HIRING SUBSIDIES FOR LOW-EDUCATED UNEMPLOYED YOUTH ARE INEFFECTIVE IN A TIGHT LABOR MARKET

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LIDAM Discussion Paper
IRES 2024 / 09

UCLouvain

IRES | LIDAM
Louvain Institute of Data Analysis and Modeling in economics and statistics

Hiring subsidies for low-educated unemployed youths are ineffective in a tight labor market

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June 24, 2024

Abstract

We evaluate the impact of hiring subsidies for unemployed jobseekers in Wallonia, the French-speaking region in the south of Belgium. The special feature of these subsidies is that they are more readily available for low-educated youths, who are eligible from registration as a jobseeker or a few months later. In contrast, others must wait 12 months to be eligible. We exploit this difference in a regression discontinuity design and show that earlier access to subsidies does not enhance the job-finding rate of the target group. We attribute the lack of effect to the pre-pandemic tightening of the labor market.

JEL-Codes: C21, J08, J23, J24, J38

Keywords: hiring subsidies, youth unemployment, low-educated, regression discontinuity design, labor market tightness.

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1. Introduction

In July 2017, the government of Wallonia (Belgium) introduced new hiring subsidies for unemployed jobseekers, replacing previous federal measures. This program—the *Impulsion plan*—provides a degressive wage subsidy starting at €500 a month for at most 3 years to employers recruiting unemployed people with poor employment prospects. The specific feature of this plan is that the eligibility conditions for the subsidies are much more favorable for youths with low levels of education than for other groups. High school dropouts[2] under 25 years of age are eligible from their first day of registration as a jobseeker, while those with a high school diploma only are entitled after 6 months of registered unemployment. All others must have been unemployed for at least 12 months. In this paper, we aim to evaluate whether the easier access to hiring subsidies for young people with little formal education has enhanced their job prospects or, on the contrary, whether it generates a deadweight loss. To that aim, we implement a regression discontinuity design (RDD) around the 25-age threshold. Our analysis uses administrative individual data on all low-educated youths who registered as unemployed jobseekers in Wallonia between July 2017 and December 2019, a period that was marked by substantial economic growth and falling unemployment.

In the empirical analysis, we follow the more recent strand of the literature on hiring subsidy impacts and estimate intention-to-treat (ITT) effects for a sample of newly registered unemployed youths with low educational attainment (see, for example, Boockman et al., 2015; Schünemann et al. 2015; Sjögren and Vikström, 2015). Identification is based on the discontinuity in subsidy take-up rate occurring at 25 years because of a different targeting strategy. As expected, the ITT estimate on the probability of benefiting from a subsidy within one year of entry is highly significant at age 25, reaching 19.8 (9.3) percentage points (pp) for high school dropouts (graduates). The higher point estimate for the least-educated youths reflects their eligibility for the subsidy from their first day of registration. We then analyze, separately for each schooling group, whether the discontinuity in treatment intensity at age 25 translates into a discontinuity in the job-finding rate and the cumulative number of months in employment. In this way, we provide evidence on the effectiveness of the policy.

Giving youths without higher education priority access to wage subsidies is a response to their much higher risk of unemployment. In 2022, the unemployment rate for young Walloon people aged 15 to 24 with no more than a high school degree was 25%, whereas it was 34% for high school dropouts (Eurostat, 2023). By way of comparison, the unemployment rate for the over-25s—all educational levels included—stood at 8%, i.e., three to four times lower than that of the low-educated youths (Eurostat, 2023). The situation of youths with little schooling in the Walloon Region is far worse than the European average and comes close to that of certain neighboring regions in Northern France (Nord-Pas-De-Calais, Lorraine).[3] The empirical literature has demonstrated that unemployment at the beginning of one's career can have a negative impact on future employment prospects, earnings, and mental health (Bell and Blanchflower, 2011; Cockx and Ghirelli, 2016; Glatt and Wunnava, 2018; Schmillen and Umkehrer, 2017). By intervening very early in the unemployment spell of low-educated youths, the Impulsion plan aims to prevent these youths from drifting into long-term unemployment.

Behind this priority strategy is the idea that real work experience can help low qualified young workers acquire vocational skills that they have not been able to learn in the conventional school system. By reducing the cost of hiring them, the government wants to incentivize private firms to increase their

[2] High school dropouts are considered as those who dropped out of school without a higher secondary education diploma.

[3] These regions are characterized by a heavy industrial past that left a profound mark on local labor markets for decades (Bodart et al., 2018; Leboute, 2009).

demand for this type of worker (see, for example, Brown and Koettl, 2015). As they acquire experience and develop new skills on the job, beneficiaries are expected to become more productive and employable, even after the subsidy has run out. However, there are some doubts in the literature as to whether "work-first" policies—as opposed to "train-first" strategies—are effective for low-educated workers, for at least two reasons. First, the skill requirements of jobs that are available to them are often too low to generate sufficient human capital development (see, for example, Autor et al., 2017; Autor and Houseman, 2010; Neubäumer, 2012). Second, accumulating work experience, even in the market sector, is not necessarily sufficient to convince future employers to hire unskilled workers. By sending fictitious resumes to real job postings in France, Cahuc et al. (2021) show that the certification of skills at the end of the work experience is needed to improve the callback rates of high school dropouts. We therefore contribute to this literature by evaluating whether targeting hiring subsidies from the start of the unemployment spell, rather than later in the spell, enhances the employment opportunities of low-educated youths.

While there is a considerable literature on the evaluation of hiring subsidies for long-term unemployed people, relatively few studies focus on young unemployed people, and there are even fewer that evaluate the impact of wage subsidies for young jobseekers with (very) low schooling attainment.[4] One exception is a recent study by Albanese et al. (2024), which evaluates the employment effects of a temporary reinforcement of a hiring subsidy targeted at low-educated unemployed youths during the recovery from the Great Recession in Belgium.[5] The groups targeted by this scheme were similar to those targeted by the Impulsion plan, with the exception that high school dropouts had to be unemployed for a minimum of 3 months to be eligible. The scheme's design was drastically different, however, since it was implemented for a limited period of 2 years while the Impulsion plan was designed to last over time. The temporary nature of the former program also allowed higher amounts of wage subsidies for low-educated youths as compared to the long-term unemployed. Based on the same evaluation method applied in our paper, the authors show that the subsidy reinforcement for the youngest accelerated job-finding in the short run by about 10 pp, for both high school dropouts and graduates. However, the subsidy generated persistent employment effects in the private sector for high school graduates only, suggesting that a minimum skill level is a condition for the effectiveness of "work-first" policies. In our paper, we contribute to the literature by evaluating the impact of a similar hiring program but in a much more favorable economic context than the one which prevailed at the outset of the financial crisis. Our results could therefore provide useful insights about the opportunity to implement such programs on a permanent basis, irrespective of the economic conditions.

The link between the effectiveness of active labor market policies (ALMPs) and the economic context has received particular attention in the literature and should be of interest to public authorities seeking to implement cost-effective policies. In their meta-analysis, Card et al. (2018) provide suggestive evidence that ALMPs work better in recessionary markets, without being able to explain the mechanisms involved. Various papers have estimated job-search models and simulated the implementation of hiring subsidies under different circumstances. The model of Cahuc et al. (2019)

[4] For a meta-analysis of recent active labor market policy (ALMP) evaluations, including private sector employment subsidies, see Card et al. (2018). For a survey discussing impact evaluations of ALMPs for the youth, including wage subsidies, see Caliendo and Schmidl (2016).

[5] The recent paper of Bermudez et al. (2024) also evaluates the effect of hiring subsidies for low-educated youths in Flanders, the Flemish-speaking region located in the north of Belgium. However, these are targeted at all new hires and not solely unemployed jobseekers.

provides evidence that such policies are most effective if they are *exclusively* targeted at short periods of high unemployment. This result can be explained by the fact that the cost of job creation is lower in these periods, as the number of unemployed per vacancy is higher. Kitao et al. (2011) come to the same conclusion. Kline and Moretti (2013) build a job-search model with different local labor markets and simulate the effects of place-based hiring subsidies. They also demonstrate that labor market tightness can moderate the effectiveness of hiring subsidies. In a tight labor market where there is excessive job creation, subsidizing hires is inefficient because vacancies crowd each other out. In the above-mentioned study, Albanese et al. (2024) empirically demonstrate this prediction. They show that labor market tightness induced by the economic hub of Luxembourg decreases the impact of the hiring subsidy in the Belgian area near the border. Based on these studies, we expect a smaller effect of the Impulsion plan implemented prior to the COVID-19 crisis in a context of increasingly tight labor market overall (OECD, 2020).

Our main finding is that the earlier access to subsidies does not enhance the job-finding rate of low-educated unemployed youths one year after registration, making this priority strategy a complete deadweight loss. Using cumulative outcomes, we further conclude that the specific focus on low-educated youths for hiring subsidies has no impact on the number of months spent in employment within two and a half years of registration. Our results therefore provide empirical evidence that in a tight labor market, subsidizing hires is inefficient. As a side effect, we show that the policy impacts the recruitment process of low-educated youths, with smaller numbers being recruited through temporary staffing agencies. The probability of transiting to a first job with the intermediary of a staffing agency decreases by 15.5% and 6.6%, respectively, for high school dropouts and graduates. The ease of benefiting from hiring subsidies for these workers encourages some firms to hire them directly and take full advantage of the cost reduction, rather than using a temporary employment agency that would instead receive the subsidy.

The outline of this paper is as follows. The next section summarizes the institutional background. Section 3 describes the data and the outcome variables. The empirical strategy and the evaluation sample are presented in Section 4. Section 5 presents and discusses the empirical findings. Some robustness analyses are reported in Section 6. The last section offers some concluding remarks.

2. Institutional framework

Belgium is a federal state that has, over time, transferred responsibility for labor market policies to regional authorities (Brussels, Flanders, and Wallonia). The last institutional reform of 2014 relocated competence and resources regarding targeted subsidized employment to the regions. It is within this context that the Impulsion plan was designed by the regional government of Wallonia, the French-speaking region in the south of Belgium. Entering into force in July 2017, this plan provides temporary wage subsidies for the hiring of young low-educated and long-term unemployed workers living in the Walloon region. These subsidies replaced old ones operating at the federal level, which consisted of deductions to employers' social security contributions (SSC) targeting similar disadvantaged groups of unemployed jobseekers. The new hiring subsidies were implemented at a time when the Belgian economy was expanding strongly, inducing employment growth and unemployment to fall in all regions. Between 2017 and 2019, the unemployment rate in Wallonia for the group aged 15–74 decreased from 9.7% to 7.2% (Eurostat), the lowest level in many decades in this region marked by high structural unemployment (Bodart et al., 2018). The trend was similar for youths, with the unemployment rate of people aged 15–24 declining from 29.0% to 21.9% in three years.

In this paper, we evaluate the impact of the Impulsion plan on the hiring of low-educated youths under 25 years of age. In this so-called "Impulsion –25", the age requirement of being less than 25 is verified on the day before the first hiring under an Impulsion subsidy. Accordingly, once they have been beneficiaries, young people targeted by the scheme continue to be eligible after they reach the age of 25. However, there is a cutoff age of 28 years. Private-sector firms[6] recruiting eligible youths benefit from a wage subsidy of €500 per month for two years and €250 (€125) in the first (last) 6-month period of a third year.[7] Three years is therefore the maximum period during which the subsidy can be granted for a given worker, either through one or more (interrupted or not) employment contracts. High school dropouts are eligible after only 1 day of registration as jobseekers at the Walloon public employment service (PES), while high school graduates become eligible after 6 months of registration.[8] Other jobseekers (aged 25 and over or highly educated) are also entitled to a similar subsidy, but only if they have been registered as jobseekers for at least 12 months. This so-called "Impulsion 12+" subsidy amounts to €500 per month during the first year and €250 (€125) in the first (last) 6-month period of a second year. There is therefore one year less eligibility than for the Impulsion –25 scheme. However, the key difference between the two types of subsidies is the required period of registered unemployment to be eligible.

Impulsion subsidies are not automatically awarded to all eligible individuals. Jobseekers (or their potential future employers) can verify eligibility for the subsidy using an online application to the Walloon PES. The employer must then draft an appendix to the employment contract, mentioning the type of Impulsion subsidy requested (–25 or 12+). Finally, based on this appendix and a completed personal data form, jobseekers must request approval from the federal Public Unemployment Agency (PUA), which is usually in charge of the unemployment insurance (UI) system. The subsidy—called the "work allowance"—is paid directly by the PUA to the beneficiary worker, and the employer can deduct the subsidy amount directly from the net wage. The work allowance can be cumulated with the pre-existing structural reduction of employers' SSC, which thus far remained a competence of the federal government. The deduction amounts to €133 per month, increased by a supplement for low wages.

To evaluate the effect of the Impulsion –25 subsidy, we exploit the discontinuity in the subsidy eligibility criterion that the Impulsion plan induces at age 25 for youths who have never drawn a subsidy. For high school dropouts, only 1 day of registration as a jobseeker is required to be eligible if they are below the age of 25, whereas they must wait for 12 months if they have just celebrated their 25th birthday and have not yet received the subsidy. For high school graduates, the difference is smaller—6 versus 12 months—but still significant. We therefore expect a discontinuity in the take-up of Impulsion subsidies at the age threshold of 25 because access is much easier to the left of this cutoff than to the right.

At the federal level, there is another policy that uses the same cutoff of 25 years. Young labor market entrants are eligible for non-means-tested UI—the so-called *activation allowance*—after a one-year waiting period, which usually starts at first registration as a jobseeker at the regional PES.[9] Only youths aged below 25 years at the time of their first claim can benefit from the allowance. Thus, there is a concern that the measured impacts of Impulsion –25 could be confused with the effects of this UI

[6] Some public companies and local administrations are also eligible if they hire contract workers.

[7] In the case of part-time work, the amount is adjusted proportionally.

[8] The counter is not set to zero if the jobseeker has worked fewer than 31 days over the last six months.

[9] This scheme aims to support young unemployed jobseekers who are not eligible for regular UI benefits because they have not contributed sufficiently. For more information, we refer the reader to Cockx et al. (2023).

scheme for youths. We do not think they are, however, since our analysis focuses on young jobseekers with at most a high school degree. Most of these register for the first time as jobseekers well before the age of 25 and are for that reason not at risk of losing their eligibility for the activation allowance because of being too old. We therefore believe that this is not a threat to our identification strategy.[10]

The Impulsion –25 subsidy was widely used right from the outset. Between July 2017 and September 2018, roughly 15,000 young people received the subsidy at least once, of which 40% were high school dropouts and 60% were high school graduates (FOREM, 2018). In the same period, 21,000 individuals benefited from the Impulsion 12+ subsidy also targeted at the long-term unemployed but without any education or age restriction. Among them, 6,000 were young adults under 30 years of age. Since its beginning in 2017, the Wallonia government has spent, on average, €48 million each year to finance the Impulsion –25 subsidies that our study evaluates. This amount must be set against a labor force of about 1.5 million people.[11]

3. Data

The empirical analysis is based on individual administrative data provided by the Walloon PES. The dataset contains information on the unemployment spells of young high school dropouts and graduates entering registered unemployment between July 2015 and June 2019.[12] Each spell is defined by the month of entry into unemployment and a few individual characteristics: month and year of birth, month and year of first registration at the PES, and socio-demographic variables measured at entry into unemployment (gender, nationality, type of secondary education, number of months spent in registered unemployment, unemployment rate by district of residence). The dataset also provides monthly information on the labor market status and the granting of an Impulsion subsidy from the start of the unemployment spell until December 2021.

