turn to a formal Difference-in-Differences model, which contrasts the employment rates before and after the end of the subsidy for individuals with short (below age 55) and long subsidies (over age 55). The model controls for age at the start of the subsidy and time elapsed since the expiry of the short subsidy. The former controls for any general differences between the two groups (although small based on Figure 9) and the latter controls for any general employment dynamics. We then measure the effect on the employment rate from the end of the short subsidy and onwards.

Initially, in Column 1 of Table 3 we only use individuals in ages 54-55. The results confirm the results from the figures. About 2-3 months after the end of the short subsidies the employment rate is considerably higher among those with long subsidies. However, since the sample only includes individuals starting subsidized employment within a fine age bracket, the precision of the estimates is rather poor. For that reason we stepwise widen the age bracket in Columns 2 and 3. In Column 3 when we use individuals in ages 52-57 we obtain very similar results as in Column 1, but with more precise estimates. We find significant effects on employment rates from 3 months after the end of the short subsidies and onwards. In Column 4 we add placebo effects for the months before the end of the subsidy, again, yielding very similar results and insignificant placebo effects. We conclude that employment rates significantly decline as the short subsidies expire, which implies that the longer subsidy duration sustains employment. The magnitude of employment gap in favor of workers still eligible for subsidies grows somewhat after the short subsidy has expired and is 5 to 7 percentage points half a year after expiry of the short subsidies.

The fact that longer wage subsidies lead to higher employment during the extended eligibility period is of course interesting in itself, but it is equally important to examine what happens to the employment rates after the expiry of the long subsidies, i.e. when neither group is eligible for wage subsidies. If wage subsidies are primarily given to individuals with permanently low productivity or with little scope of gaining productivity during their subsidized employment, we expect to see no difference in employment rates between the groups after the end of the double subsidy, whereas if workers thanks to an extended period of subsidized employment are able to acquire valuable new experience and skills and/or obtain new labor market contacts we expect to see the employment rate difference to persist also beyond the expiry also of the double subsidy.

Table 3: Employment effects around end of single subsidy

	(1) Ages 54-55	(2) Ages 53-56	(3) Ages 52-57	(4) Ages 52-57
Subsidy expiry - 2 months				0.0054
				(0.0092)
Subsidy expiry - 1 months				0.0046
				(0.010)
Subsidy expiry	0.0084	-0.00025	0.0035	0.0043
	(0.017)	(0.012)	(0.010)	(0.011)
Subsidy expiry + 1 months	0.0024	-0.0031	0.0035	0.0043
	(0.022)	(0.015)	(0.012)	(0.013)
Subsidy expiry + 2 months	0.013	0.00077	0.012	0.013
	(0.022)	(0.016)	(0.014)	(0.014)
Subsidy expiry + 3 months	0.038	0.024	0.031**	0.032**
	(0.024)	(0.017)	(0.015)	(0.016)
Subsidy expiry + 4 months	0.048*	0.033*	0.038**	0.039**
	(0.027)	(0.019)	(0.016)	(0.016)
Subsidy expiry + 5 months	0.047	0.035*	0.041**	0.042**
	(0.029)	(0.020)	(0.017)	(0.017)
Subsidy expiry + 6 months	0.043	0.027	0.039**	0.040**
	(0.030)	(0.022)	(0.019)	(0.019)
Subsidy expiry + 7 months	0.047	0.030	0.048**	0.049**
	(0.032)	(0.024)	(0.020)	(0.021)
Subsidy expiry + 8 months	0.052	0.049*	0.056***	0.056***
	(0.034)	(0.026)	(0.021)	(0.021)
Subsidy expiry + 9 months	0.063*	0.048*	0.060***	0.061***
	(0.037)	(0.027)	(0.022)	(0.023)
Subsidy expiry + 10 months	0.061	0.051*	0.065***	0.066***
	(0.037)	(0.028)	(0.023)	(0.023)
Subsidy expiry + 11 months	0.038	0.039	0.058**	0.059**
	(0.037)	(0.027)	(0.023)	(0.023)
Subsidy expiry + 12 months	0.052	0.051*	0.067***	0.068***
	(0.040)	(0.029)	(0.024)	(0.024)
# ind.	486	930	1351	1351
# obs.	10,676	20,405	29,661	29,661
Mean	0.94	0.94	0.94	0.94

Notes: DID estimates using the monthly employment panel dataset for individuals starting subsidized employment (described in the text). Each column uses different samples depending on the age bracket. The outcome is a monthly indicator of employment. All models include age at the start of year fixed effects and time since actual/hypothetical end of subsidy fixed effects. Standard errors in parentheses are clustered at the individual level. *, ** and *** denote significance at the 10, 5 and 1 percent levels.

