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Abstract

Using a survey representative of individuals who left the educational system in France at any level in 2017, we examine the impact of the COVID-19 pandemic on young people's probability of being employed between the start of lockdown in March 2020 and July 2020. We find that the COVID-19 pandemic had a strong impact on youth employment. Our results show that young people's probability of being employed decreased by as much as 3 % during the lockdown period relative to the pre-pandemic baseline. This impact is smaller than that observed in other countries, probably due to the significant measures implemented in France. Our heterogeneity analyses indicate that the impact of the COVID-19 pandemic on young people's labor market integration varied with the type of employment contract, area of study, and, to a lesser extent, having a working-class parent, a foreign-born parent, or residing in a rural area.

JEL classification: I14, J01, I26.

Keywords: COVID-19, youth employment, labor market.

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1 Introduction

The COVID-19 pandemic led to unprecedented changes in our societies. Beyond its health effects, the COVID-19 pandemic has had major consequences in many areas, including education, employment, mental health and well-being, the environment, and racial and gender inequalities (Brodeur et al., 2021).

In the domain of employment, a large body of research has highlighted the pandemic's negative impact on working hours and employment rates (Lemieux et al., 2020). Because young people who have recently entered the labor market are most likely to be in temporary jobs, they are also more likely to be strongly affected by a sudden drop in economic activity (Beland et al., 2023; Fukai et al., 2021; Soares and Berg, 2022). Among young people, those not in employment, education or training (NEET) were the hardest hit by the COVID-19 pandemic (Pastore and Choudhry, 2022). In addition, Barford et al. (2021) show that young women were more severely affected than young men by the crisis in terms of job losses and falling incomes. In Austria, Bock-Schappelwein et al. (2021) find that the young workers most affected by the COVID-19 crisis were those aged 20-24, particularly the least qualified and those from racial minorities.

The magnitude of the pandemic's impact on young people is so great that job losses appear to have been greater than during the global financial crisis (Koczan, 2022). We may thus speak of a "COVID-19 generation" (Barford et al., 2021). This concept of the "COVID-19" or "lockdown generation", which has spread particularly in the media, refers to the possibility that the affected young people may be marked for decades by the coronavirus crisis, in terms of both their situation on the labor market and their mental health. Fortunately, the effects of the spread of the coronavirus on youth unemployment seem to have been limited by the public policies implemented in industrialised countries, which have helped to attenuate the expected rise in youth unemployment (Tamesberger and Bacher, 2020). At the same time, if the deployment of specific labor market measures helped young people during the pandemic, the cessation of those measures may also have affected them. For example, Chatterji and Li (2023) show that the end of unemployment insurance programs linked to the pandemic led to an increase in working hours and full-time employment among 20- to 24-year-olds (with no particular effect on 15- to 19-year-olds).

Moreover, the labor market consequences have also had repercussions in other domains of young adults' lives. In a study investigating young people's mental health during the pandemic (May-June 2020, October-December 2020 and June-August 2021), Melchior et al. (2022) find a link between labor market situation and the effects of COVID-19 on young people's mental health. For example, they found that

young people who were at school or unemployed in these periods were significantly more likely to suffer from depression than those who were in employment. In addition, the COVID-19 pandemic, by making young people more vulnerable on the labor market in a context where the public measures implemented by various European governments provided proportionally less support for young people, led many to abandon or delay plans for autonomous housing (Luppi et al., 2024).

Even before the pandemic, many young people were already in a precarious situation during their first years on the labor market, working mainly on temporary contracts – but the crisis exposed and accentuated that precarity. The closures particularly affected sectors that traditionally employ young people, such as the hotel and catering industry and personal services. As labor market entrants, young people suffered the collapse in job entry flows due to the COVID-19 pandemic. In France, due to government measures taken to safeguard employment, they also faced the limitation of exit flows (Couppié et al., 2022). The resulting difficulties most affected those who were in the most fragile position to begin with: those who were on temporary contracts or unemployed when the first lockdown began (Dupray et al., 2023). Young people, the majority of whom are on insecure employment contracts, did not see their contracts extended or renewed (Givord and Silhol, 2020). And neither they nor those who were already unemployed before lockdown were able to access new contracts or look for work during this period.

In France, the effects of the crisis on youth employment can be seen not only in the fall in the youth employment rate, but also in the growth of the so-called halo of unemployment: people not counted as unemployed in the sense of the International Labour Organization (ILO), but whose situation comes close to it (Jauneau and Vidalenc, 2021). The deterioration in the situation of young people can also be seen in the rise in the proportion of NEETs, which reached 14 % for 15- to 29-year-olds in 2020 (Echegu et al., 2021). In addition to the fall in the number of people in employment, the COVID-19 crisis was also accompanied by a rise in inactivity, particularly among young people, which also translated into longer periods of study (Blaize et al., 2021).

As documented in an ample literature, the COVID-19 pandemic has had negative effects on employment around the world. But in France, contrary to other countries, the government implemented various measures to preserve employment, under President Emmanuel Macron's "whatever it takes"[1] policy. Due to the particular French context, it is important to analyze the causal effects of the COVID-19 pandemic on

[1]"Quoi qu'il en coûte" (`https://www.elysee.fr/emmanuel-macron/2020/03/12/adresse-auxfrancais`).

young people's labor market integration. Recent studies have demonstrated that the implementation of large-scale dedicated measures limited the effects of the COVID-19 pandemic on the labor market (see for example Bartik et al., 2020; Soares and Berg, 2022).[2] Although several studies have looked at young people in the French labor market during the COVID-19 pandemic, none has adopted a causal approach to estimating the effects of the crisis on their probability of being employed. In this article, we seek to determine whether, despite the special measures implemented in France, the COVID-19 pandemic has had a continued effect on young people's employment a few years after they leave the education system. It is therefore appropriate to examine the impact of the COVID-19 pandemic on young people, who were particularly exposed to the labor market effects of the crisis, in a country where state support to preserve jobs was particularly generous. To do this, we primarily use an event study design on a representative survey of young people who left the educational system in the 2016-2017 academic year. We also use a difference-in-differences model (DiD). Our results highlight a strong impact of the COVID-19 pandemic on youth employment. We find that young people's probability of being employed decreased by 3 % at the end of the lockdown period relative to the pre-pandemic baseline. Our heterogeneity analyses reveal that the influence of the COVID-19 pandemic on the labor market integration of young individuals varied depending on the type of employment contract. There was a more significant initial decline in the proportion of young people with short-term contracts, followed by a reversal of that trend. Field of study had distinct effects, with healthcare graduates showing resilience and more pronounced negative impacts observed in the tertiary sector. Gender differences are minimal. Additionally, social factors, such as having working-class or foreign-born parents, or residing in a rural area, appear to have influenced the impact of the pandemic. However, caution is warranted due to the statistical fragility of analyses of small sub-populations.

The paper is organized as follows. Section 2 presents the institutional background, data and descriptive statistics. Section 3 presents the empirical strategy. Section 4 describes the results, and Section 5 concludes.

[2] In the US, Bartik et al. (2020) show that "states that received more small business loans from the Paycheck Protection Program and states with more generous unemployment insurance benefits had milder declines and faster recoveries." Soares and Berg (2022) find that "governments that favoured wage subsidies over other forms of income support were able to lessen labour market volatility" due to the COVID-19 pandemic.