In the evaluation sample, we select unemployment spells that started in the first two years of the Impulsion plan, i.e., between July 2017 and June 2019. This selection allows us to analyze employment outcomes up to 30 months after entry into unemployment for the whole sample. This corresponds to a slightly shorter time horizon than the maximum duration of the subsidy (36 months). Moreover, we only retain in the sample unemployment spells related to individuals who have never received Impulsion subsidies. By doing so, we ensure that all individuals aged 25 or over at entry into unemployment are not eligible for the Impulsion –25 subsidy (see Section 2). After restricting the population to those aged 21 to 28 years at entry into unemployment (see Section 4 for details about the empirical strategy), the sample is composed of 55,136 spells of young adults with at most a high school degree.

Note that the data are not informative about whether a high school graduate satisfies the unemployment duration requirement (at least 6 months) to be eligible for a subsidy. This duration is not measured in months from the beginning of the spell but within the last 6 calendar months, with beneficiaries being allowed to have worked for a maximum of 31 days (consecutive or not). As a result, some high school graduates retained in the sample may be hired with a subsidy from the very

[10] In order to provide evidence in support of this claim, we checked that the estimated treatment effects are robust to the exclusion from the sample of individuals who register for the first time as unemployed jobseekers. Results are available upon request.

[11] Labor Force Survey (2022); see https://www.iweps.be/indicateur-statistique/structure-dactivite-de-population-wallonne/.

[12] We treat multiple spells for the same individual as independent.

beginning of their unemployment spell if they had worked the previous month and registered as an unemployed jobseeker in the five months prior.

We estimate the impact of the Impulsion –25 subsidy on two employment outcomes: the cumulative transition rate to employment during the first year of unemployment and the number of accumulated months in employment up to 30 months after entry into unemployment. More specifically, the first outcome is defined as the share of entrants who find at least one job within 12 months of the spell's starting date. We ignore transitions to very short employment spells that start and end within the same month because a transition is counted only to the extent that the person is still employed at the end of the month. According to the same definition of employment, the second outcome tracks the number of months a person has been registered in employment within a period of two and a half years following entry into unemployment.

As shown in Panel (A) of Table 1, among youths aged between 21 and 24, 29% of high school dropouts received an Impulsion –25 subsidy within one year of entry into unemployment. Take-up of the subsidy drops to 18% for high school graduates. Take-up rates below 100% reflect the conditions required to access the subsidy: the person must (i) find a job, (ii) apply for the subsidy and receive their employer's consent and approval by the PUA, and for high school graduates only, (iii) satisfy the unemployment duration criterion of 6 months. A lower take-up rate for youths with a high school degree is expected given that they must fulfil the additional condition (iii). Among the eligible age group (21–24), 71% of high school graduates found a job within one year of unemployment, compared to only 57% of dropouts. Similarly, graduates worked 14.7 months, on average, over the 2.5 years after entry into unemployment, while dropouts worked only 10 months, on average. For both levels of education, this outcome is higher among the subpopulation of recipients of the subsidy than in the overall population. This does not demonstrate the effectiveness of the subsidy, however, since benefiting from a subsidy has the effect of automatically being associated with an employment spell.

Table 1. Descriptive statistics on outcomes

	(A) 21 – 24		(B) 25 – 28
	All	Impulsion –25	All
	(1)	(2)	(3)
High school dropouts			
Take-up of Impulsion within 1 year	0.29	1	0.11
	(0.45)	(0.00)	(0.32)
Employment in any month within 1 year	0.57	0.93	0.66
	(0.49)	(0.25)	(0.47)
Total months in employment within 30 months	10	15.80	12
	(9.9)	(9.0)	(10.5)
N	8,115	2,310	7,302
High school graduates			
Take-up of Impulsion within 1 year	0.18	1	0.08
	(0.39)	(0.00)	(0.27)
Employment in any month within 1 year	0.71	0.93	0.73
	(0.45)	(0.26)	(0.44)
Total months in employment within 30 months	14.7	17.50	15.2
	(10.7)	(8.7)	(10.7)
N	25,893	4,722	13,826

Note: Mean and standard deviation (in brackets) of the outcome variables. Descriptive statistics are computed by education level and for different groups. Panel (A) concerns youths aged between 21 and 24 at unemployment entry: column (1) refers to all of these, and column (2) to only those that benefited from an Impulsion –25 subsidy within one year of unemployment. Panel (B) concern all youths aged between 25 and 28 at unemployment entry. For group (2), the variable employment in any month within one year of entry into unemployment is not equal to 1 because a transition is counted only if the youth is still employed at the end of the month.

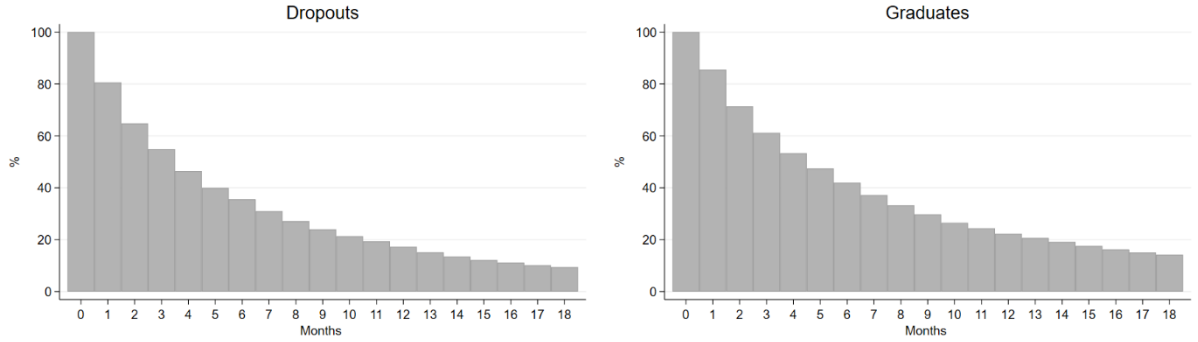
Table A1 in Appendix A reports descriptive statistics for the whole group of youths aged 21–24 and for those who benefited from an Impulsion –25 subsidy. There is not much difference between the two groups, except that actual recipients of the subsidy have more often experienced a first-ever registration as a jobseeker.

Panel B of Table 1 shows that subsidy take-up is, as expected, much lower for youths aged 25–28 than for their younger counterparts. This difference in take-up reflects the easier access to Impulsion –25 compared to Impulsion 12+ subsidies. Both employment outcomes are higher among the oldest age group for the two levels of education. However, the difference in means for those two age groups cannot be interpreted as causal, given the direct effect of age on the job-finding rate.

Before turning to the empirical strategy, it is useful to examine the duration of actual subsidy receipt. For this purpose, we calculate the proportion of youths who, after a first transition to a subsidized job, continue to benefit from the Impulsion –25 subsidy each month, continuously, up to 18 months after the first month of receipt. We focus on high school graduates and dropouts aged 21 to 24 who benefited at least once from the scheme within one year of unemployment. In Figure 1, month 0 represents the month of the first transition to subsidized employment and is by construction equal to 100%. Then, for each subsequent month we calculate the proportion of youths who still receive the

subsidy and have done so each month until then.[13] Figure 1 indicates that the subsidy tends to be used for relatively short periods. The probability of continuing to receive the subsidy decreases over time for both education-level groups and more rapidly for high school dropouts. Nearly half of high school dropouts and graduates who benefited from the subsidy are no longer in subsidized employment 4 months later. After 18 months, only 9.5% of high school dropouts and 14.2% of high school graduates received the Impulsion –25 subsidy on an uninterrupted basis.

Figure 1. Duration in subsidized employment



Note: Analyses based on individuals entering registered unemployment between July 2017 and June 2019 at the age of 21 to 24 who had never benefited from an Impulsion subsidy in the past but who benefited from an Impulsion –25 subsidy at least once within one year of entry into unemployment.

4. Empirical strategy

The main objective of the Impulsion –25 hiring subsidy is to enhance the transition from unemployment to employment among the eligible population of low-educated youths aged below 25 years. In the empirical analysis, we therefore aim to identify the causal impact of the subsidy on employment outcomes for this target population and estimate intention-to-treat (ITT) effects. To this aim, we exploit the age eligibility condition for Impulsion –25 in a regression discontinuity design.[14] Identification is based on the discontinuity in the treatment probability occurring at 25 years. As soon as they reach this age threshold, young jobseekers are eligible for the less readily available Impulsion 12+ subsidy, which requires an unemployment duration of at least 12 months. This means that the counterfactual we estimate is not the absence of eligibility but, rather, eligibility for less accessible hiring subsidies.

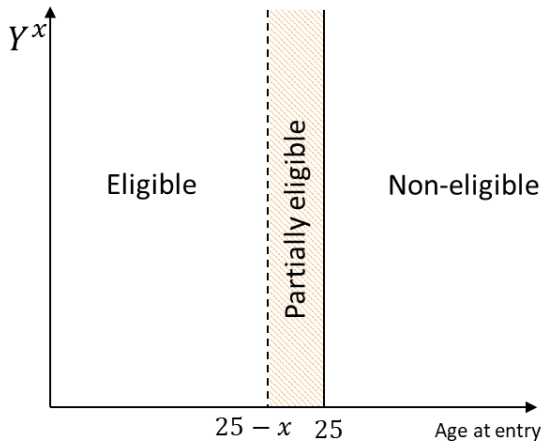
The forcing variable is the age of the individual at entry into registered unemployment, measured in months. However, we cannot implement a standard RDD based on this forcing variable because the age requirement for Impulsion –25 subsidies is not determined at unemployment registration but at the first claim of the subsidy (i.e., just before being hired for the first time with an Impulsion –25 subsidy). Young unemployment entrants aged slightly below 25 years of age will therefore lose their eligibility for this subsidy shortly after they register as jobseekers. Standard RDD is therefore not appropriate because eligibility is only partial for young entrants who turn 25 in the time window of the outcome variables, for instance, the job-finding rate within one year of unemployment entry. In the canonical RDD graph depicted in Figure 2, these partially eligible individuals are located just to the left

[13] Even if youths benefit from the subsidy every month, the subsidy can be interrupted by very short periods of unemployment (or even unsubsidized employment) and be linked to different working contracts with different employers.

[14] Owing to data limitations (see Section 3), in the analysis we cannot exploit the eligibility thresholds for unemployment duration that apply to high school graduates below the age of 25 (6 months) and to youths aged 25 or over (12 months).

of the age cutoff of 25. Their probability of benefitting from the subsidy within x months after unemployment gradually decreases from age $25-x$ to 25 (not included).[15]

Figure 2. The eligibility rule for Impulsion –25 subsidies, with age measured at unemployment entry



To address this issue, we follow Albanese et al. (2024) and apply a "donut hole" RDD, wherein observations of partially eligible individuals are excluded from the RDD model estimation (see also Gerard and Gonzaga, 2021).[16] Since the transition rate to employment is measured during the first year of unemployment, we drop observations of youths aged between 24 and 25, creating a one-sided "donut hole" of 12 months to the left of the age threshold of 25. In a sensitivity analysis in which transition rates are measured for periods shorter than one year, we decrease the size of the donut hole from 12 to 1 month, depending on the time window considered. For the outcome measuring the number of accumulated months in employment up to 2.5 years after unemployment entry, the donut size is set at a maximum of 12 months. A larger size would threaten the comparability of observations on each side of the hole—the central hypothesis of our identification strategy. For this long-run outcome, the treatment is therefore eligibility for the Impulsion –25 subsidy for at least one year.

In the estimated model, the outcomes of the partially eligible units are linearly predicted using the observations to the left of the one-sided donut hole. The prediction at the left-hand side of the age cutoff is then used to identify the ITT effect of the Impulsion –25 subsidy. In the bandwidth on both sides of the cutoff value of 25, outcomes are assumed to vary linearly with age. Formally, the one-sided donut RDD consists in estimating the following linear regression:

$$y_i^x = \alpha^x + \delta^x \cdot 1(age_i < 25) + \beta_1^x \cdot (age_i - 25) \cdot 1(age_i < 25)$$
$$+\beta_2^x \cdot (age_i - 25) \cdot 1(age_i \geq 25) + \gamma^x \cdot C_i + \varepsilon_i^x$$

$for\ age_i < 25 - \min_x(x, 12)\ \ or\ \ age_i \geq 25$, where

[15] For example, if the outcome is measured within 3 months of unemployment entry, individuals reaching the age of 25 within 3 months of entry are partially eligible. The partially eligible individuals are those aged between age 25 minus 3 months and age 25 at entry into unemployment.

[16] The donut hole RDD is a common approach used in the literature to test for manipulation of the running variable around the threshold (Cattaneo et al., 2019). In that context, a donut hole is required at both sides of the discontinuity and not only on the left-hand side, as in our case.

y_i^x is the outcome for individual (spell) i measured within x months of entry into unemployment;[17]

α^x is the constant for outcomes measured within x months of entry;

$1(.)$ is an indicator variable equal to 1 if the condition is true and 0 otherwise;

age_i is the age of individual i at the month of entry into unemployment, i.e., the forcing variable;

$\beta_1^x \cdot (age_i - 25) \cdot 1(age_i < 25)$ is the linear relationship between the age and the outcome to the left of the cutoff;

$\beta_2^x \cdot (age_i - 25) \cdot 1(age_i \geq 25)$ is the linear relationship between the age and the outcome to the right of the cutoff;

δ^x is the intention-to-treat effect at the cutoff within x months of entry;

C_i are the control variables mentioned in Section 3 and detailed in Table A1, which are included to increase the precision of the estimates but are removed in a sensitivity analysis (see Section 6);

ε_i^x is the idiosyncratic error term (with zero conditional mean).

Because of the donut hole, the bandwidth size cannot be determined using data-driven selectors. We therefore choose to set the bandwidth at three years on each side of the donut hole. In Section 6, we test the sensitivity of the results to wider or narrower bandwidths. We estimate the model using triangular kernels that assign a greater weight to observations closer to the donut hole. Finally, following Lee and Card (2008) we cluster the standard errors by age in months to account for the grouped nature of the forcing variable. This results in 72 clusters for the benchmark analysis.

5. Results

In this section, we report and discuss the empirical findings of our analysis. We first provide evidence of a discontinuity in the treatment intensity at the age of 25. Second, we present the impact of the Impulsion –25 subsidies on short-run transitions to employment and on cumulative employment within up to 30 months of entry into unemployment. Finally, we investigate whether the subsidies displace the hiring of eligible youths from temporary work agencies to the user firms. The results are presented graphically for high school dropouts and graduates separately. Some additional graphs are available in Appendix B. The main econometric estimates and associated statistics underlying these graphs are reported in different tables in Appendix C.