Specifically, in Figure 12, we present employment rates around the end of the long subsidy for age groups 52-54 (short subsidies) and 55-57 (long subsidies). We have highlighted with dashed lines both the expiry of the short and long subsidies in the figure. Naturally, for those with short subsidies the expiry of the long subsidy is time the subsidy would have ended if these individuals would have been eligible for a long instead of a short subsidy. Note that the expiry of the short subsidies is shown as an interval – marked by the two left-most dashed lines -, because the number of months

between the end of the short and long subsidies varies depending on previous unemployment duration. Note also that because the subsidies were implemented quite recently we are only able to follow the individuals up to four months after the end of the long subsidies. Despite these limitations Figure 12 shows some very interesting results.

Figure 12: Employment rates around end of long subsidies. Individuals with long and short subsidies

First, the figure confirms that employment rates diverge after the expiry of the short subsidy, i.e. in the period when only one group has access to the subsidy, between -12 months and 0 months in Figure 12. Second, some of this gap persists beyond the end of the long subsidies, so that at least parts of the employment effects persist after the end of the actual subsidy. We conclude that subsidy duration matters for the probability of staying employed also beyond the expiry of the subsidy at least for older workers that we are able to study using the 55 years age discontinuity.

4.2.2 Subsidy rate

We next study how the subsidy rate affects the employment adjustment around the expiry of the short subsidies. To this end we construct a similar monthly employment status dataset as in the previous subsection. We sample all workers starting subsidized employment during 2009 (double rate) and 2008-2007 (single rate) after a 12-18 months unemployment spell. Note that the doubling of the subsidy rate from 2009 onwards only applied to new subsidy episodes. Moreover, note that we exclude individuals starting an wage subsidy in 2010. The reason for this is that with our dataset we are not able to follow these individuals until the end of their subsidies. We also exclude individuals

older than 54, since they are eligible to the double subsidy duration. With this sample we contrast the employment rates for individuals with single and double subsidy rates before and after the expiry of the subsidy. We use a DID model where we control for general differences between the two time periods and general employment effects depending on time elapsed since the expiry of the subsidy. If the employment rates decrease more at the end of the subsidy in the group with double subsidy rate we conclude that the subsidy rate has important effects on employment adjustments around the end of the subsidies. Because our previous analysis showed that doubling the subsidy rate increased job-finding rates, it is possible that subsidized workers are selected differently, most likely less favorably selected, when the subsidy is higher. Hence differences in employment rates at expiry, may reflect this difference in selection.

The DID estimates, reported in Column 1 of Table 4, suggest that the drop in employment at the end of the subsidy is larger for double rate subsidies compared to the single rate subsidies. However, in addition to being an effect of the subsidy rate, the difference might reflect business cycle effects, since even if we control for general differences between the two periods any changed economic conditions within the time periods will affect our estimates. For that reason we also use data for individuals who left unemployment for an unsubsidized job within the same time periods. For this group we construct hypothetical expiry of subsidy time points that would have applied had they got a subsidized job instead of an unsubsidized job. Initially, we estimate the same DID model as for workers with subsidized employment, but in this placebo DID regression any significant estimates are assumed to capture business cycle effects. The results in Column 2 of Table 4indeed indicate a presence of such business cycle effects. In some cases the placebo effects are significant and in all cases quite sizable (about half of the effects in Column 1).

For that reason we merge the two datasets and use data for individuals with subsidized and unsubsidized jobs in a DIDID framework, where we are able to control for any business cycle effects under the assumption that these are the same for workers in subsidized and unsubsidized employment. Using this DIDID model we find no significant differences in employment rates between workers with single rate and double rate subsidies around the expiry of the subsidy. We conclude that the subsidy

rate seems to have less impact on time in employment, at least in terms of the magnitude of the employment adjustments around subsidy expiry. This suggests that the increase in employment due to the double subsidy rate, in fact, is not driven by a larger fraction of individuals with permanently low productivity among those finding subsidized employment. In view of the increased job finding rate a larger downward adjustment might have been expected due to a worse selection of workers finding subsidized jobs, but it is possible that the higher subsidy rate increases the room for on the job training or learning to offset such differences in productivity at expiry of the subsidies.