2 Background, data and descriptive statistics

2.1 Institutional background

In France, three main types of measures were deployed to support employment during the COVID-19 pandemic: i) support measures for workers to prevent layoffs, ii) support measures for the unemployed to compensate for job losses, and iii) support measures for firms to bolster economic activity.[3]

France was one of the countries that provided the most support for economic activity during the COVID-19 crisis. Numerous emergency measures were implemented to support households and firms. For employees, up to 8.6 million people were covered by the short-time working scheme,[4] at an estimated cost of € 30.6 billion in 2020. Short-time working is a compensation scheme for companies that temporarily reduce or interrupt their activity. It is co-financed by the French government and the French unemployment insurance fund (Unédic). During the crisis this existing scheme was extended, made more flexible and simplified, and the allowance paid was increased, as was the quota of annual hours eligible for compensation. Additionally, measures to compensate individuals who had lost their jobs led to an expenditure of nearly € 41.6 billion. These measures prolonged compensation for the recipients of unemployment insurance benefits and the beneficiaries of a scheme for workers employed via short-term contracts in the performing arts industry (*intermittents du spectacle*), and facilitate access to unemployment benefits for those who were unable to work during lockdown. The scale of this public expenditure in favor of the unemployed and waged workers was much greater in France than in other similar countries, such as Germany, for example. Although Germany has a population of 83 million (vs. 67 million in France), it spent only € 9.6 billion on income support for the unemployed in 2020. Moreover, Germany spent € 23.5 billion on keeping employees in work via its short-time working scheme (with 7.3 million people covered by short-time working in the country in 2020), even though it has made more use of this scheme than France in the past. Taking the sum of all exceptional public measures combined, France spent proportionally more than any other country (Cho et al., 2021).

Alongside these measures, other measures offered support to firms (more than € 210 billion in deferred social insurance payments and other charges), as well as € 37.5 billion in various forms of aid and subsidies to firms, particularly in the hardest-hit sectors. A € 100 billion recovery plan was subsequently implemented. Further

[3] Unless stated otherwise, the figures in this section are drawn from Unédic (2020).

[4] Compared to between 25,000 and 50,000 employees on average each month from 2015 to 2019 (Otte, 2021). For details see `https://static.eurofound.europa.eu/covid19db/cases/FR-2020-10_462.html`.

expenditures were also incurred in the health sector: funding for COVID-19 screening tests, expenditure on staff and equipment for health and social care, and aid for health professionals in towns and cities affected by activity restrictions. Furthermore, with regard to young people specifically, following the end of lockdown in 2020, France offered a subsidy of € 4,000 to companies for hiring a young person under the age of 26, and used strong incentive policies to encourage the hiring of apprentices (Konle-Seidl et al., 2021). The government grouped these measures together under the name "one young person, one solution" ("un jeune, une solution").

Overall, the Cour des comptes (2021) estimates that 86 % of the increase in public spending in 2020 compared to 2019 was crisis-related. The measures taken in this context had an impact on young employees, notably through short-time working. This approach was instrumental in retaining a significant number of workers affected by the health crisis. Support was also offered to young people who were receiving unemployment benefits, through the extension of their period of entitlement to them. But this substantial aid proved insufficient to mitigate all of the repercussions of the crisis on young people. This is primarily due to the fact that few qualifies for unemployment benefits, having only recently entered the labor market, while those who were already employed predominantly had fixed-term contracts.

2.2 Data

We analyze data from the 2017 Génération survey conducted by CEREQ (the Center for Research on Qualifications). The survey groups together young people who left the educational system in the same school year (2016–2017), regardless of their level or field of education. The survey was administered to a representative sample of 25,164 young people[5] in France who left formal education (with or without a diploma) for more than a year for the first time during that school year. Exclusion criteria were being 35 or older in 2017, having left education for 17 or more months before the 2016-2017 school year, and having re-entered education during the 16 months following entry into the labor market. The survey can be used to reconstruct the career paths

[5]The sample was constructed as follows. The survey sampling frame of all individuals enrolled in an educational institution in France was constructed based on information collected from each one on individual enrolment in 2016-2017 and 2017-2018. A comparison of the two identified 1,134,000 individuals who were presumed to have exited the educational system during the 2016-2017 academic year. Within this sampling frame, a sample of 303,573 was randomly selected. Among these, 86,706 (29 %) agreed to respond to the survey. Of this group, 42,264 (49 %) were within the scope of the survey. Among these, 25,164 (about 60 %) responded in full to the approximately 40-minute survey either by phone or online. The final weighting of individual survey respondents was obtained using a combination of a selection weight, a coefficient to adjust for nonresponse, a coefficient to adjust for over/undercoverage of the sampling frame, and a further calibration weight established using the SAS CALMAR macro.

of young people during their first three years of activity month by month. Here, they are analyzed in the context of the respondents' educational background, educational qualifications, and family and geographical environment. The Génération 2017 survey interviews were conducted after the first lockdown, between 31 August 2020 and 22 March 2021.[6]

Figure A1 presents the distribution of the employment situations of young people in France who left the education system in 2016-2017 over that academic year and the following three years, measured at monthly intervals. Our observation period ends in July 2020, as the respondents were surveyed from August 2020 onwards, and we no longer have monthly data for the entire sample beyond this date. During the first 14 months of the observation period, young people gradually left initial training. As the proportion in employment increased (shifting over time away from short-term contracts and towards long-term contracts), the proportion who were looking for a job gradually decreased, while the share in training or in other situations stabilized.

2.3 Descriptive statistics

The detailed information contained in Table 1 highlights the socio-demographic diversity of the respondents to the Génération 2017 survey. Notably, these statistics shed light on the gender balance in our sample. Examining the age distribution, a substantial majority – more than two-thirds – of the participants were 25 years old or younger at the time of the survey in 2020. With regard to sociodemographic background, the fathers of around a fifth (21 %) of respondents work in "Management, professional, and higher-level intellectual occupations" and as manual workers. The pattern in the data on mothers' activity differs, with 34 % in clerical and sales roles, while 17 % and 11 % are executives/professionals and manual workers respectively. In terms of parents' country of birth, respectively 81 % and 83 % of the respondents' fathers and mothers were born in France. The data on living arrangements show that, at the time of the first lockdown, a significant proportion of young individuals lived outside the parental home—whether in shared housing (7 %), with an intimate partner (30 %), or independently (23 %). Nevertheless, living with parents was the most common arrangement, encompassing 40 % of the cohort. At the time of the survey, a majority of these young individuals had no children, with only 10 % reporting being parents. Eighty-two percent of the sample lived in an urban area.

[6]The young respondents underwent individuals are a retrospective interviewed once, retrospectively on their career paths. The collection questionnaire is available on from the webpage describing the Génération 2017 survey: `https://www.cereq.fr/enquetes-et-donnees-enquetes-sur-linsertion-professionnelle-des-jeunes-generation/generation-2017`.

The educational trajectories represented in the cohort are diverse. Twelve percent left the educational system with no educational qualifications, 17 % and 26 % with vocational qualifications in industrial and tertiary specialties respectively, 41 % with what we refer to as a 'general' qualification (see below for details), and 4 % with a postsecondary qualification in health or social care. These multifaceted sociodemographic variations enrich our understanding of the diverse composition of the survey population, which provide a robust foundation for the subsequent analysis of their labor market integration dynamics during the unprecedented challenges posed by the COVID-19 pandemic.