5.1 SUBSIDY RECEIPT

Panel (a) of Figure 3 below illustrates the donut RDD for the take-up of either type of Impulsion subsidy.[18] The take-up rate corresponds to the fraction of unemployment entrants benefiting from a subsidy within one year of entry. Each circle indicates the average take-up in a six-month age interval.[19] The donut excludes the empty circles reporting take-up rates for youths aged between 24 and 25 at entry into unemployment. These have to be withdrawn from the estimation sample because these

[17] If there are multiple spells for a given individual, they are supposed to be independent. In the sample, only 21% of the individuals experienced more than one spell, and 5% had more than two. In the text, an individual must be understood as a particular spell of unemployment.

[18] Recall that two types of subsidies are available: Impulsion –25 for youths aged younger than 25 and Impulsion 12+ for the long-term unemployed without age restriction.

[19] The six-month age range was chosen for visualization purposes. A narrower age range would make graphical evidence too noisy. Estimations are made on all observations, not on means.

youths are only eligible for the Impulsion –25 subsidy during a part of the year, i.e., until they turn 25. The predicted take-up rates around the age of 25 are based on the estimated linear splines to the left and the right of age 25. For high school dropouts, the take-up at the left of the age discontinuity at 25 is 31.8%, while it is only 12.0% to the right of this discontinuity. The ITT estimate on subsidy receipt at the threshold is therefore 19.8 pp and is highly significant. This confirms that unemployed high school dropouts have greater access to the Impulsion subsidies if they are slightly younger than 25, relative to slightly older ones. As mentioned in Section 3, only 1 day of registered unemployment is required for the former, while the latter group cannot apply for the subsidy if they have been in registered unemployment for fewer than 12 months. As expected, the ITT estimate is smaller for the high school graduates since below the age of 25 this requirement drops to 6 months (and not to one day). We estimate their take-up to be 17.8% at the left-hand side of the age cutoff and 8.1% at the right-hand side of this cutoff, for a difference of 9.3 pp. This is about half of the ITT estimate for dropouts but is still highly statistically significant.

Take-up rates for the subsidies are affected by the hiring opportunities available for low-educated youths. A more direct way to represent the discontinuity in the treatment probability at age 25 is to estimate the attention rate, which is the share of workers hired with a subsidy among all first transitions to employment in the year following unemployment entry. According to Panel (b) of Figure 3, the attention rate is estimated to be 48.6% at the left and 19.2% at the right of the age cutoff for high school dropouts, the ITT estimate being 29.4 pp. It is worth noting that the attention rate below age 25 is not 100% for this group, even though they do not have to meet a minimum unemployment duration criterion. This suggests that some young people, or their employers, do not comply with the administrative formalities or are simply not aware of the hiring subsidy. For high school graduates, the respective estimates of the attention rate are 23.7% and 10.8% to the left and right of the age cutoff, the ITT effect being estimated at 12.9 pp. For this group, however, like the take-up, the attention rate is also affected by the 6-months of unemployment criterion.

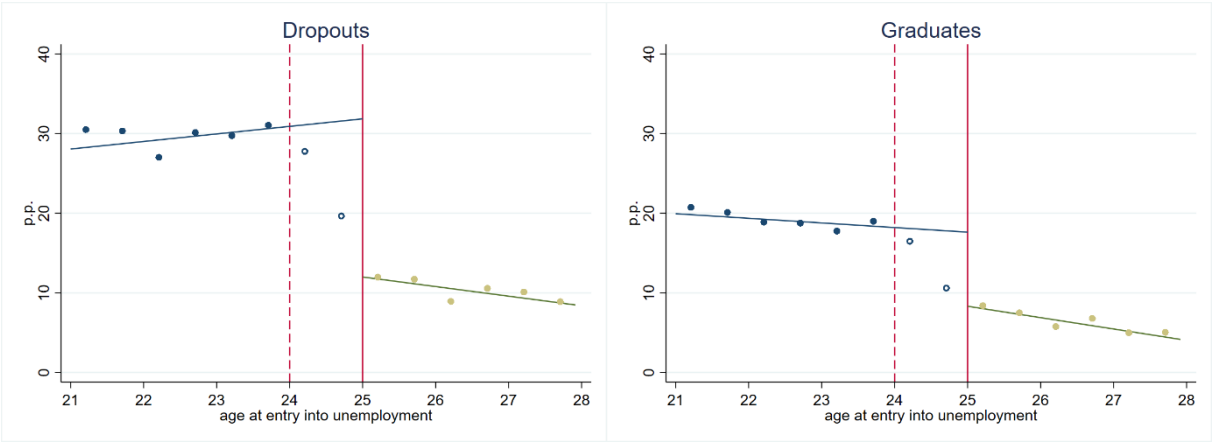
A final way to look at the discontinuity in the treatment assignment is to report the average subsidy amount conditional on hiring. This indicator is just the exogenously fixed subsidy (€500 per month in full-time equivalent) multiplied by the attention rate. It gives an indication of the discontinuity in the treatment intensity at the cutoff age of 25. As shown in panel (c) of Figure 3, the subsidy amount conditional on hiring to the left and right of the cutoff is on average €242 and €95, respectively, for high school dropouts, while it is 118€ and 55€, respectively, for high school graduates. The differential expected monthly subsidy at age 25 is therefore estimated to be €147 per month for dropouts and €63 per month for graduates, both of which are highly significant. Our data does not provide information on wage costs, so we cannot estimate the proportional reduction in the cost of labor caused by the subsidy at the 25 cutoff. As an approximation, we compare the differential expected monthly subsidy at age 25 to the average monthly labor cost for young workers without and with a high school diploma. According to Statbel data, this amounts to, respectively, €2,140 and €2,318.[20] Recruiting low-educated jobseekers below the age of 25 is therefore associated with an approximate proportional decrease of wage costs of 6.9%, on average, for those who had not completed high school, and 2.7%, on average, for high school graduates. These figures suggest that the increase in the employment transition rate

[20] According to Statbel, in 2017 the average monthly gross wage of a full-time worker without a high school diploma was €1,876, and for a full-time worker with a high school diploma, it was €2,004. These data are available upon request to Statbel. Considering the employer social security contribution rules at that time, we estimate the monthly wage costs for a full-time high school dropout and a high school graduate to be €2,140 and €2,318, respectively. Details of the calculations are available upon request.

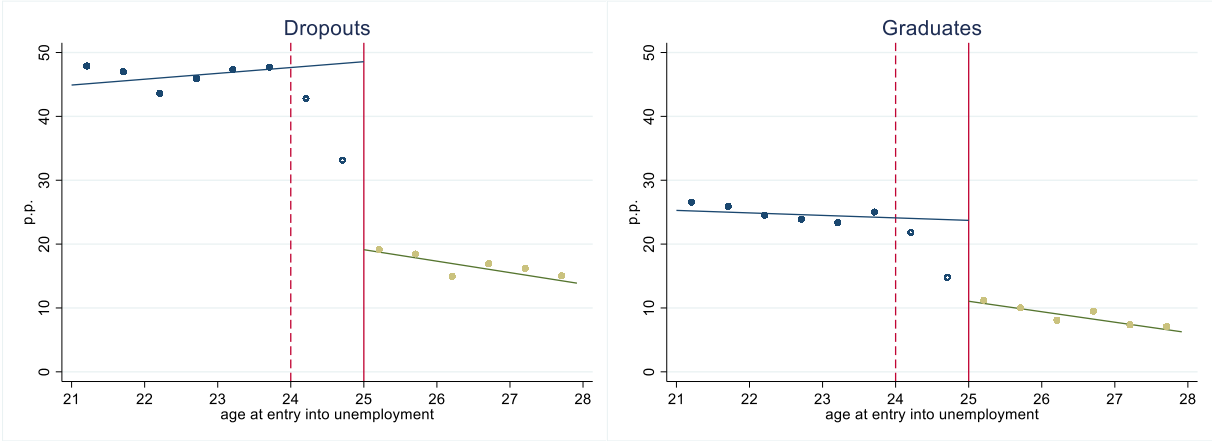
at the cutoff due to the reduced cost of hiring low-educated youths may not be large. The employment elasticity reported in studies evaluating the impact of hiring subsidies on the re-employment probabilities of disadvantaged jobseekers ranges from –0.2 to –2.5 (Albanese et al., 2024, p. 8). The proportional increase in the hiring rate for dropouts is therefore expected to range from 1.4% to 17.25%, and from 0.5% to 6.75% for graduates.

Figure 3. Discontinuity at age 25 in subsidy receipt within one year of entry into unemployment

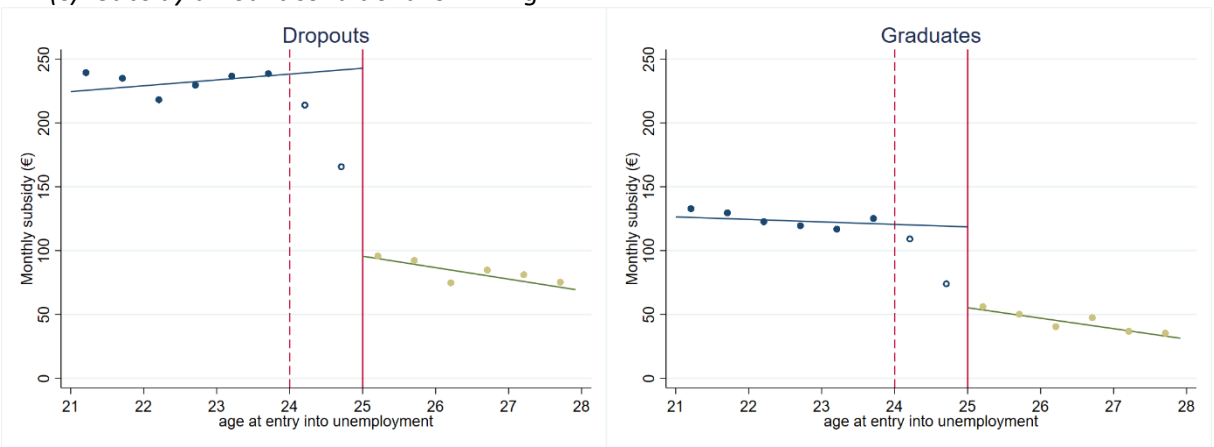
(a) Subsidy take-up



(b) Attention rate



(c) Subsidy amount conditional on hiring



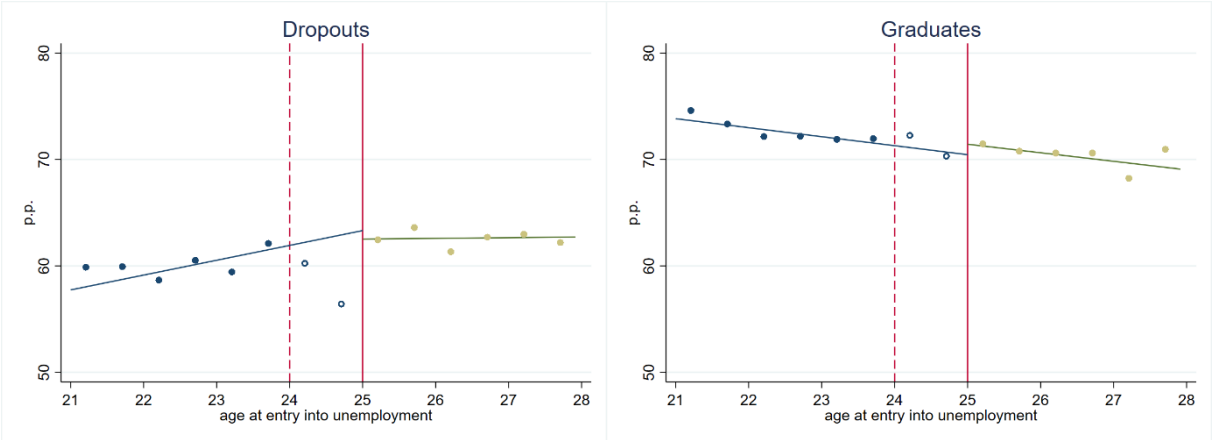
Note: The graphs depict the one-sided donut RDD estimates on the sample of youths entering unemployment between July 2017 and June 2019 without having ever received an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff age is 25. The bandwidth is set to 3 years on each side of the donut hole. The outcomes, measured within one year after unemployment entry, are (a) the subsidy take-up rate; (b) the attention rate, i.e., the share of subsidized

hires among all hires; and (c) the amount of subsidy received (in full-time equivalent), conditional on hiring. Mean values of outcomes are plotted over a six-month age interval. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level. For high school dropouts (graduates), the estimated ITT effects at 25 are the following: for (a), 19.8 (9.7) pp with a p-value of 0.000; for (b), 29.4 (13.7) pp with a p-value of 0.000; for (c), 147 (63) euros with a p-value of 0.000. For (a), N= 15,417 (39,719); for (b) and (c), N= 9,227 (27,952).

5.2 SHORT-RUN TRANSITIONS TO EMPLOYMENT

In this section, we check whether the discontinuity in subsidy receipt at age 25 translates into a corresponding discontinuity in the transition rate to employment within one year of unemployment entry. Figure 4 shows that there is no significant difference in the donut RDD estimates of the hiring rates around the age cutoff for the two education groups (see also Table C1 in Appendix C). For high school dropouts, the job-finding rate is observed to increase slightly with age, and more clearly on the left-hand side of the age threshold. From age 25 to a slightly younger age, this rate improves marginally from 62.6% to 63.1%. As a result, the estimated ITT effect is +0.5 pp, a proportional increase of 0.8% relative to the counterfactual hiring rate (=0.5/62.6). This increase is not statistically significant. Nevertheless, if we relate this percentage change to the approximate proportional decrease in labor costs induced by the Impulsion –25 subsidy (–6.9%), the corresponding employment elasticity (0.1) is very close to 0. Comparing with other studies, this estimate is at the very low end of the spectrum (see Section 5.1). For jobseekers with a high school diploma, the transition rate to employment is 10 pp higher overall compared to that of dropouts and decreases slightly with age. However, just like dropouts, there is no discontinuity in the probability of finding a job around age 25 for HS graduates. This probability is estimated to be 71.3% at 25 and drops to 70.5% just below this age. Unexpectedly, the ITT effect is negative (–0.8 pp) but not statistically different from 0 (p-value=0.414).

Figure 4. Discontinuity at age 25 in the transition rate to employment within 12 months of entry into unemployment



Note: The graphs depict the one-sided donut RDD estimates on the sample of youths entering unemployment between July 2017 and June 2019 without having ever received an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff age is 25. The bandwidth is set to 3 years on each side of the donut hole. The outcome is the cumulative transition rate to employment within one year of unemployment entry. Mean values of the outcome are plotted over a six-month age interval. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level. For high-school dropouts (graduates), the estimated ITT effect at 25 is 0.5 pp (–0.8 pp) with a p-value of 0.844 (0.414); N= 15,417 (39,719).