Table 4: Effects of double subsidy rate compared to single subsidy rate on employment around the end of subsidy

	(1) DID subsidized jobs	(2) Placebo DID unsubsidized jobs	(3) DIDID
Subsidy expiry	0.011* (0.0059)	0.0057 (0.0072)	0.0054 (0.0093)
Subsidy expiry + 1 month	0.015** (0.0068)	0.0038 (0.0077)	0.011 (0.010)
Subsidy expiry + 2 months	0.022*** (0.0081)	0.0078 (0.0081)	0.015 (0.011)
Subsidy expiry + 3 months	0.020** (0.0092)	0.0080 (0.0085)	0.013 (0.013)
Subsidy expiry + 4 months	0.030*** (0.010)	0.014* (0.0088)	0.015 (0.013)
# ind.	3386	14,507	17,871
# obs.	50,823	218,387	269,210
Mean	0.96	0.81	0.84

Notes: The sample is the monthly employment panel dataset for individuals starting subsidized/unsubsidized employment (described in the text). Outcome is a monthly indicator of employment. The DID models also include time period (single/double) fixed effects and time since actual end of subsidy fixed effects. The DIDID model also includes indicator for subsidized job, time period fixed effects, time since actual end of subsidy fixed effects and interactions between these variables. Standard errors in parentheses are clustered at the individual level. *, ** and *** denote significance at the 10, 5 and 1 percent levels.

4.3   Double duration and double rate

We are also able to examine if there are any additional interaction effects from having both double subsidy rate and double subsidy duration. Such an analysis provides further interesting margins. We study how the effects of doubling the subsidy rate depend on subsidy duration for both time in unemployment and time in employment.

Initially, in Table 5 in the appendix we examine if the effect of double subsidy duration on time in unemployment depends on the subsidy rate. To this end we run separate RD regressions using the discontinuity at 55 and the same approach as in

Section 4.1.1 for the periods with single and double subsidy rate. As comparison we also present or main estimates for both periods jointly. We find no significant effects of double subsidy duration on job finding rates unemployment, neither for the period with double no single subsidy rate. This holds for all orders of the polynomial in the parametric control function.

We next study the same margin and the effects on employment at subsidy expiry by comparing the employment rates for individuals with short and long subsidies in the periods with single and double subsidy rate, respectively. We run similar DID regressions as in Section 4.2.1 The results, reported in Table 6 in the appendix indicate that the effects on time in employment after expiry are somewhat stronger during the period with double subsidy rate compared to the period with single subsidy rate. However, due to the limited sample size the difference is not statistically significant. This result is largely expected, since from an incentives perspective it is not surprising that the employment adjustment at the end of the subsidy depends on the subsidy rate, the reason being that a higher subsidy rate is likely to induce employment of individuals who are less productive and may require more time to recover and build up their human capital.

5   Conclusions

Employment and wage subsidies targeted toward the long term unemployed have been studied in numerous evaluations. This paper is the first to provide guidance as to how these programs should be designed. Two discontinuities in the design and implementation of wage subsidies under the Swedish *New Start Jobs*-policy which was introduced in 2007 allow us to study effects of subsidy rate and subsidy duration on job finding rates and longer term employment prospects. We utilize that older workers (55+) are entitled to double-duration subsidies creating an age discontinuity, and exploit a time discontinuity in the form of a doubling of the subsidy rate in 2009 compared to the first two years of the scheme. Using these discontinuities in combination with rich administrative data we study effects on job finding rates and the probability of staying employed after the subsidy expires.

We find that a doubling of the subsidy rate increases the probability of finding employment 12-19 percent while extending the duration of an already extensive subsidy

duration has no impact on job finding rates and time in unemployment. This suggests that the subsidy rate is the dimension of subsidy design that matters for job finding rates. Subsidy duration instead is found to matter for the probability of staying employed. In particular, and perhaps not surprising, individuals' employment prospects are improved for the duration of their wage subsidy, but interestingly individuals who are entitled to a long subsidy are also more likely to remain employed in the longer term after subsidy expiry than individuals with short subsidy duration. A possible interpretation is that longer subsidy durations allow individuals to gain skills and develop more productive labor market networks which improve their labor market prospects also in the longer term.