A national lockdown was imposed extending from 17 March 2020 to 11 May 2020. A comprehensive analysis of the average monthly probability of being employed, whose results are presented in Table 2, reveals major differences between the pre- and post-COVID periods. The results show that there was a pronounced drop in the probability of being employed from the pre-COVID period (March 2020 to July 2020) to the post-COVID-19 period (from September 2019 to February 2020). This significant divergence highlights the disruptive effect of the crisis on young people's labor market integration.

The concept of employment during lockdown encompasses a range of scenarios in which individuals report that they continued to work and receive income. This applies not only to people working remotely, but also to those whose employer moved them into a short-time working (partial activity/partial unemployment) regime. The latter case involves a sustained decrease in operational activity, resulting in a reduction in working time. In recognition of this situation, the state granted these employees an allowance, which was accompanied by a commitment on the part of the employer to retain the employees despite operational constraints. In our sample, of those who were employed during the lockdown and for whom relevant information is available (70 %), half of them reported working remotely (49 %). This underlines the importance of remote working as a coping mechanism in the difficult circumstances imposed by the lockdown. In addition, 39 % of this group went into partial activity, indicating that a significant portion of the youth workforce faced reduced working hours due to the wider economic impacts of the pandemic. The prevalence of remote and partial working reflects the dynamic nature of the labor market in these unprecedented times, with individuals and companies adopting alternative work arrangements to cope with the uncertainty and economic fluctuations triggered by the COVID-19 crisis.

3 Empirical strategy

3.1 Event study

In order to assess the impact of the COVID-19 pandemic on the integration of young people into the labor market a few years after they leave the education system, we use an event-study methodology. This analytical framework enables us to observe the evolution of young people's probability of employment month by month. The equation to be estimated is the following:

$$Y_{i,t} = \alpha + \sum_{\substack{t=-6 \\ t\neq -1}}^{4} \beta_t \text{COVID-19}_t + \mathbf{X}'_{\mathbf{i,t}}\gamma + \epsilon_{i,t} \tag{1}$$

where $Y_{i,t}$ is the outcome of interest, i.e. individual i's probability of being employed in month t. The latter represents the number of months before/after the beginning of lockdown, and is equal to 0 for March 2020, the month of lockdown implementation. $COVID-19_t$ is the indicator variable. We exclude the period prior to the event ($t = -1$)using it as baseline against which later values can be compared to identify any effect. $\mathbf{X}'_{\mathbf{i,t}}$ includes gender, age, mother's and father's socio-occupational status, parents' country of birth, living arrangement (with parents, shared housing, etc.), parenthood status, area of residence (by French department), urban/rural area of residence, area of study and month of departure from the educational system as controls. $\epsilon_{i,t}$ is an unobserved error term.

3.2 Difference-in-differences

To verify the robustness and reliability of our results, we tested an alternative estimation method. Drawing on the wealth of data from previous waves of the Génération survey, we reconstructed the labor market entry trajectories of previous cohorts, in particular those of 2010 and 2013, month by month. This enables us to use a difference-in-differences approach, with the previous cohorts serving as the control group and the 2017 cohort as the treatment group. We can then determine the causal effect of the COVID-19 pandemic on labor market integration. The estimate is calculated using the following equation:

$$Y_i = \alpha + \beta \text{Cohort}_i + \gamma \text{COVID-19}_i + \delta(\text{Cohort}_i \times \text{COVID-19}_i) + \mathbf{X}'_{\mathbf{i}}\zeta + \varepsilon_i \tag{2}$$

where δ is the coefficient of interest, measuring the impact of the COVID-19 pandemic after the beginning of lockdown. This enables us to measure the effects of the pandemic on labor market integration trajectories. Due to the limited follow-up period of previous cohorts, which only extends to month 42 (while lockdown begins in month 41 for the 2017 cohort), our analysis in this context is limited to this cut-off date. Consequently, we focus on estimating the impact of the COVID-19 pandemic on labor market integration in the immediate aftermath of lockdown, providing a focused examination of post-closure dynamics within a truncated time window. This alternative approach strengthens the robustness of our analysis, ensuring that the observed effects do not depend solely on the choice of our primary method, and offering a more comprehensive picture of the impacts of the pandemic on young people's labor market outcomes.

Appendix Figure A2 features a transition graph equivalent to the one in Figure A1 for previous Génération surveys. Trends analogous to those for the 2017 cohort can be seen for the 2010 and 2013 cohorts. This provides evidence that the identification assumption holds in our setting.

4 Results

4.1 Main results

Figure 1 illustrates the profound impact of the COVID-19 pandemic on the labor market integration of young individuals, as revealed using the event-study methodology described above. Table 3 presents monthly coefficients. Prior to the onset of the COVID-19 crisis, young people's probability of being employed was roughly constant. The test for pre-trends, with a p-value of 0.893, underscores the stability observed during this period. But the landscape dramatically shifts in the aftermath of the pandemic, and young people's probability of employment declines substantially. Figure 1 shows an immediate drop in the probability of being employed during the first month of lockdown. After this sudden decline, employment was lower than the pre-pandemic level throughout the observation period, albeit with the net loss moving back towards zero by the conclusion of the study. The empirical evidence thus highlights the significant impact of the pandemic on the employment landscape facing young people, providing a strong indication of the abrupt and sustained challenges faced by this demographic during the COVID-19 crisis.

4.2 Heterogeneity analysis

We assessed heterogeneity effects in several ways.

Figure 2 provides a breakdown of the impact of the COVID-19 pandemic on labor market integration by type of employment contract. Notably, the probability of being employed on a short-term contract[7] dropped more markedly and immediately during the initial stages of the COVID-19 crisis compared to the probability of having a long-term contract. This trend reversed towards the end of the observation period. These disparities can be attributed to the distinct vulnerabilities associated with short-term contracts, which were directly susceptible to the precipitous drop in economic activity and heightened uncertainty facing companies during the crisis. In this difficult context, employers may have been inclined to either refrain from retaining their temporary workforce or reduce their recruitment. Employees with long-term contracts likely had an easier time accessing partial unemployment, which allowed them to maintain their employment, at least immediately after lockdown began. As the pandemic persisted and uncertainty about the duration of its impacts grew, some employers may nonetheless have been driven to take more drastic measures, such as layoffs. This underscores the dynamic nature of the employment landscape, wherein the immediate shocks induced by the pandemic affected short-term contracts more acutely. The subsequent recovery, marked by a reversal in trends, reveals employers' adaptive strategies and the labor market's responsiveness to evolving economic conditions.

Next, we explore the heterogeneity of the effects of the COVID-19 pandemic on young people's labor market integration based on their field of study. Limitations in the data collected in the Génération survey make it difficult to make a granular distinction between fields of study. Despite these limitations, we can distinguish between individuals who graduated with what we will refer to as a 'general' qualification, those with a qualification in a health or social care specialty, those with a qualification in an industrial specialty, and those with a qualification focused on the tertiary sector, as well as individuals who left education without obtaining any formal qualifications.[8]

[7]Short-term jobs in our analysis are defined at the time of the interview as past jobs that lasted no more than 12 months or current jobs with a contract duration of no more than 6 months.