Based on these results, we can calculate the local average treatment effect (LATE), which measures the effect of the Impulsion –25 subsidy on the job-finding rate for the subpopulation of *actual recipients* of this subsidy (Albanese et al., 2023). In the standard RDD literature, a Wald estimator is used to estimate the LATE: the ITT on the transition rate to employment divided by the ITT on the

subsidy take-up. For HS dropouts, the ITT estimate at the threshold is 19.8 pp for take-up and 0.5 pp for the transition rate to employment. The Wald estimate of the LATE is therefore 2.2 pp (=0.5/19.8). This means that only 2.2% of jobseekers who are hired with an Impulsion –25 subsidy would not have been recruited in the absence of this specific scheme. Symmetrically, this means that 97.8% of actual recipients of the subsidy would have found a job even without the subsidy. This is the so-called "deadweight loss" of the subsidy. Given the insignificant value of the ITT effect on employment transitions, we cannot reject that the Impulsion –25 subsidy creates a full deadweight loss for dropouts, as is the case for graduates, for which the estimate of this ITT effect is negative but not statistically different from 0.

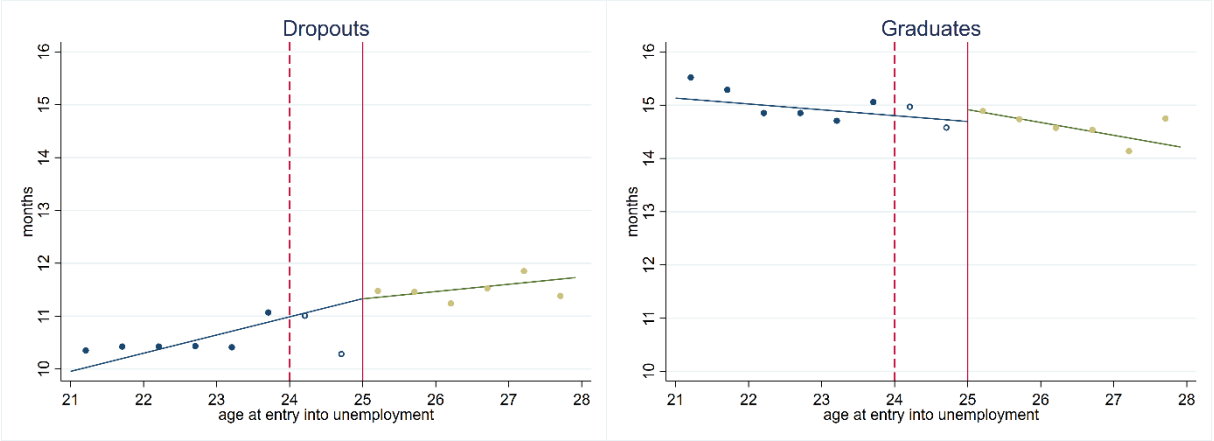
In Figure B1 in Appendix B, we report the evolution of the donut RDD estimates on the transition rate to employment from 1 to 12 months after entry into unemployment (see also Table C1 of Appendix C). The results confirm the absence of any significant effect of the Impulsion –25 subsidy on short-run transitions to employment. The evolution of the point estimates is quite erratic for dropouts, alternating between negative and positive values. This may be related to a much smaller sample size for this group as compared to high school graduates.

5.3 CUMULATIVE EMPLOYMENT IN THE LONGER RUN

In the previous section, we provided evidence that employers collected the Impulsion –25 subsidies but hired the same individuals they would have recruited if this subsidy had not been in place. Despite this lack of impact on the recruitment process of low-educated jobseekers, the long subsidy duration (up to 3 years) may have incentivized employers to retain the subsidy recipients for longer periods than in the absence of subsidy. In that case, we expect a longer working experience, on average, for jobseekers slightly younger than 25 relative to slightly older ones, the subsidy take-up being much higher for the former. From Figure 1 in Section 3, however, we already know that most recipients do not complete their period of eligibility for subsidies.

Figure 5 shows the donut RDD estimate on the number of months in employment within a period of 30 months from entry into unemployment, by educational attainment. We see that there is no discontinuity in this outcome around the cutoff age of 25 for either high school dropouts or for graduates. This means that the higher subsidy take-up to the left of the cutoff did not affect the time spent in employment within 2.5 years of unemployment entry. In the counterfactual of less-accessible hiring subsidies, high school dropouts (graduates) spent 11.5 (15.0) months in employment, on average, and these numbers are not significantly altered for youths below the age of 25. Figure B2 in Appendix B shows that regardless of the time horizon considered, the donut RDD estimates are very close to zero and never statistically significant. Regression results are available in Table C2 of Appendix C at some selected time windows, including 30 months.

Figure 5. Discontinuity at age 25 in the number of months in employment within 30 months of entry into unemployment



Note: The graphs depict one-sided donut RDD estimates on the sample of youths entering unemployment between July 2017 and June 2019 without having ever received an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff age is 25. The bandwidth is set to 3 years on each side of the donut hole. The outcome is the number of months a person has been registered in employment within a period of 30 months after unemployment entry. Mean values of the outcome are plotted over a six-month age interval. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level. For high school dropouts (graduates), the estimated ITT effect at 25 is 0.0 pp (–0.2 pp) with a p-value of 0.992 (0.560); N= 15,417 (39,719).

In order to verify that the absence of positive employment effects extends over an even longer period, we restrict the sample to low-educated youths entering unemployment between July 2017 and June 2018. This allows us to measure the number of months in employment up to 42 months after entry into unemployment. Since the size of the sample is drastically reduced, these long-term effects are estimated with great imprecision. Nevertheless, the point estimates barely differ from the benchmark estimates (see Figure B3 in Appendix B).

5.4 DISCUSSION

From our results, we cannot reject that the more accessible Impulsion –25 subsidies have no direct effect on job finding and time spent in employment for low-educated young jobseekers. Even though this policy does not induce a major decline in expected wage costs at hiring, the elasticity of the hiring probability to a change in labor costs is estimated to be only –0.1 for high school dropouts and even slightly (but not significantly) positive for high school graduates. Based on the insights of the literature review, we try to determine key factors in the policy design and context that are driving such ineffectiveness in the scheme.

First, it is now well established in the literature on hiring subsidies that sensible targeting is crucial to limit deadweight losses (see, for example, Brown, 2015; Cahuc et al., 2019; Sjögren and Vikström, 2015). At first sight, it seems that the Impulsion –25 plan targets those who most need help, that is, young unemployed people who lack post-secondary education. Nonetheless, even within this group there may be some heterogeneity in the way workers integrate into the labor market, due to different types of personal skills or education. For instance, young people who were previously enrolled in vocational or technical programs in high school may more easily find a job even when they did not graduate, compared to general-track high school graduates who did not go on to college or university (Forem, 2022; OECD, 2023). For high school dropouts, the Impulsion –25 subsidy can be granted as of the first day of registration as a jobseeker. The absence of any unemployment duration criterion implies that subsidies will be disbursed for the recruitment of jobseekers who would have been employed regardless of the subsidy, amplifying a potential deadweight loss problem. It is worth noting,

however, that a 6-month duration criterion applies to high school graduates, for whom the Impulsion –25 subsidies also do not impact job finding. This factor therefore cannot be the main cause behind the ineffectiveness of the scheme.

The second factor is the economic context, and in particular, the tightness of the labor market (the vacancies-to-unemployment ratio). We evaluate the effectiveness of the Impulsion plan for the first beneficiaries of the subsidies flowing into unemployment in 2017 and 2018 and making a first transition to employment in the three years preceding the pandemic. These years were characterized by relatively strong economic growth and increasing employment. A number of indicators suggest that labor demand was fairly buoyant in the Walloon job market in that period. Annual growth in domestic employment oscillated between 1.2% and 1.7%, and the unemployment rate was on the decline, falling by 2.4 percentage points in 3 years (from 9.6% to 7.2% between 2017 and 2020). The labor market was tight, as attested by the low number of unemployed per vacancy. While this number fluctuated between 9 and 11 in the 2014–2015 period, it was estimated to be 4.6 in the third quarter of 2017 and only 3.9 in the second quarter of 2019 (the period corresponding to our evaluation sample).[21] Job opportunities were thus relatively abundant. In such a context, financial support for hiring is likely to generate significant deadweight losses. This is because the expected cost of creating new job opportunities rises when the labor market is tight, and congestion externalities make the recruitment process difficult. This relationship has been highlighted theoretically in search and matching models (see Kline and Moretti, 2013 and Cahuc et al., 2019, for example). In Cahuc et al. (2019), the authors even conclude that the effectiveness of targeted hiring subsidies is magnified when they are limited to short periods of time in which unemployment is high (and when they are not destined to be permanent, unlike the Impulsion plan). Several empirical studies have confirmed the countercyclical nature of hiring subsidies, which are more effective during recessions or in the initial stages of recovery from recessions (Batut, 2021; Neumark, 2013; Neumark and Grijalva, 2013; Neumark and Grijalva, 2017; Pasquini et al., 2019; Sjögren and Vikström, 2015;).

In a very recent paper, Albanese et al. (2024) demonstrated the effectiveness of hiring subsidies for low-educated unemployed youth[22] in 2010 and 2011 in Belgium. At that time, the labor market had not yet recovered from the 2008 financial crisis and firm recruitment decisions were still subject to considerable uncertainty. In that context, the authors show that the subsidies increased job-finding in the private sector for the target group by 10 percentage points within one year of unemployment. Given its short-term nature, the 2010–2011 scheme was more generous, at double the amount granted by the Impulsion program. However, we believe that this is not the main reason for the difference in impact found between our study and theirs, because we find a zero effect for a smaller but nonetheless significant reduction in the wage cost of hiring. The labor market situation and the temporality of the schemes under study are, in our opinion, the main causes of this difference. The 2010–2011 scheme was limited to two calendar years, during which the degree of labor market tightness was much lower. These are precisely two necessary conditions for hiring subsidies to be cost-effective, according to Cahuc et al. (2019). Interestingly, another finding of Albanese et al. (2024) confirms the role of tightness in shaping the effectiveness of hiring subsidies. They find that the effect of the policy was not homogeneous across space. More precisely, the subsidy resulted in a complete deadweight loss in the Belgian area near the border with Luxembourg. In this area, a very high share of workers cross the border every day because of the very attractive employment opportunities in the

[21] This ratio is calculated with figures from the Labor Force Survey (LFS) and the Job Vacancy Survey.

[22] High school dropouts (graduates) became eligible after 3 (6) months of registration as jobseekers within the last 4 (9) calendar months.

economic hub of Luxembourg. This leads to a tighter labor market near the border, precisely where the hiring subsidies failed to stimulate job creation.

5.5 SIDE-EFFECT ON THE RECRUITMENT PROCESS

In recent years, there have been discussions in the Walloon government about the design of the Impulsion plan, which has been regularly criticized for the windfall effects it generates for companies. These criticisms are based on feedback from the field, and not on impact evaluations such as the one undertaken in our study. In particular, the government was looking for a way to eliminate a "pure" windfall effect that was supposed to be induced by temporary work agencies ("temp agencies"). A temp agency is a recruiting firm that acts as an intermediary between candidates looking for a new job and companies needing temporary workers. The agency does not fill a vacancy for its own internal needs but on behalf of its client company, also known as the "user company". The recruited worker (called the "interim" or "temp" worker) signs an employment contract with the agency specifying, among other things, the wage rate, while the agency concludes a commercial contract with the user company that needs the temp worker. If the worker is eligible for a subsidy, it is the temp agency that takes the money off the worker's wage as a profit, unless it re-negotiates the commercial contract with the user firm. Consequently, when commercial contracts are not adjusted, hiring subsidies do not incentivize user firms to create new jobs and may involve deadweight losses.

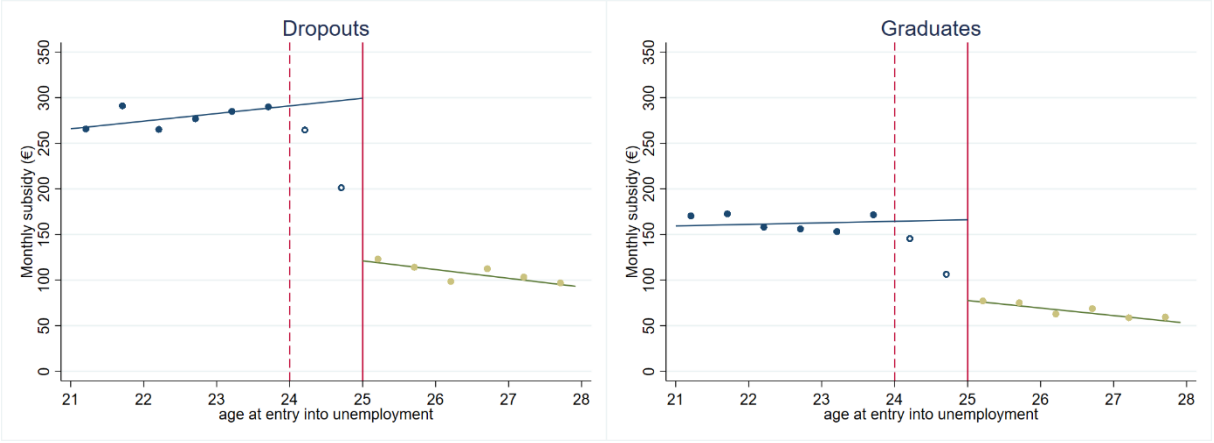
In Belgium, temporary work agencies are an important recruitment channel for young jobseekers. In our evaluation sample, almost half of young people make their first transition to employment with the intermediation of a temporary work agency within a year of becoming unemployed. The presence of these agencies could therefore reduce the effect of the Impulsion –25 subsidies on job finding. To get more insight into this question, we study whether the hiring subsidy increases the transition rate to jobs found without the intermediation of such agencies and whether it has no effect on transition probabilities to temp jobs.

Our dataset allows us to know whether a jobseeker is employed directly by a company or via a contract with a temp agency. As a first stage, in Figure 6 we report the subsidy amount conditional on hiring through a temp agency (the equivalent of panel (c) in Figure 3). On average, across all ages this amount is higher than for all hires. This does not reflect a higher take-up of the subsidies among temp agencies but, rather, a higher attention rate, as illustrated by panels (a) and (b) of Figure B4 in Appendix B. It therefore appears that temporary work agencies make greater use of Impulsion subsidies when recruiting eligible jobseekers. This fact has already been highlighted in the work of Cockx and Desiere (2022) and Bermudez et al. (2024), which evaluated the impact of hiring subsidies in the Dutch-speaking region of northern Belgium. According to these authors, temp agencies, being specialized in recruiting workers, are much better informed about the financial support instruments available for hiring and the required administrative tasks to ensure subsidy payments. They are therefore more likely to make use of them, particularly since they collect the subsidies directly. In a study that examined the take-up behavior of hiring subsidies for the long-term unemployed and migrants in Sweden, Behrenz and Månsson (2021) confirmed that informational frictions are the main deterrent to using subsidies to which workers are entitled.