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Appendix

Table 5: Heterogeneous effects of double subsidy duration on monthly re-employment rate into subsidized jobs and all jobs. By subsidy rate

	Single rate period (2007-2008)		Double rate period (2009)		Both periods
	(1) Sub. jobs	(2) All jobs	(3) Sub. jobs	(4) Allb. jobs	(5) All jobs
Order of polynomial					
One	0.00145	0.00221	-0.000669	0.000170	0.00101
	(0.00282)	(0.00639)	(0.00215)	(0.00401)	(0.00344)
Two	-0.00177	0.00305	-0.00327	-0.00371	-0.00135
	(0.00427)	(0.00948)	(0.00310)	(0.00583)	(0.00503)
Three	-0.00326	-0.00587	-0.000731	-0.00769	-0.00674
	(0.00582)	(0.0125)	(0.00390)	(0.00761)	(0.00658)
Four	-0.00504	0.00223	-4.06e-05	-0.00178	-0.000216
	(0.00750)	(0.0154)	(0.00465)	(0.00923)	(0.00801)
Optimal order	1	1	2	4	4
# ind.	3438	3438	6194	6194	8814
# obs.	23,142	23,142	47,885	47,885	71,027
Mean	0.00953	0.0417	0.0125	0.0444	0.0437

Notes: RD-estimates using unemployed in ages 45-60. The outcomes are monthly re-employment rate into subsidized/unsubsidized. Columns 1-2 (3-4) report RD-estimates for the effect of double subsidy duration for the single (double) rate period in the years 2007-2008 (2009-2010). Column 5 gives our main estimates for both periods. Optimal polynomial order selected using the Akaike information criteria (see e.g. Lee and Lemieux, 2010). Standard errors are clustered on individual level in parentheses. *, ** and *** denote significance at the 10, 5 and 1 percent levels.

Table 6: Heterogeneous effects of double subsidy duration on employment around end of single subsidy. By subsidy rate

	(1) Single rate period (2007-2008)	(2) Double rate period (2009)	(3) Both periods
Subsidy expiry	0.013	-0.021	0.0035
	(0.013)	(0.017)	(0.010)
Subsidy expiry + 1 months	0.016	-0.029	0.0035
	(0.015)	(0.022)	(0.012)
Subsidy expiry + 2 months	0.028*	-0.037	0.012
	(0.016)	(0.026)	(0.014)
Subsidy expiry + 3 months	0.039**	-0.0016	0.031**
	(0.017)	(0.030)	(0.015)
Subsidy expiry + 4 months	0.044**	0.0068	0.038**
	(0.017)	(0.034)	(0.016)
Subsidy expiry + 5 months	0.039**	0.047	0.041**
	(0.018)	(0.040)	(0.017)
Subsidy expiry + 6 months	0.044**	0.0066	0.039**
	(0.020)	(0.042)	(0.019)
Subsidy expiry + 7 months	0.045**	0.064	0.048**
	(0.022)	(0.049)	(0.020)
Subsidy expiry + 8 months	0.053**	0.091*	0.056***
	(0.022)	(0.052)	(0.021)
Subsidy expiry + 9 months	0.058**	0.093	0.060***
	(0.023)	(0.064)	(0.022)
Subsidy expiry + 10 months	0.063***	0.11	0.065***
	(0.024)	(0.074)	(0.023)
Subsidy expiry + 11 months	0.056**	0.091	0.058**
	(0.023)	(0.086)	(0.023)
Subsidy expiry + 12 months	0.064***	0.14	0.067***
	(0.024)	(0.13)	(0.024)
# ind.	915	439	1351
# obs.	22,604	7057	29,661
Mean	0.93	0.97	0.94

Notes: DID estimates using the monthly employment panel dataset for individuals starting subsidized employment (described in the text). Outcome is a monthly indicator of employment. All models include age at the start of year fixed effects and time since actual/hypothetical end of subsidy fixed effects. Standard errors in parentheses are clustered at the individual level. *, ** and *** denote significance at the 10, 5 and 1 percent levels.