[8]Given the colinearity of level and area of study and the use of a variable for educational qualifications combining the two in the Génération databases, we were not able to integrate these two dimensions into the analyses. To examine the differential effects of the pandemic in different sectors, we divided the respondents by area of study. It must be noted, however, that the ranges of level of education covered by the different categories vary. Vocational qualifications up from lower secondary to two years of postsecondary education are categorized as either 'industrial' (technical) or 'tertiary' (services). Other qualifications are grouped by broad subject areas: arts and social sciences, sciences, business, or health and social care. Here, we group all but the last of these under the 'general' category. This includes the general (non-vocational, academic) secondary school diploma,

Figure 3 presents the estimated monthly probability of employment by area of study. The results highlight the differential impact of the COVID-19 pandemic on young people's employment depending on their chosen field of study. In particular, people with a qualification in health or social care showed remarkable resilience on the job market during the pandemic, attesting to the demand for their expertise during the crisis. Conversely, the pandemic had a particularly pronounced negative impact on the probability of employment of young people with a qualification focused on the tertiary sector. This impact slightly surpassed that faced by those with an industrial qualification, underscoring the differential impact of the crisis depending on individuals' area of study. This difference is likely attributable to the fact that jobs in the tertiary sector were more severely affected by the lockdown, notably given their higher likelihood of being in sectors classified as non-essential. The effect on young individuals with a general qualification was less pronounced. The observed effect on the employment of young people who left education with no formal qualifications is similar to the overall (average) effect. These results are consistent with the economic literature, which has shown that the impact of the COVID-19 pandemic varied by sector of activity (see Cortes and Forsythe, 2023; Rothstein and Unrath, 2020; Lemieux et al., 2020, for example).

In addition, we analyse whether gender played a significant role in the impact of the COVID-19 crisis on youth employment. Recent research, notably by Meekes et al. (2023); Villarreal and Yu (2022), has highlighted a disproportionate impact of the pandemic on women's employment. This gap has been attributed, in large part, to difficulties associated with limited access to reliable childcare and in-person schooling, as highlighted by various studies (e.g. Albanesi and Kim, 2021; Alon et al., 2020; Amuedo-Dorantes et al., 2023; Fuchs-Schündeln et al., 2020). Figure 4 provides a visual representation of these gender-specific effects in our setting. The results suggest that in our study population, there was only a marginal difference between the impact of the crisis on men's and women's employment. This smaller gender disparity can likely be attributed in large part to the youth of the study population, and in particular the fact that relatively few (14.35 %) of the women respondents were mothers during the observation period. These younger women thus did not experience a "COVID motherhood penalty" (Couch et al., 2022).

We then examined the influence of social background, parents' country of birth, and residence in an urban or rural area on the effect of the COVID-19 crisis on em-

or baccalauréat, and bachelor's degrees or above in arts, sciences, engineering or business. Health and social care graduates include individuals who completed a two or more year postsecondary program in health or social care (including nurses) or an M.D. degree. Respondents who left formal education without qualifications form the final group.

ployment in the study population. We differentiate between young people with at least one parent whose occupation was as a manual worker and others, between those with at least one foreign-born parent and those with two French-born parents, and between those living in rural and urban areas. The results are shown in Figures 5 to 7. In all three cases, one of the two groups – those with at least one blue-collar parent, those with at least one foreign-born parent, and those living in rural areas – appears to have been slightly more affected by the COVID-19 pandemic in terms of their probability of being employed in a given month compared to their peers, but the associated effects are not significant with our limited sample size for those subpopulations. It is crucial to acknowledge, however, that the impact on these specific groups is characterized by statistical imprecision. The relatively smalll sample size of these apparently more affected subpopulations necessitates caution in interpreting the findings, as the associated confidence intervals are wider. Consequently, our results do not allow us to definitively conclude that these effects diverge significantly from those experienced by their peers.

4.3 Robustness

Here we discuss potential concerns about the analyses and results above, and assess their robustness in a number of ways.

First, we run a placebo test. We perform an additional event study estimation on a placebo sample using a time period without COVID-19 for our analysis. In this way, we use the sample data only for the period before the treatment, and estimate the event-study model with a false cutoff that is unrelated to the COVID-19 pandemic. The original time window runs from months 35 to 45[9] with the lockdown commencing in month 41. He we run the same analysis between months 30 and 40. In this simulated scenario, a "fake lockdown" period is introduced starting in month 36. The results are shown in Figure 8. They reveal the lack of statistically significant variations in the probability of being employed in this alternative time window, reaffirming the robustness of our results and the absence of spurious effects in our main analysis.

Second, we test two alternative specifications. We start by running an event study with a grouped pre-period. The results, shown in Table 4, are similar to those presented in Table 3. Next, we test whether our control variables affected the results. In Figure 9, we present the baseline results without controlling for any of the respondents' characteristics. The results mirror our initial findings, confirming the reliability and validity of our primary results.

[9]Where month 0 is September 2016.

Third, to reduce the likelihood of false rejections of the null hypothesis, we use Romano-Wolf step-down adjusted p-values to correct for multiple hypothesis testing (Romano and Wolf, 2016). The results are presented in Table 5, with the initial p-values in parentheses and the adjusted p-values in square brackets. While naturally the p-values increase with multiple-hypothesis correction, with the exception of month 4, the differences initially identified as statistically significant remain so. This again confirms the robustness of our earlier results, alleviates concerns about potential false positives, and strengthens the credibility of our research findings.

Fourth, we test the "no anticipation" assumption. According to this assumption, the treated units do not change their behavior in anticipation of the treatment before it begins. The first case of COVID-19 was reportedly detected in Wuhan, China, on 1 December 2019, and the first lockdown was implemented there on 23 January 2020. It was thus conceivable that individuals might have anticipated the arrival of similar measures in France and adapted their behavior accordingly. Here, to check that individuals and employers did not change their behavior in $t = -1$ (the month that preceded that of the beginning of the treatment) based on anticipation of the implementation of a lockdown, we use the period $t = -2$ (January 2020) as a reference period. The results are presented in Table 6. There is no evidence of a significant effect of the treatment at $t = -1$, which means that there was no discernible alteration in the employment of young individuals during this period. In simpler terms, this means that individuals in a position to determine young people's employment did not anticipate the treatment, which confirms the robustness of our results and shows that the observed effects are not distorted by anticipatory behavioral changes in the pretreatment period.

Fifth, we gradually extend the reference period up to 12 months before the lockdown to ensure that our results are not dependent on the choice of reference period. The results of these regressions are presented in Table 7. Regardless of the number of months in the reference period (between 6 and 12), our main results regarding the effects of the COVID-19 pandemic on young people's labor market integration in France remain unchanged.

Sixth, we use the alternative difference-in-differences estimation method presented in section 3.2. The results are presented in Table 8. This alternative method corroborates the findings obtained with the event-study methodology, underscoring the consistency and reliability of our estimates. The two methodologies converge on the conclusion that the COVID-19 pandemic and the associated lockdown exerted a negative impact on young people's probability of employment. To further reinforce the credibility of our DiD approach, we subjected it to a placebo test. In this test, we

designated the 2013 cohort as the treatment group and the 2010 cohort as the control group. The outcomes of this placebo test are detailed in Table 9. They reveal the absence of any spurious "false pandemic" effect on our outcomes of interest. This further confirms the robustness of our main findings.