According to Figure 6, there is also a more pronounced decrease in the expected subsidy amount at the age of 25 when focusing exclusively on recruitment by temp agencies: €178 per month (rather than €147 for all hires) for high school dropouts and €88 per month (rather than €63 for all hires) for high school graduates. This is due to a larger difference in the attention rate for Impulsion subsidies at the 25-years threshold for hires in temp agencies as compared to all hires. We could therefore expect

higher ITT effects on job finding in temp agencies, unless the incentive effect is absent for them, as discussed above.

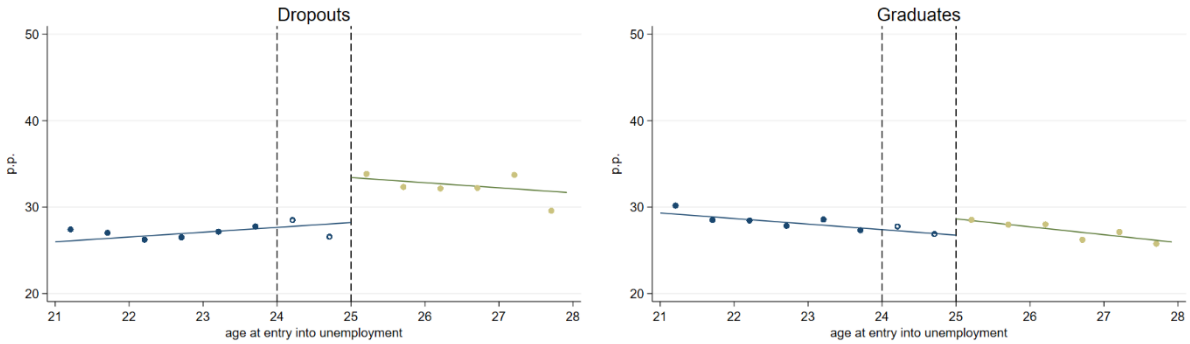
Figure 6. Discontinuity at age 25 in the subsidy amount conditional on hiring through a temporary work agency within one year of entry into unemployment



Note: The graphs depict one-sided donut RDD estimates on the sample of youths entering unemployment between July 2017 and June 2019 without having ever received an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff age is 25. The bandwidth is set to 3 years on each side of the donut hole. The outcome, measured within one year of unemployment entry, is the amount of received subsidy (in full-time equivalent) conditional on being hired by a temporary work agency. Mean values of outcomes are plotted over a six-month age interval. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level. For high school dropouts (graduates), the estimated ITT effect at 25 is €178 (€88) with a p-value of 0.000; N= 5,033 (12,527).

Figure 7 shows the donut RDD estimate on the probability of making a first transition to employment as a temp worker within one year after becoming unemployed. This estimate is equal to –5.2 pp (resp. –1.9 pp) for high school dropouts (resp. graduates) and represents a proportional decrease of 15.5% (resp. 6.6%) relative to the counterfactual. According to our expectations, the presence of Impulsion –25 subsidies had no positive effect on employment opportunities for young jobseekers with low and medium levels of education in temp agencies; it even slightly decreases job-finding in these work agencies for this population. These negative effects are highly significant for high school dropouts and are significant at the 5% level (p-value of 0.032) for high school graduates. The finding that the Impulsion –25 subsidy has a negative impact on the hiring rate to temp jobs is robust to variation in the observation window from 1 to 12 months after unemployment entry (Figure B5 in Appendix B). For graduates, this estimate is even statistically significant at the 5% level for most of the considered time windows. The sample being smaller for dropouts, estimates are less precise for this group but are statistically significant at the 5th month and after the 9th month. The main regression results are available in Table C3 of Appendix C.

Figure 7. Discontinuity at age 25 of the transition rate to a temp job within one year of entry into unemployment



Note: The graphs depict one-sided donut RDD estimates on the sample of youths entering unemployment between July 2017 and June 2019 without having ever received an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff age is 25. The bandwidth is set to 3 years on each side of the donut hole. The outcome, measured within one year of unemployment entry is the cumulative transition rate to a first job with the intermediation of a temporary work agency, i.e., a temp job. Mean values of outcomes are plotted over a six-month age interval. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level. For high school dropouts (graduates), the estimated ITT effect at 25 is –5.2 (–1.9) pp with a p-value of 0.002 (0.032); N= 15,417 (39,719).

Since the impact on the transition rate to all types of jobs is not significantly different from zero, this negative effect on the transition rate to temp jobs must be fully offset by a small positive effect on the transition rate to jobs found without the intermediation of a temporary work agency. Figure B6 in Appendix B displays the donut RDD estimates on the latter outcome, still considering the very first transition to employment after unemployment entry. One can see that the plot is the mirror image of that in Figure B5. The gain in job finding in all firms, except temporary work agencies, is completely offset by a corresponding decrease in the transition to temp jobs. This finding reveals a change in the way the hires of the targeted groups were made. The mechanism for granting the subsidy led some employers to directly hire the eligible jobseekers rather than hiring them through a temporary work agency, in order to benefit directly from the hiring subsidy and take full advantage of the reduction in wage costs. In any case, overall, the Impulsion –25 subsidy did not induce employers to create new job opportunities for low-educated youths.

6. Robustness analyses

In this section, we report the results of a series of tests carried out to check the validity of the (donut) RDD. We also assess whether our estimates are robust to using alternative definitions of the employment criterion. First, we test whether the 6 predetermined characteristics (reported in Table A1) are smooth around the cutoff age of 25. The estimates are shown in Table C4 in Appendix C. The absence of discontinuity cannot be rejected at the 5% level for most of the characteristics, suggesting that individuals are similar around the cutoff age. Only a few binary variables relating to the month of entry into unemployment show a significant jump at age 25. The months of May and August in the sample of high school dropouts are individually significant at the 5% level, even though the RDD estimates are low.

We then test the validity of the results by changing the model specification. First, we remove the control variables when computing the donut RDD estimates (see Figures B7 to B9 in Appendix B). Second, we test the sensitivity of the donut RDD estimates to wider or narrower bandwidths. The benchmark bandwidth being at three years on each side of the donut hole, we use two and four years

as alternative bandwidth sizes (see Figures B10 to B12 in Appendix B). Third, we let the spline on the right of the donut (instead on the left) predict the outcome inside the hole and estimate the ITT effect at age 24 (see Figures B13 to B15 in Appendix B). In all scenarios, the results are very close to the benchmark estimates. For HS dropouts, they are slightly different, but in all cases we cannot reject that the ITT effect of the subsidy is equal to 0.[23] The absence of any statistically significant effect of the Impulsion –25 subsidies on job-finding and on the number of months spent in employment is thus robust to different model specifications. The conclusion of a displacement of hirings at the expense of temp agencies is also robust.

We also implement some placebo tests for the statistically significant donut RDD estimates using false cutoff points for the forcing variable. We focus on the cumulative transition rate to employment in temp agencies for HS graduates because the donut RDD estimates are statistically significant for this particular outcome. We test two alternative false cutoffs: 26 and 27 years. As shown on Figure B16 in Appendix B, these placebo tests deliver nonsignificant estimates. This increases the reliability of the causal relationship we identify between the eligibility for the Impulsion –25 subsidy and the displacement away from temp agencies.

Finally, we test the variability of donut RDD estimates according to alternative definitions of a transition to employment. As a reminder, in our benchmark definition we consider only transitions to jobs that are still occupied at the end of the month. To test whether the Impulsion –25 subsidies affected the transition to short-lived jobs, we relax our definition of employment by looking at the share of individuals who transit to a job that lasts at least one day, regardless of their status at the end of the month. On the other hand, we also consider two stricter measures of job finding to test whether the hiring subsidies had any effect on the transition to more durable employment. The transition is counted only to the extent that (i) the individual is still employed at the end of the current month and of the next one and (ii) the individual is still employed at the end of the month and at the end of the next two months. In Figure B17 in Appendix B, we report the donut RDD estimates on cumulative transition rates for the benchmark definition and the three alternatives in months 1 to 12 after entry into unemployment. For both HS dropouts and graduates, the donut RDD estimates on alternative outcomes are close to the benchmark estimates and are never significantly different from zero. The absence of an impact of earlier access to the subsidy on transition to employment is thus robust to alternative measures of job finding.

7. Conclusion

Hiring subsidies are commonly used to enhance job opportunities for specific groups that are disadvantaged in the labor market. In Wallonia, the French-speaking region in the south of Belgium, jobseekers under the age of 25 with at most a high school diploma have been eligible for a hiring subsidy of 500€/month (for up to 3 years of employment) since July 2017. By temporarily reducing labor costs, the "Impulsion –25" plan aims to encourage employers to offer new employment opportunities to this target group, which is at risk of long-term unemployment. Apart from the age and schooling criteria, the eligibility requirements for this subsidy are fairly light. High school dropouts are eligible after just one day of registered unemployment, while high school graduates need to be registered as jobseekers for six months, but not necessarily continuously.

[23] The sole exception is the ITT effect on the transition rate to a temp job with a 4-year bandwidth, which is statistically significant at all time horizons, but the confidence intervals are large.

We evaluate whether this plan increases the transition to work of low-educated unemployed youths within one year of entering unemployment. To that purpose, we use the 25-year eligibility threshold in a regression discontinuity approach, corrected by a one-sided "donut hole" to account for the fact that age is measured at entry into unemployment and not at hiring as according to the policy rules. Individuals who are very close to their 25th birthday at entry into unemployment (in the "donut hole") are removed from the estimation because they are only eligible for the subsidy for part of the year. We estimate an intention-to-treat effect, defined as the causal effect of being targeted by the Impulsion –25 plan at entry into unemployment, with the counterfactual being *not the absence of subsidies but a much more restricted access to them*. This is because people aged 25 and over are targeted by the "Impulsion 12+" plan, which provides similar hiring subsidies but with the condition of at least 12 months of registered unemployment. The evaluation sample consists of young people entering unemployment over the period of July 2017 to December 2019, and their employment outcomes are measured up to two and a half years after unemployment entry.

Despite a greater effective access to hiring subsidies for those below the age of 25, we do not find any impact of the Impulsion –25 plan on the rate of return to employment of low-educated youths within one year of entry into unemployment, regardless of whether they are high school graduates or not. The same conclusion applies if we consider the number of months observed in employment over a period of two and a half years from unemployment entry. The only significant effect that emerged was a change in the way some youths are recruited. We find that the less-restrictive access to hiring subsidies for those below the age of 25 decreases the probability of transitioning to a first job through a temporary work agency by 15% and 7% for high school dropouts and graduates, respectively. This suggests that the greater access to subsidies for those below the age of 25 incentivized some firms to recruit young jobseekers directly, rather than through a temp agency, to take full advantage of reduced labor costs. Temp agencies have no incentives to reflect these lower costs in the contract they negotiated with their clients long before any recruiting.

The core insight from our study is that targeting hiring subsidies at the (very) short-term rather than long-term unemployed fails to generate new employment opportunities for low-educated youths, resulting in a complete deadweight loss. A key determinant of the absence of effect seems to be the favorable job market conditions observed during the study period in Belgium and its regions. From 2017 until the pandemic, a positive trend in employment growth was recorded, leading to a steady decrease in unemployment rates. In a tight labor market, employers struggle to find workers with the right skills and qualifications to fill open positions, resulting in labor shortages. In that context, employers may be reluctant to open new vacancies in response to wage cost reductions targeted at disadvantaged youths, especially as those in this group who are still unemployed in a period of economic vitality are likely to be the least productive.

Our results therefore provide empirical evidence that in a tight labor market, subsidizing hires is inefficient (see, for example, Cahuc et al. 2019; Kline and Moretti, 2013). In a recent empirical study, Albanese et al. (2024) demonstrated the effectiveness of hiring subsidies for low-educated unemployed youths in enhancing their transition to employment in Belgium, at least in the short run. Contrary to the program evaluated in our paper, those subsidies were implemented over a limited period of two years as the economy emerged from the Great Recession in 2010–2011. Targeting the Impulsion subsidies exclusively in a context of high unemployment would therefore be a better strategy for enhancing the cost-effectiveness of the program.

Although this aspect is undoubtedly not the primary determinant of the program's ineffectiveness, the absence of conditions in terms of minimum unemployment duration for high school dropouts is also a

factor likely to generate deadweight loss effects. In the above-mentioned study, at least three months of registered unemployment were required to determine eligibility for this group. A final factor that would be useful to explore further is the way to deal with temporary work agencies in designing hiring subsidies. In some countries, such as Belgium, temp agencies play an important role in providing young people with their first job experience. The presence of these private intermediaries on the job market creates a decoupling between the firm that makes the hiring decision and the firm that receives the subsidy, which can also be a source of inefficiency.

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Appendix

A. Descriptive statistics

Table A1 reports descriptive statistics for the evaluation sample measured at unemployment entry. The first panel (A) refers to high school dropouts. The second panel (B) refers to high school graduates. In each panel, descriptive statistics are presented by age group. All individuals in the evaluation sample aged between 21 and 24 constitute the treatment group, while individuals aged between 25 and 28 belong to the control group. The treatment group is therefore comprised of youths who are potentially eligible for the Impulsion –25 subsidy for at least one year following unemployment entry. For both education levels, descriptive statistics on the beneficiaries of this subsidy among the youngest age group are also presented. In Table A1, the unemployment duration refers to the number of months of registration as a jobseeker. According to the Eurostat definition, the counter is reset to zero only after three consecutive months out of the unemployment registers. For this reason, the variable is not always equal to zero at the beginning of the unemployment spell. We use this variable as a proxy of recent employment history since the longer the last employment spell is, the higher are the chances of an unemployment duration of zero. However, note that young people who register for the first time as unemployed jobseekers after leaving school will also have a zero duration. This is the reason for the use of another variable indicating the share of entrants with a first-ever registration. The unemployment rate (15–64 years) is measured at the district of residence level, based on register data.

The comparison of the age groups shows that the composition of the population varies slightly across age groups. In particular, the mean unemployment duration is 4 months higher for the older jobseekers, on average, and the proportion of first registrations is much larger for the younger ones, as expected. With regard to the other variables, the composition across age groups is very similar. In Section 6, we formally test whether individuals are similar around the age cutoff.

Comparing the overall youngest group with the actual beneficiaries of the subsidy[24] among them, we must be mindful of selection into employment. By nature, beneficiaries are employed whereas the overall group may consist of both employed and unemployed individuals. We observe a slightly higher prevalence of women among the Impulsion –25 beneficiaries. For both education levels, women also tend to have a weaker recent employment history and are less likely to register unemployment for the very first time. Individuals with a technical education are slightly overrepresented among high school dropout beneficiaries. Regarding high school graduates, individuals from apprenticeships and vocational education are also overrepresented among beneficiaries.

[24] Within one year of entry into unemployment.

Table A1. Descriptive statistics for pre-determined characteristics

	(A) Dropouts			(B) Graduates		
	21–24 years		**25–28 years**	**21–24 years**		**25–28 years**
	All	Impulsion –25	All	All	Impulsion –25	All
Age at entry into unemployment (in years)						
Mean	22.3	22.4	26.5	22.3	22.4	26.4
(sd)	(0.87)	(0.87)	(0.86)	(0.85)	(0.86)	(0.86)
Gender						
Women	35.7%	33.8%	35.1%	44.3%	40.3%	47.4%
Nationality						
Belgian	93.7%	95.0%	93.9%	96.1%	96.6%	95.1%
EU	3.7%	3.6%	4.0%	2.6%	2.4%	3.2%
Unemployment duration (in months)						
Mean	8.7	10.3	12.1	5.0	6.4	10.2
(sd)	(13.7)	(14.5)	(17.8)	(9)	(10.3)	(15.3)
Highest level of education						
HS dropouts (1)						
Primary school	30.6%	28.0%	34.9%			
Basic HS	8.0%	7.6%	7.0%			
Lower general HS	10.0%	9.3%	9.2%			
Lower technical HS	37.5%	40.6%	35.3%			
Lower vocational HS	13.9%	14.5%	13.6%			
HS graduates						
Apprenticeship				4.5%	9.1%	6.5%
General				20.6%	13.3%	22.5%
Technical				37.6%	31.4%	36.8%
Vocational				34.2%	46.2%	34.2%
Unemployment rate of the district (in %)						
Mean	13	13.1	13	12.8	13	13.8
(sd)	(3.7)	(3.7)	(3.7)	(3.6)	(3.6)	(3.7)
First-ever registration at the PES	27%	19.9%	3.8%	39%	32%	8.5%
N	8,115	2,310	7,302	25,893	4,722	13,826

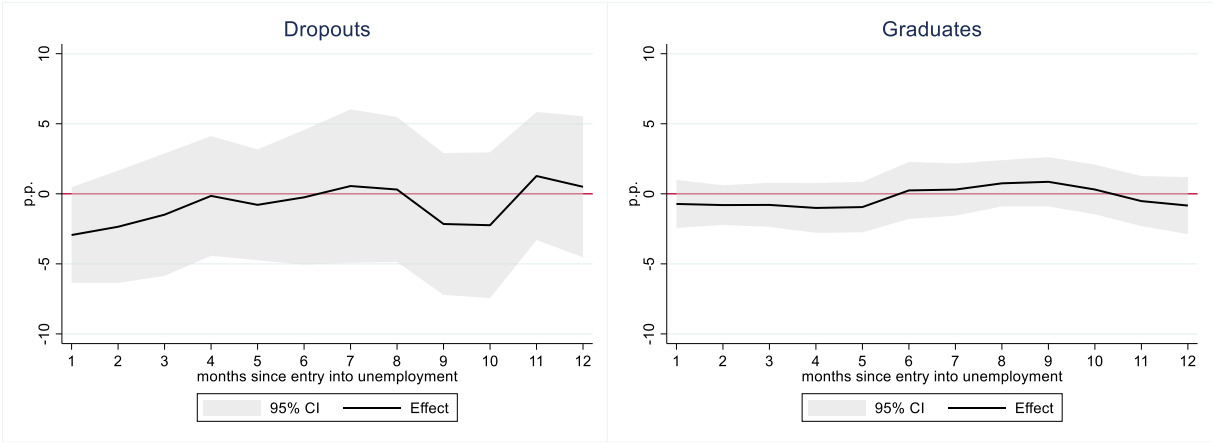
(1) The category "Primary school" refers to individuals who at maximum have the final primary school degree. The category "Basic HS" refers to individuals who at maximum passed the first two years of high school. The category "Lower/general/technical/vocational HS" refers to individuals who passed more than the first two years of high school but did not graduate high school.

Note: Descriptive statistics for the sample used in the benchmark analysis: youths entering registered unemployment between July 2017 and June 2019 at age 21 to 28 without ever having benefited from an Impulsion subsidy. All variables are

measured at entry into unemployment. For categorical variables, the proportion of individuals by category is given. For other variables, the mean and standard deviation are given.

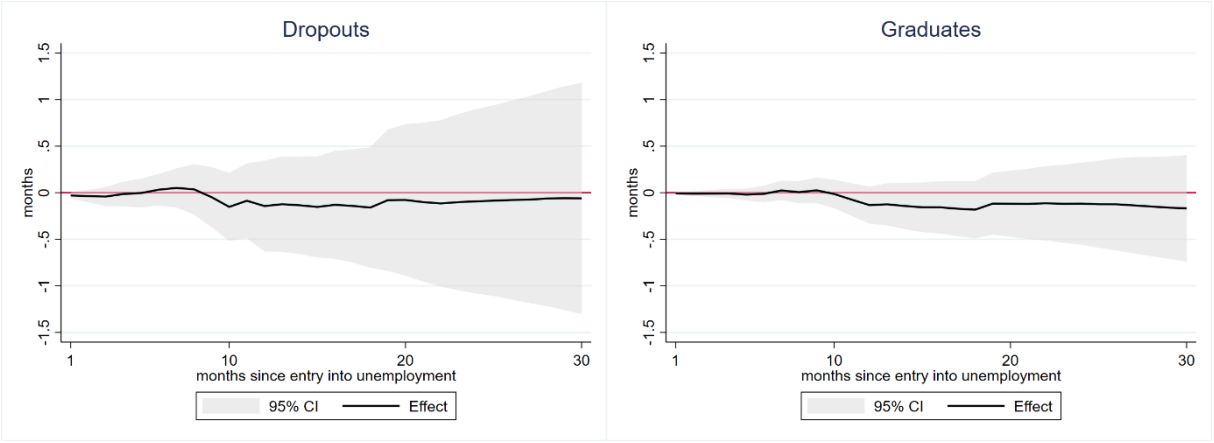
B. Donut RDD estimates: additional figures

Figure B1. Evolution of the discontinuity at age 25 in the transition rate to employment up to 12 months after entry into unemployment



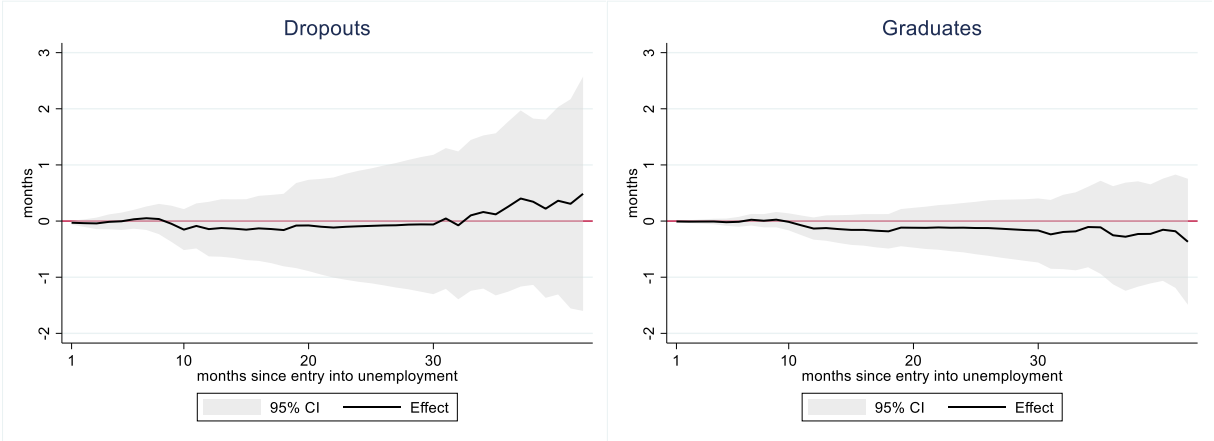
Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the cumulative transition rate to employment within 1 to 12 months after entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25−X and 25 at entry into unemployment. The bandwidth is set at 3 years on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Figure B2. Evolution of the discontinuity at age 25 in the number of months in employment up to 30 months after entry into unemployment



Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the cumulative number of months in employment within 1 to 30 months after entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25−X and 25 at entry into unemployment. The bandwidth is set at 3 years on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

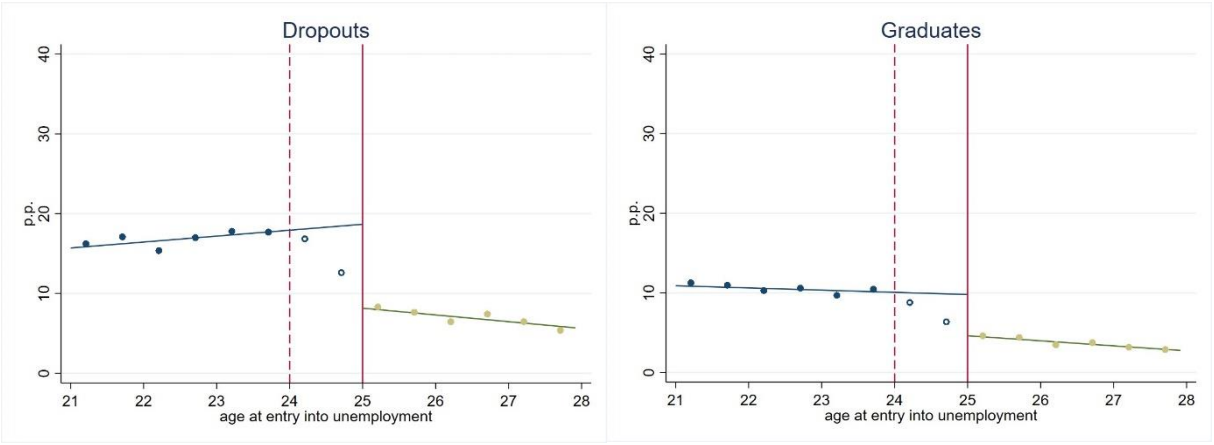
Figure B3. Evolution of the discontinuity at age 25 in the number of months in employment up to 42 months after entry into unemployment



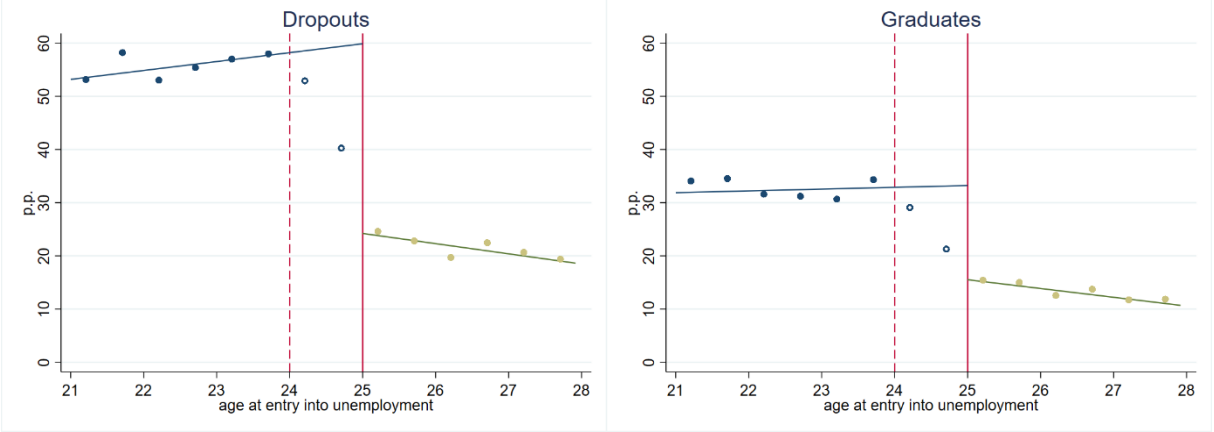
Note: The graphs depict one-sided donut RDD estimates for youths entering unemployment between July 2017 and June 2018 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the cumulative number of months in employment within 1 to 42 months after entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25−X and 25 at entry into unemployment. The bandwidth is set at 3 years on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Figure B4. Discontinuity at age 25 in subsidy receipt for a temp job within one year of entry into unemployment

(a) Subsidy take-up

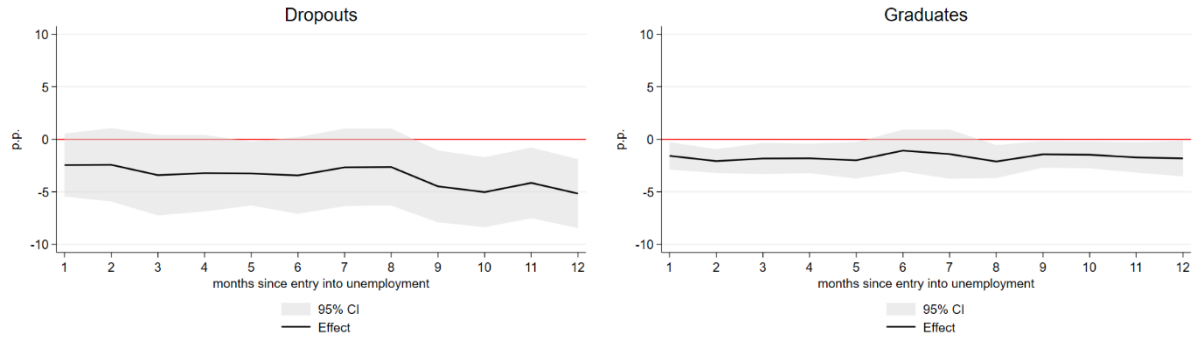


(b) Attention rate



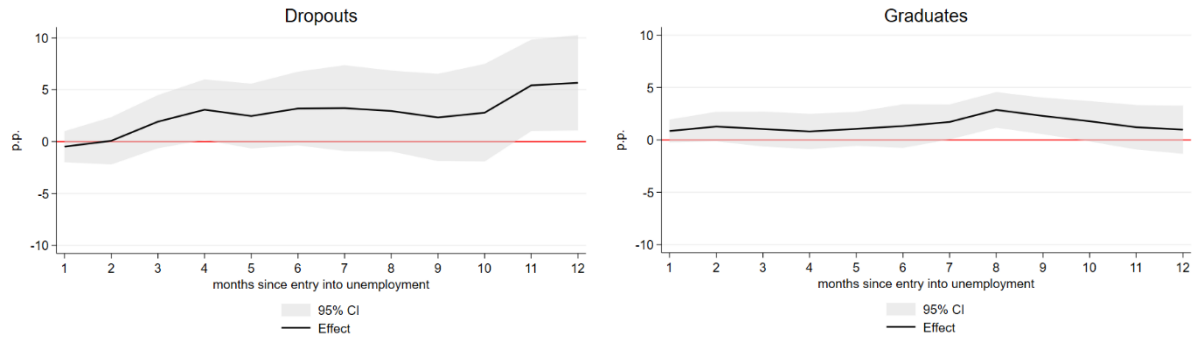
Note: The graphs depict one-sided donut RDD estimates for the sample of youths entering unemployment between July 2017 and June 2019 without having ever received an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff age is 25. The bandwidth is set at 3 years on each side of the donut hole. The outcomes, measured within one year after unemployment entry, are (a) the subsidy take-up in temp jobs and (b) the attention rate, i.e., the share of subsidized temp hires among all hires. Mean values of outcomes are plotted over a six-month age interval. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. We control for the set of variables presented in Table 1 in Appendix X. Standard errors are clustered at the age-in-months level. For high-school dropouts (graduates), the estimated ITT effects at 25 are the following: for (a), 10.5 (5.4) pp with a p-value of 0.000; for (b), 35.6 (17.7) pp with a p-value of 0.000; N= 15,417 (39,719).