All of these tests confirm the robustness of our initial results.

5 Conclusion

This study provides a comprehensive analysis of the immediate repercussions of the COVID-19 pandemic on the labor market integration of young people in France. The findings underscore the substantial impact of the crisis on youth employment, revealing a nearly 3 % decrease in young people's probability of being employed during the initial lockdown period from March to May 2020. While this decline is somewhat less severe than those revealed by similar studies in other countries, it indicates that young people faced a significant challenge on the French labor market in this period.

The results also suggest that the robust economic measures implemented in France during the pandemic may have played a crucial role in mitigating adverse effects on youth employment. The proactive measures, aimed at supporting businesses and preserving jobs, appear to have contributed to a more moderate decline in youth employment compared to some other nations. This observation underscores the importance of effective policy interventions in safeguarding the employment prospects of young people during times of crisis.

Heterogeneity analyses reveal differentiated patterns between employment contract types, areas of study, and social characteristics. There was a more pronounced initial decline in short-term contracts, followed by a subsequent recovery, emphasizing the associated vulnerability to economic shocks. Resilience is observed among graduates of health and social care programs, highlighting the crucial role of these professions during public health crises. Conversely, those who had been trained to work in the tertiary sector experienced more substantial negative impacts, reflecting differentiated activity in different employment sectors during the pandemic.

The gender differences revealed by our analysis are marginal, potentially due to the youth of the women in our sample, most of whom did not have children at the time and thus were not subject to the "COVID motherhood penalt". Social factors, including parental background and residing in a rural as opposed to an urban area, seem to have influenced the impact of the pandemic, although caution is warranted due to the statistical fragility of the results for smaller subpopulations.

In the early stages of the pandemic, then, specific categories of young individuals

were disproportionately affected, emphasizing the need for targeted support mechanisms for young people during future crises. Policymakers should consider tailored interventions to address the specific challenges facing these groups, ensuring a more equitable recovery and long-term labor market integration for all. Our findings contribute valuable insights to guide future policy decisions aimed at fostering the resilience and well-being of the younger workforce in the face of unforeseen challenges.

As a natural extension of this research, further investigation into the long-term effects of the COVID-19 pandemic on the labor market outcomes of young individuals would provide valuable insights. Exploring the enduring impacts beyond the immediate post-lockdown period could uncover trends and challenges that might not be immediately apparent. This longitudinal perspective would contribute to a more comprehensive understanding of the lasting consequences of the pandemic on youth employment trajectories, guiding policymakers in developing sustainable measures for future crises.

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Declarations of interest

Declarations of interest: none.

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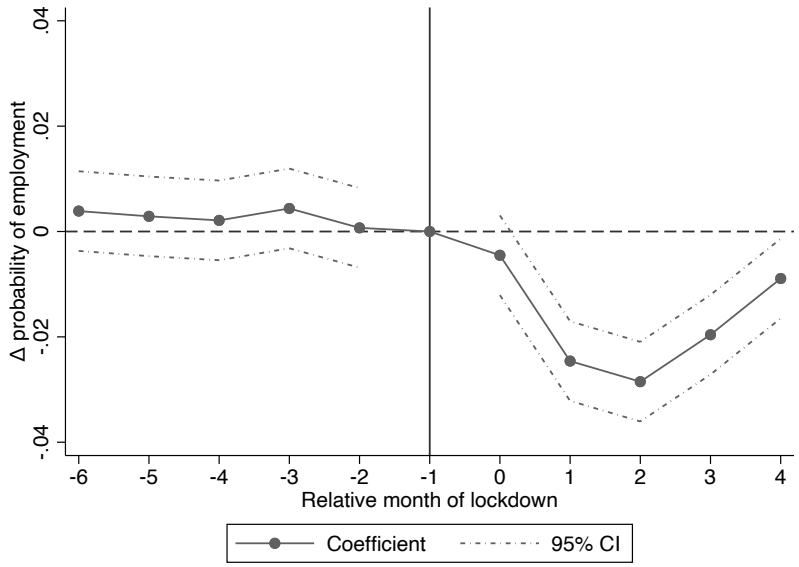
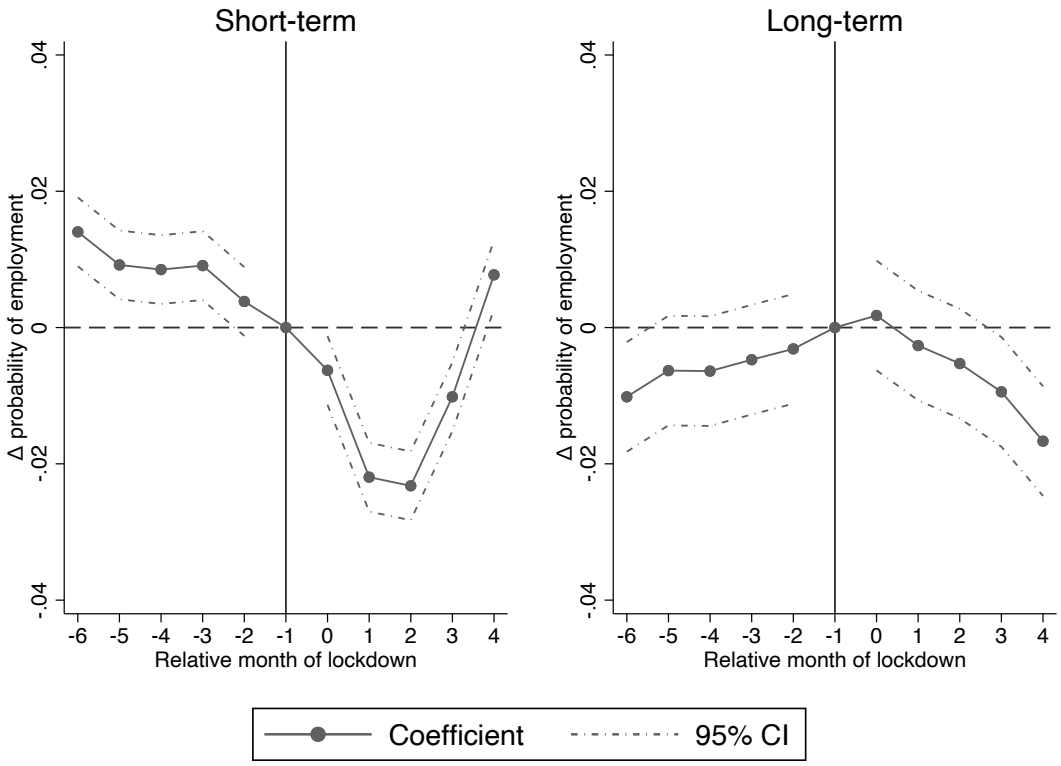
Figures and Tables

Figure 1: Event study: main results



Note: The coefficients plotted on the y axis are dummy variables, and represent the change in the probability of employment relative to the reference period ($t = -1$, February 2020). The x-axis represents the number of months before and after the beginning of the first lockdown in France (March 2020). Solid lines connect the estimated coefficients. Dashed lines show the 95 % confidence intervals. Control variables include gender, age, mother's and father's socio-occupational status, parents' country of birth, living arrangements, parenthood status, department of residence, urban/rural area of residence, area of study and month of departure from the educational system. Significance levels: $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.
Source: 2017 Génération survey.