Figure B5. Evolution of the discontinuity at age 25 in the transition rate to a temp job up to 12 months after entry into unemployment



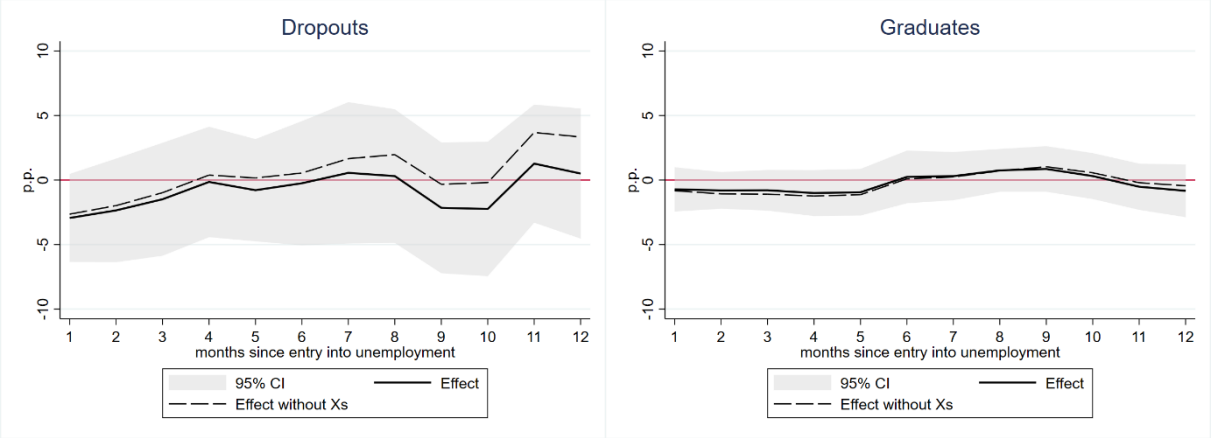
Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the transition rate to employment in a temp job within 1 to 12 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25–X and 25 at entry into unemployment. The bandwidth is set at 3 years on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Figure B6. Evolution of the discontinuity at age 25 in the transition rate to a non-temp job up to 12 months after entry into unemployment



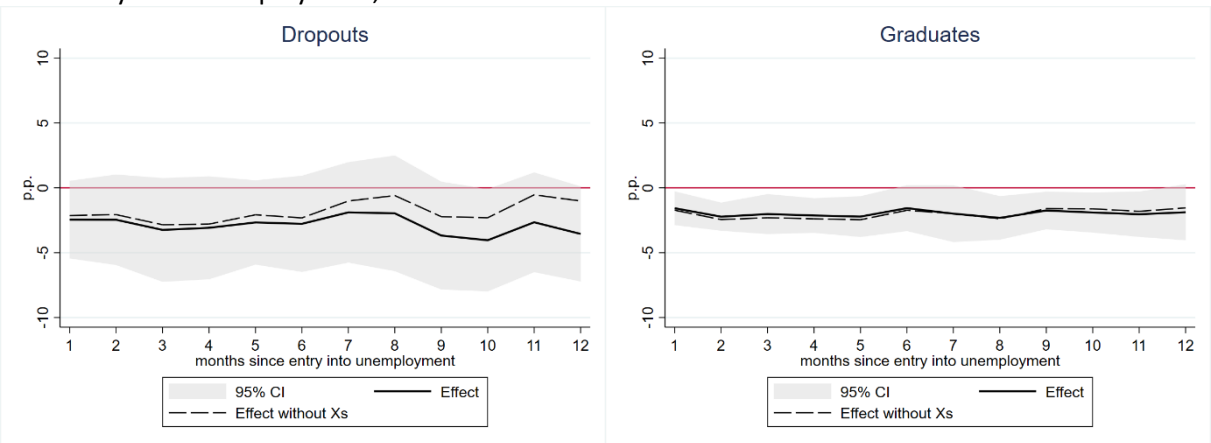
Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the transition rate to a first job without the intermediation of a temporary-work agency within 1 to 12 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25–X and 25 at entry into unemployment. The bandwidth is set at 3 years on each side of the donut hole. We present estimates with and without controlling for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Figure B7. Evolution of the discontinuity at 25 in the transition rate to employment up to 12 months after entry into unemployment, with and without controls



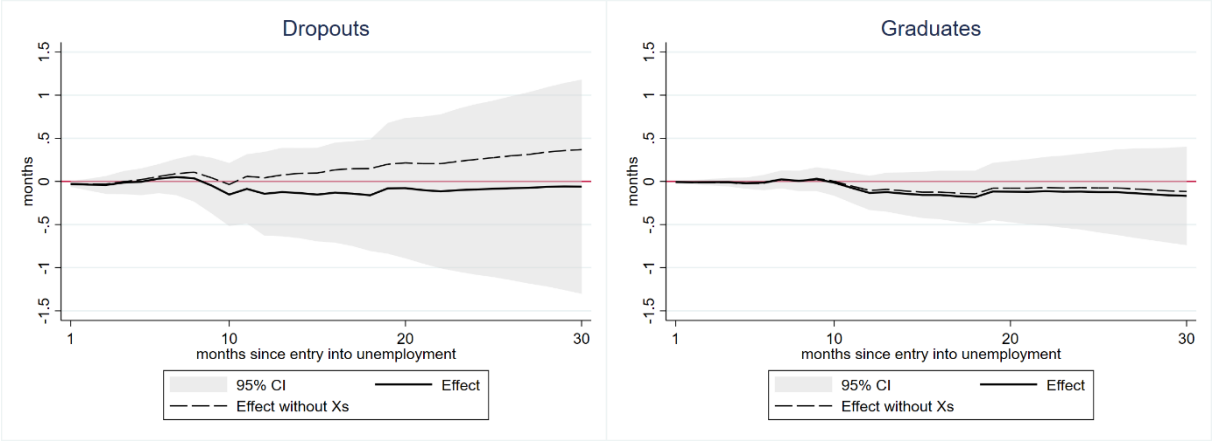
Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever had benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the transition rate to employment within 1 to 12 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25–X and 25 at entry into unemployment. The bandwidth is set at 3 years on each side of the donut hole. We present estimates with and without controlling for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Figure B8. Evolution of the discontinuity at age 25 in the transition rate to a temp job up to 12 months after entry into unemployment, with and without controls



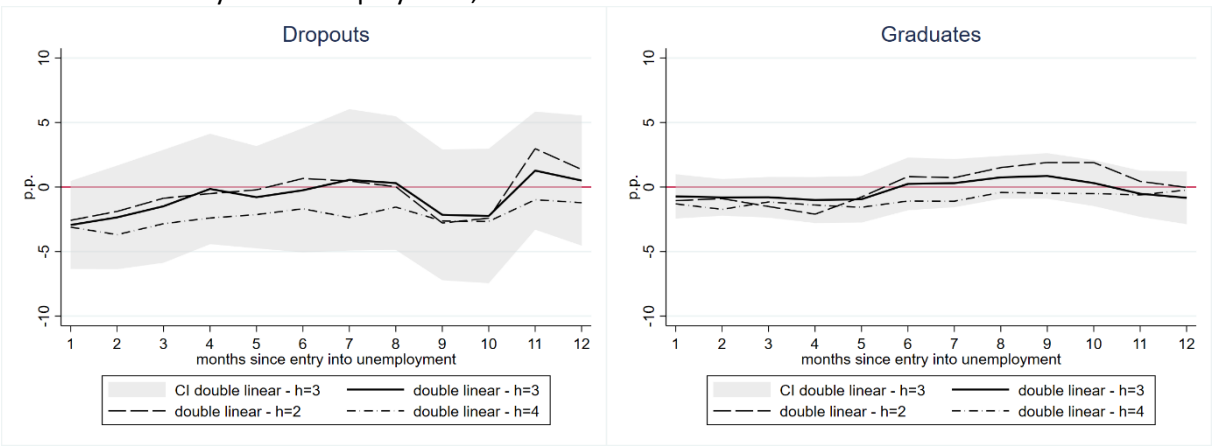
Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the cumulative transition rate to employment in a temp job within 1 to 12 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25–X and 25 at entry into unemployment. The bandwidth is set at 3 years on each side of the donut hole. We present estimates with and without controlling for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Figure B9. Evolution of the discontinuity at age 25 in the number of months in employment up to 30 months after entry into unemployment, with and without controls



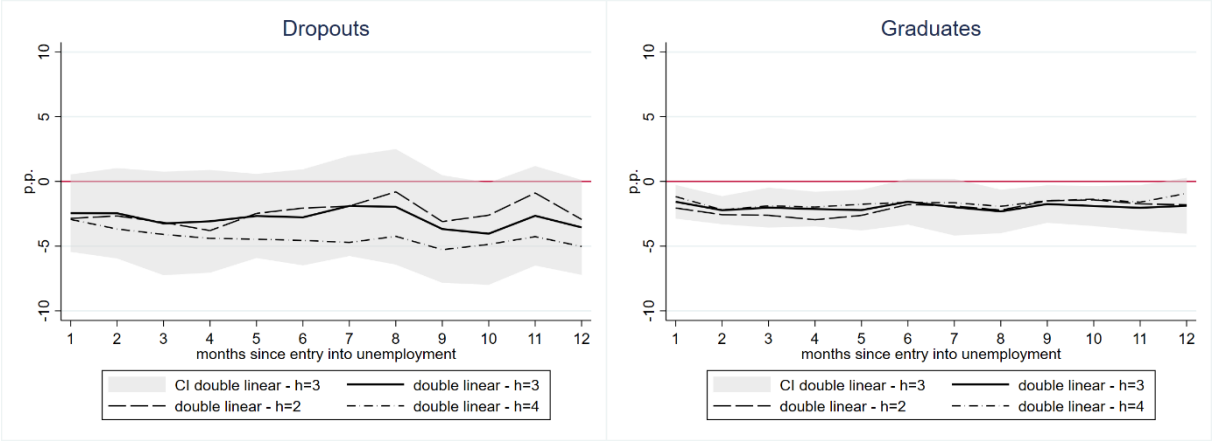
Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever had benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the cumulative number of months in employment within 1 to 30 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25–X and 25 at entry into unemployment. The bandwidth is set at 3 years on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Figure B10. Evolution of the discontinuity at age 25 in the transition rate to employment up to 12 months after entry into unemployment, with alternative bandwidth sizes



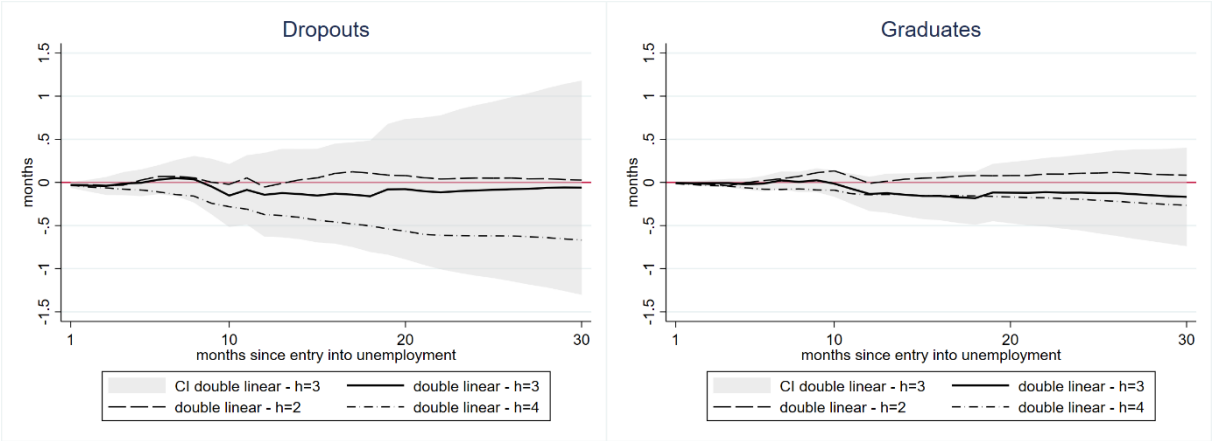
Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the cumulative transition rate to employment within 1 to 12 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25–X and 25 at entry into unemployment. The benchmark bandwidth is set at 3 years on each side of the donut hole. For the two alternative specifications, we retain observations within a two- and four-year bandwidth on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Figure B11. Evolution of the discontinuity at age 25 in the transition rate to a temp job up to 12 months after entry into unemployment, with alternative bandwidth sizes



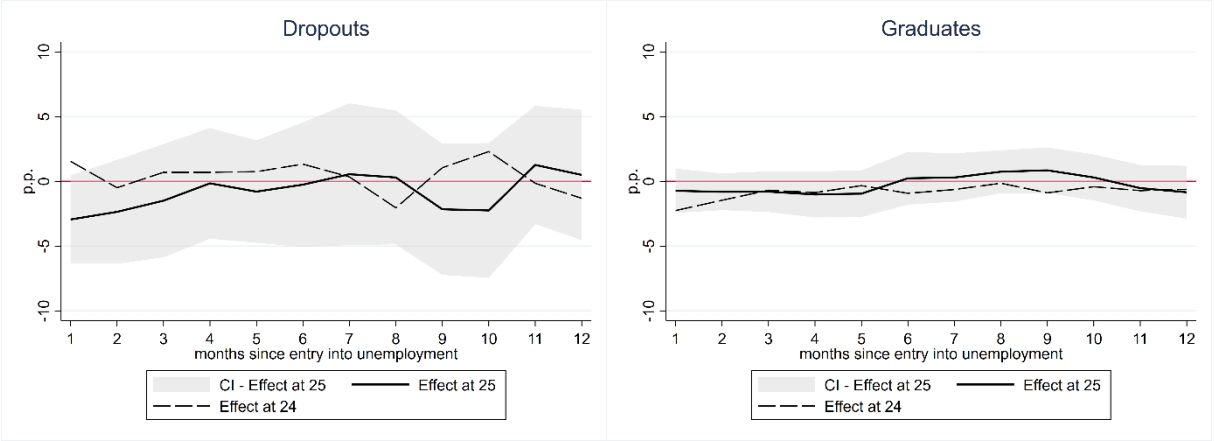
Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the cumulative transition rate to employment in a temp job within 1 to 12 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25–X and 25 at entry into unemployment. The benchmark bandwidth is set at 3 years on each side of the donut hole. For the two alternative specifications, we retain observations within a two- and four-year bandwidth on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Figure B12. Evolution of the discontinuity at 25 in the number of months in employment up to 30 months after entry into unemployment, with alternative bandwidth sizes



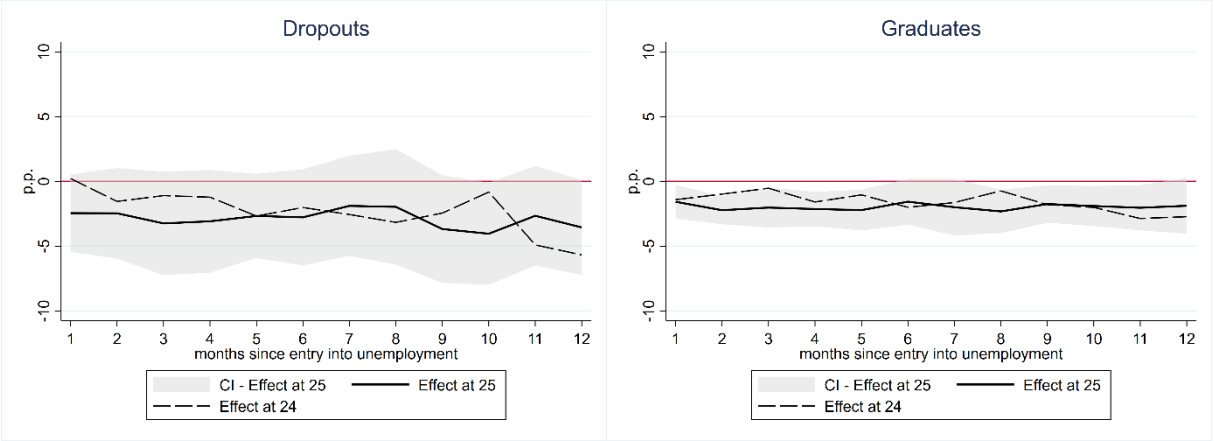
Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the cumulative number of months in employment within 1 to 30 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25–X and 25 at entry into unemployment. The benchmark bandwidth is set at 3 years on each side of the donut hole. For the two alternative specifications, we retain observations within a two- and four-year bandwidth on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Figure B13. Evolution of the discontinuity at 24 in the transition rate to employment up to 12 months after entry into unemployment



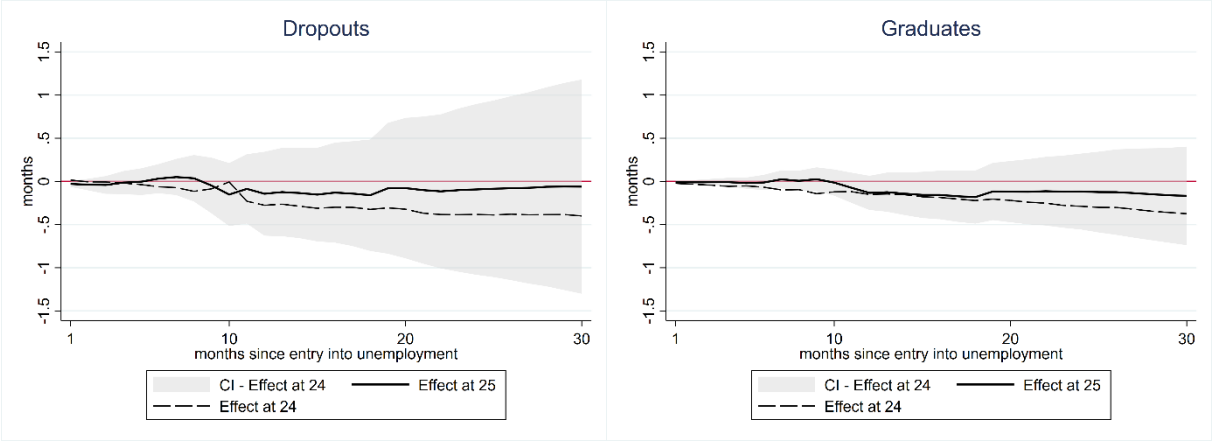
Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable. The cutoff is 25 in the benchmark specification and 24 in the alternative one. The outcome is the cumulative transition rate to employment within 1 to 12 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. The bandwidth is set at 3 years on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Figure B14. Evolution of the discontinuity at age 24 in the transition rate to a temp job up to 12 months after entry into unemployment



Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable. The cutoff is 25 in the benchmark specification and 24 in the alternative one. The outcome is the cumulative transition rate to employment in a temp job within 1 to 12 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. The bandwidth is set at 3 years on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

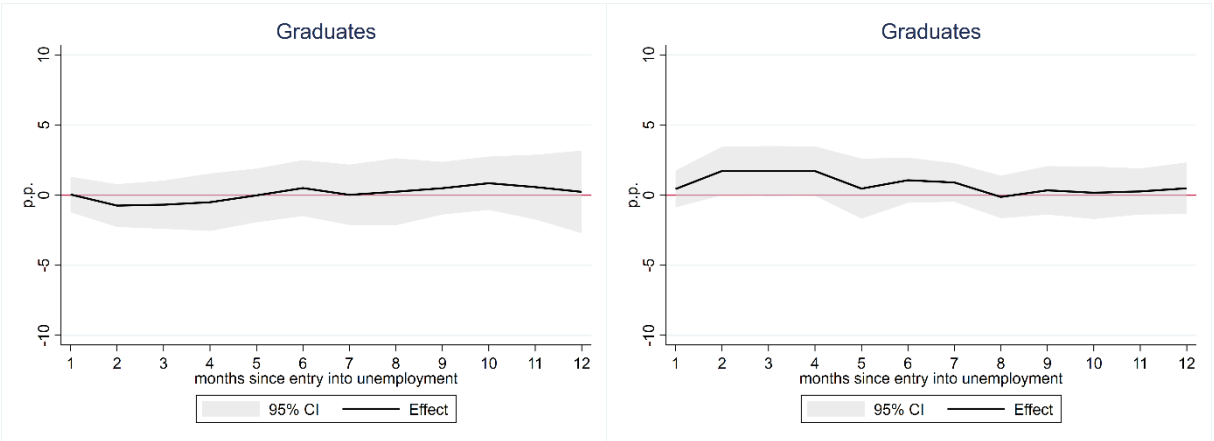
Figure B15. Evolution of the discontinuity at 24 in the number of months in employment up to 30 months after entry into unemployment



Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable. The cutoff is 25 in the benchmark specification and 24 in the alternative one. The outcome is the cumulative number of months in employment within 1 to 30 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. The bandwidth is set at 3 years on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

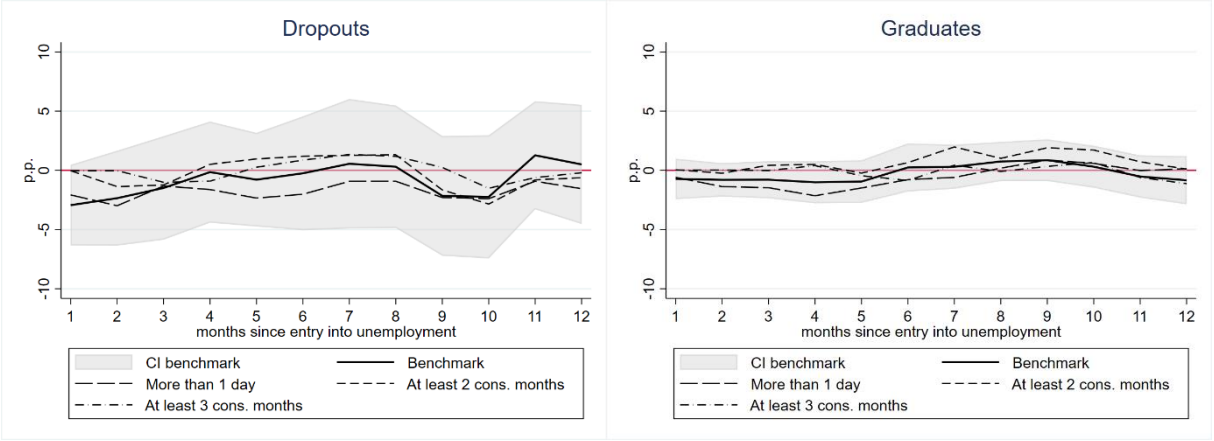
Figure B16. Evolution of the discontinuity at age 26 and 27 (false cutoffs) in the transition rate to a temp job up to 12 months after entry into unemployment: false cutoffs

Age cutoff=26 Age cutoff=27



Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the alternative cutoff points are moved to 26 and 27. The outcome is the transition rate to a temp job within 1 to 12 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. The bandwidth is set at 3 years on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Figure B17. Evolution of the donut RDD effect on alternative measures of the cumulative transition rate up to 12 months after entry into unemployment



Note: The graphs depict one-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the cumulative transition rate to employment within 1 to 12 months of entry into unemployment. The benchmark definition of the outcome and three alternatives are presented. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25–X and 25 at entry into unemployment. The bandwidth is set at 3 years on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

C. Donut RDD estimates: summary tables

Table C1. Evolution of the discontinuity at 25 in the transition rate to employment up to 12 months after entry into unemployment

	(1) m=1	(2) m=3	(3) m=6	(4) m=9	(5) m=12
Panel A – High school dropouts					
Effect	-2.94	-1.49	-0.25	-2.15	0.50
p-value	0.090	0.499	0.918	0.399	0.844
CI	[-6.35;0.47]	[-5.86;2.88]	[-5.06;4.56]	[-7.22;2.91]	[-4.53;5.53]
N (left)	7,071	7,203	7,512	7,782	8,115
N (right)	7,302	7,302	7,302	7,302	7,302
Panel B – High school graduates					
Effect	-0.72	-0.79	0.24	0.86	-0.84
p-value	0.401	0.318	0.813	0.335	0.414
CI	[-2.43;0.99]	[-2.36;0.78]	[-1.79;2.28]	[-0.90;2.62]	[-2.87;1.20]
N (left)	22,418	23,607	24,071	24,971	25,893
N (right)	13,826	13,826	13,826	13,826	13,826

Note: One-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the cumulative transition rate to employment within 1 to 12 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25–X and 25 at entry into unemployment. The bandwidth is set at 3 years on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Table C2. Evolution of the discontinuity at 25 in the number of months in employment up to 30 months after entry into unemployment

	(1)	(2)	(3)	(4)	(5)	(6)
	m=5	m=10	m=15	m=20	m=25	m=30
Panel A – High school dropouts						
Effect	-0.00	-0.15	-0.15	-0.08	-0.09	-0.05
p-value	0.962	0.408	0.576	0.849	0.868	0.922
CI	[-0.16;0.15]	[-0.52;0.21]	[-0.69;0.39]	[-0.89;0.74]	[-1.11;0.94]	[-1.30;1.18]
N (left)	7,405	7,896	8,115	8,115	8,115	8,115
N (right)	7,302	7,302	7,302	7,302	7,302	7,302
Panel A – High school graduates						
Effect	-0.02	-0.01	-0.16	-0.12	-0.12	-0.17
p-value	0.536	0.856	0.246	0.507	0.599	0.560
CI	[-0.08;0.04]	[-0.17;0.14]	[-0.42;0.11]	[-0.47;0.24]	[-0.59;0.34]	[-0.74;0.40]
N (left)	23,681	23,662	25,893	25,893	25,893	25,893
N (right)	13,826	13,826	13,826	13,826	13,826	13,826

Note: One-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the cumulative number of months in employment within 1 to 30 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25–X and 25 at entry into unemployment. The bandwidth is set at 3 years on each side of the donut hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Table C3. Evolution of the discontinuity at age 25 of the transition rate to a temp job up to 12 months after entry into unemployment

	(1)	(2)	(3)	(4)	(5)
	m=1	m=3	m=6	m=9	m=12
Panel A – High school dropouts					
Effect	-2.45	-3.25	-2.78	-3.68	-3.55
p-value	0.106	0.110	0.140	0.082	0.057
CI	[-5.44;0.53]	[-7.24;0.75]	[-6.48;0.93]	[-7.83;0.47]	[-7.22;0.11]
N (left)	7,071	7,203	7,512	7,782	8,115
N (right)	7,302	7,302	7,302	7,302	7,302
Panel B – High school graduates					
Effect	-1.57*	-2.02*	-1.57	-1.75*	-1.88
p-value	0.018	0.011	0.081	0.018	0.086
CI	[-2.87;-0.28]	[-3.56;-0.49]	[-3.33;0.20]	[-3.19;-0.31]	[-4.04;0.27]
N (left)	22,418	23,607	24,071	24,971	25,893
N (right)	13,826	13,826	13,826	13,826	13,826

Note: One-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The outcome is the cumulative transition rate to employment in a temp job within 1 to 12 months of entry into unemployment. The estimates and their 95% confidence intervals (CI) are presented by education level. To estimate the linear splines, observations are weighted by a triangular kernel, without considering the observations within the donut hole. For a variable measured over a time window of X months, the donut hole consists of observations between 25–X and 25 at entry into unemployment. The bandwidth is set at 3 years on each side of the donut

hole. We control for the set of variables presented in Table A1 in Appendix A. Standard errors are clustered at the age-in-months level.

Table C4. Continuity of the predetermined characteristics at 25

	Dropouts			Graduates		
	Discontinuity	CI	p-value	Discontinuity	CI	p-value
Man	0.007	[-0.031;0.045]	0.709	0.003	[-0.020;0.025]	0.808
Belgian	-0.008	[-0.020;0.005]	0.232	0.001	[-0.006;0.009]	0.685
EU	0.004	[-0.006;0.014]	0.399	-0.002	[-0.011;0.005]	0.458
Unemployment duration	0.58	[-0.830;1.991]	0.415	-0.279	[-0.822;0.263]	0.309
Unemployment rate of the district	-0.133	[-0.453;0.188]	0.412	0.066	[-0.093;0.226]	0.408
First registration	-0.004	[-0.026;0.018]	0.712	0.002	[-0.012;0.016]	0.777
Month of entry						
January	-0.001	[-0.021;0.019]	0.912	-0.012	[-0.028;0.002]	0.099
February	0.015	[-0.002;0.031]	0.076	0.008	[-0.004;0.018]	0.181
March	-0.004	[-0.025;0.017]	0.735	0.003	[-0.007;0.012]	0.534
April	0.004	[-0.010;0.019]	0.533	-0.001	[-0.012;0.012]	0.934
May	0.014	[0.001;0.028]	0.041	0.002	[-0.005;0.011]	0.510
June	-0.006	[-0.023;0.010]	0.439	-0.008	[-0.021;0.005]	0.242
July	0.002	[-0.027;0.029]	0.912	-0.007	[-0.021;0.006]	0.315
August	-0.019	[-0.038;-0.001]	0.039	0.004	[-0.009;0.018]	0.505
September	-0.001	[-0.021;0.021]	0.987	-0.002	[-0.016;0.011	0.718
October	0.005	[-0.010;0.021]	0.488	0.004	[-0.012;0.020]	0.644
November	-0.003	[-0.023;0.017]	0.763	0.010	[-0.002;0.022]	0.120
December	-0.006	[-0.023;0.009]	0.410	-0.000	[-0.016;0.014]	0.902
N	14,078			35,146		

Note: One-sided donut RDD estimates for the sample selected for the benchmark analysis: youths entering unemployment between July 2017 and June 2019 without having ever benefited from an Impulsion subsidy. Age at unemployment entry is used as the forcing variable, and the cutoff is 25. The estimates and their 95% confidence intervals (CI) are presented by education level. Given that predetermined characteristics are measured at entry into unemployment, no donut hole is needed. The RDD estimates for the control variables are obtained retaining observations within a three-year bandwidth on each side of the cutoff. Observations are weighted using a triangular kernel. Standard errors are clustered at the age-in-months level.

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ISSN 1379-244X D/2024/3082/09

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