Figure 2: Event study: heterogeneity by type of contract



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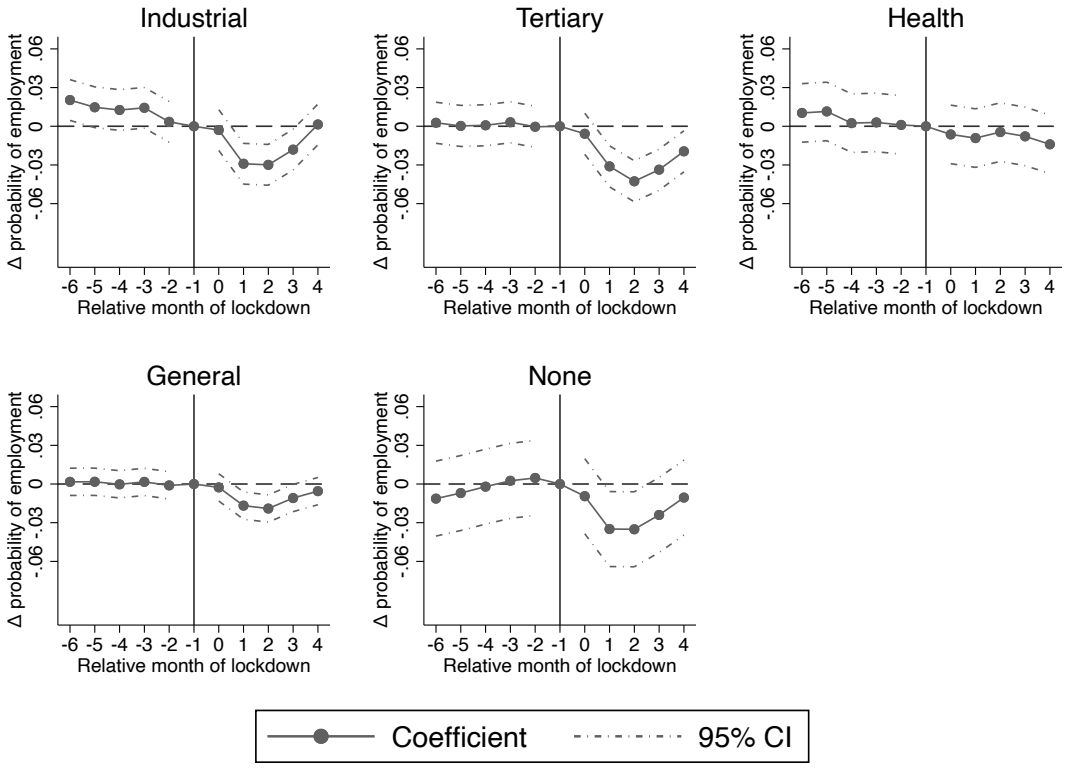
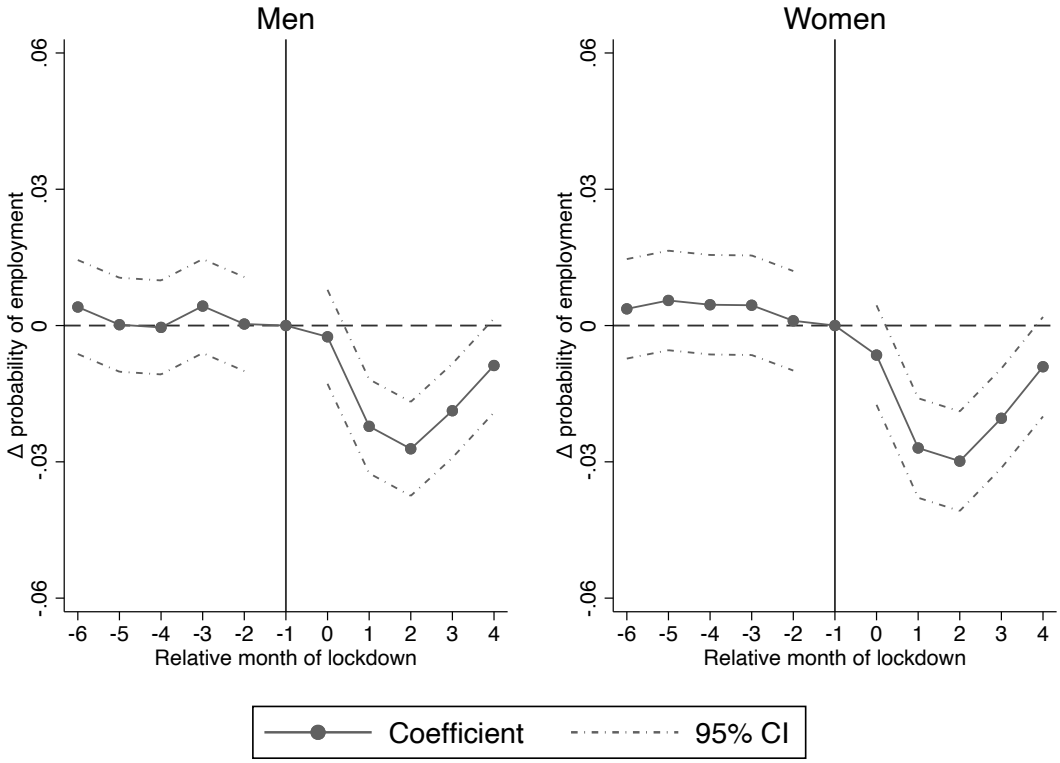
Source: 2017 Génération survey.

Figure 3: Event study: heterogeneity by area of educational qualification



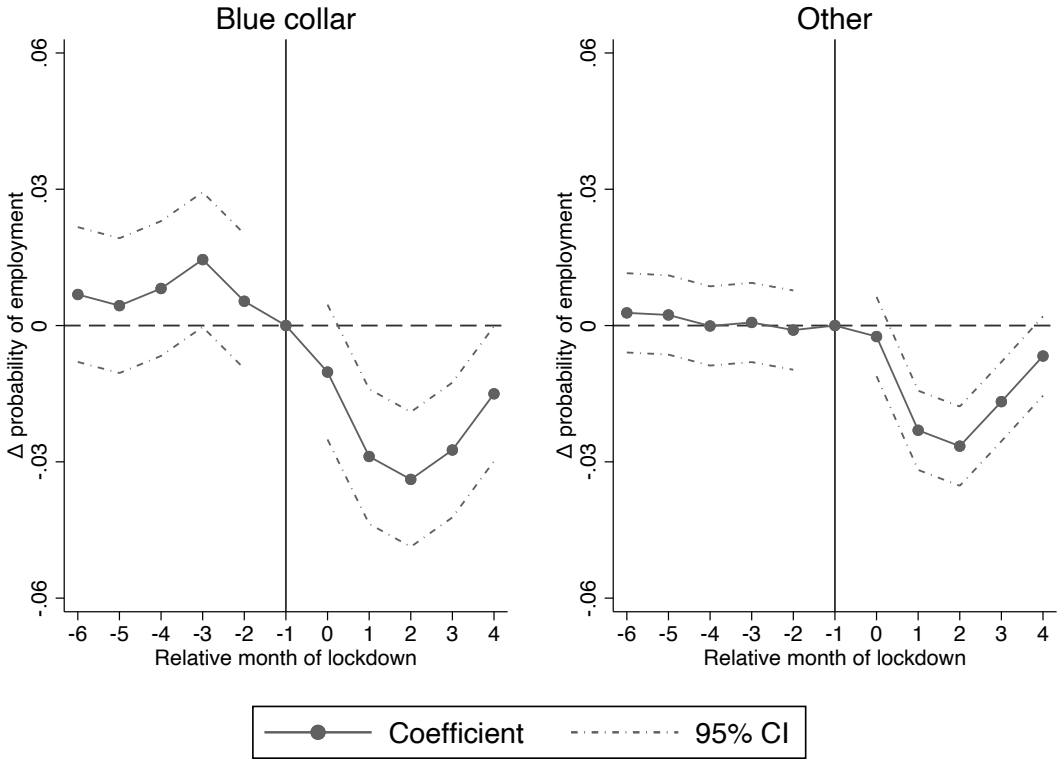
Note: The coefficients plotted on the y axis are dummy variables, and represent the change in the probability of employment relative to the reference period ($t = -1$, February 2020). The x-axis represents the number of months before and after the beginning of the first lockdown in France (March 2020). Solid lines connect the estimated coefficients. Dashed lines show the 95 % confidence intervals. Control variables include gender, age, mother's and father's socio-occupational status, parents' country of birth, living arrangements, parenthood status, department of residence, urban/rural area of residence and month of departure from the educational system. Significance levels: $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.
Source: 2017 Génération survey.

Figure 4: Event study: heterogeneity by gender



Note: The coefficients plotted on the y axis are dummy variables, and represent the change in the probability of employment relative to the reference period ($t = -1$, February 2020). The x-axis represents the number of months before and after the beginning of the first lockdown in France (March 2020). Solid lines connect the estimated coefficients. Dashed lines show the 95 % confidence intervals. Control variables include age, mother's and father's socio-occupational status, parents' country of birth, living arrangements, parenthood status, department of residence, urban/rural area of residence, area of study and month of departure from the educational system. Significance levels: $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.
Source: 2017 Génération survey.

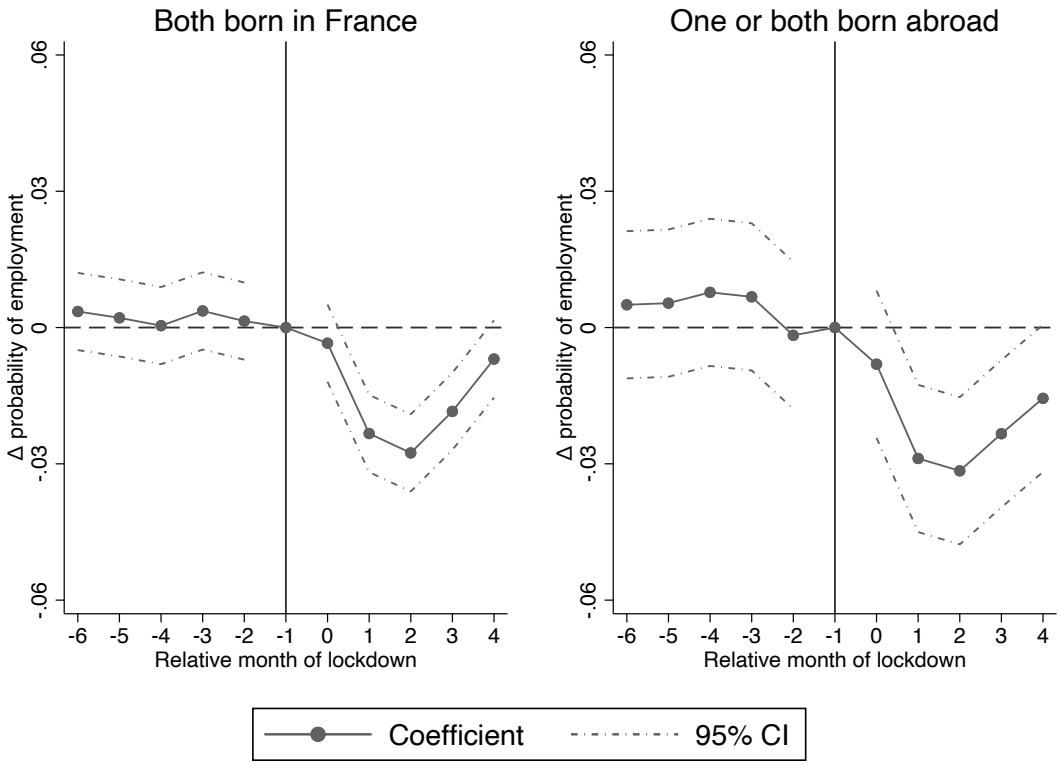
Figure 5: Event study: heterogeneity by parents' occupation



Note: The coefficients plotted on the y axis are dummy variables, and represent the change in the probability of employment relative to the reference period ($t = -1$, February 2020). The x-axis represents the number of months before and after the beginning of the first lockdown in France (March 2020). Solid lines connect the estimated coefficients. Dashed lines show the 95 % confidence intervals. Control variables include gender, age, parents' country of birth, living arrangements, parenthood status, department of residence, urban/rural area of residence, area of study and month of departure from the educational system. Significance levels: $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.

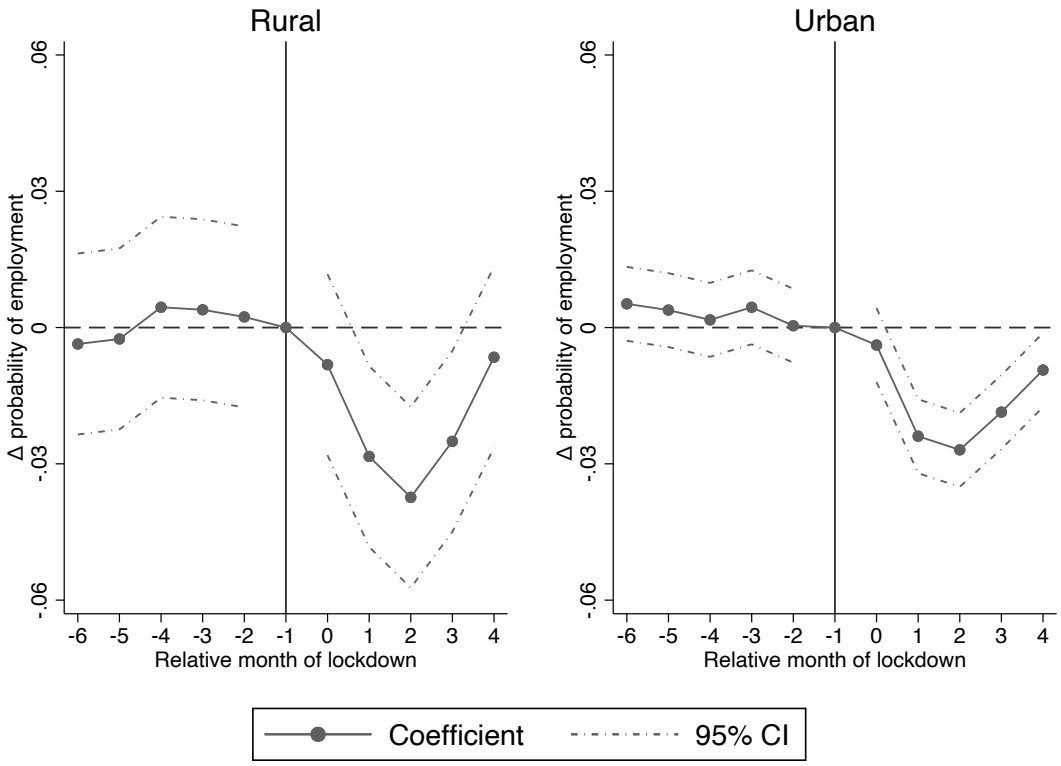
Source: 2017 Génération survey.

Figure 6: Event study: heterogeneity by parents' country of birth



Note: The coefficients plotted on the y axis are dummy variables, and represent the change in the probability of employment relative to the reference period ($t = -1$, February 2020). The x-axis represents the number of months before and after the beginning of the first lockdown in France (March 2020). Solid lines connect the estimated coefficients. Dashed lines show the 95 % confidence intervals. Control variables include gender, age, mother's and father's socio-occupational status, living arrangements, parenthood status, department of residence, urban/rural area of residence, area of study and month of departure from the educational system. Significance levels: $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.
Source: 2017 Génération survey.

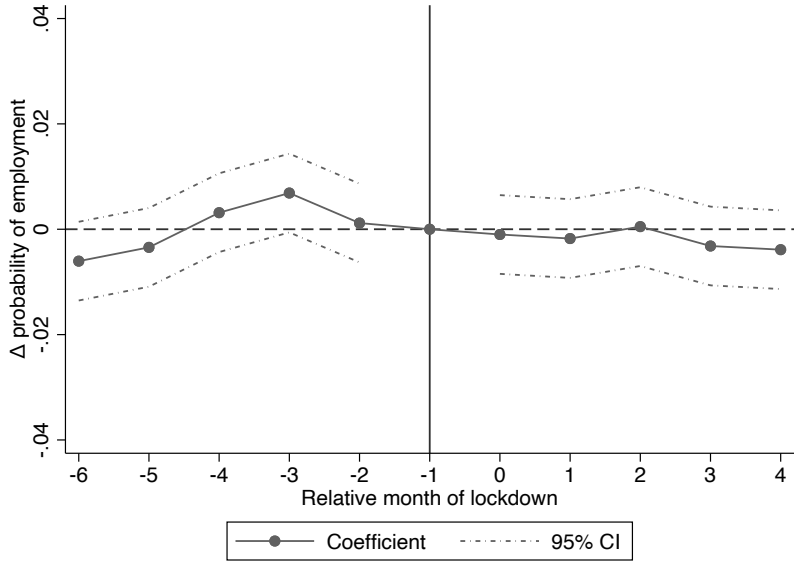
Figure 7: Event study: heterogeneity by urban/rural area of residence



Note: The coefficients plotted on the y axis are dummy variables, and represent the change in the probability of employment relative to the reference period ($t = -1$, February 2020). The x-axis represents the number of months before and after the beginning of the first lockdown in France (March 2020). Solid lines connect the estimated coefficients. Dashed lines show the 95 % confidence intervals. Control variables include gender, age, mother's and father's socio-occupational status, parents' country of birth, living arrangements, parenthood status, department of residence, area of study and month of departure from the educational system. Significance levels: $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.

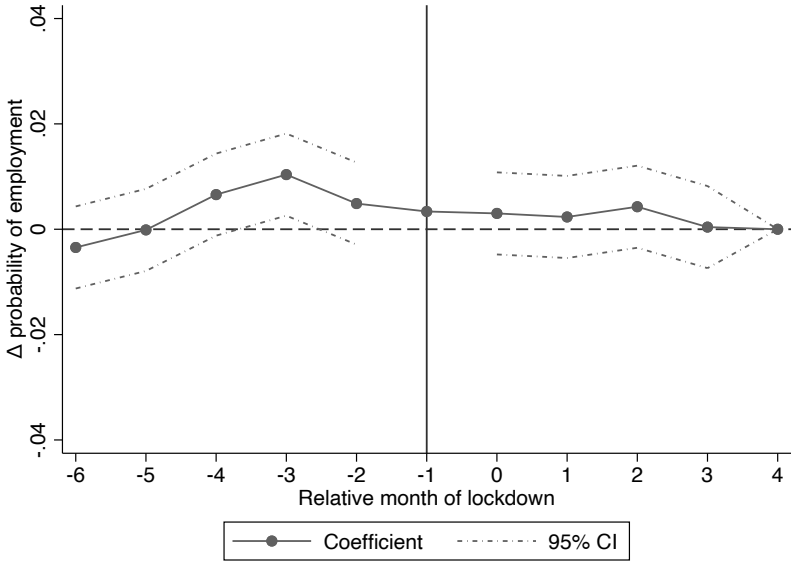
Source: 2017 Génération survey.

Figure 8: Event study: placebo test



Note: The coefficients plotted on the y axis are dummy variables, and represent the change in the probability of employment relative to the reference period ($t = -1$, September 2019). The x-axis represents the number of months before and after the beginning of the "fake lockdown" (October 2019). Solid lines connect the estimated coefficients. Dashed lines show the 95 % confidence intervals. Control variables include gender, age, mother's and father's socio-occupational status, parents' country of birth, living arrangements, parenthood status, department of residence, urban/rural area of residence, area of study and month of departure from the educational system. Significance levels: $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.
Source: 2017 Génération survey.

Figure 9: Event study: without controls



Note: The coefficients plotted on the y axis are dummy variables, and represent the change in the probability of employment relative to the reference period ($t = -1$, February 2020). The x-axis represents the number of months before and after the beginning of the first lockdown in France (March 2020). Solid lines connect the estimated coefficients. Dashed lines show the 95 % confidence intervals. Significance levels: $^{*}p < 0.1$,** $p < 0.05$,*** $p < 0.01$.
Source: 2017 Génération survey.

Table 1: Descriptive statistics

Sociodemographic characteristics	
Gender	
Men	49.38%
Women	50.62%
Age	
<=20	5.53%
20–21	15.26%
22–23	25.30%
24–25	20.12%
26–27	19.84%
>=28	17.56%
Father's socio-occupational category	
Farmer	3.08%
Self-employed	12.29%
Managers, professionals, and higher-level intellectual occupations	20.51%
Intermediate occupations	9.61%
Clerical and sales	8.69%
Manual	21.44%
Economically inactive, or NR	24.37%
Mother's socio-occupational category	
Farmer	1.41%
Self-employed	5.88%
Managers, professionals, and higher-level intellectual occupations	16.88%
Intermediate occupations	6.95%
Clerical and sales	33.86%
Manual	11.32%
Economically inactive, or NR	23.69%
Father's country of birth	
France	80.71%
Other country	19.29%
Mother's country of birth	
France	82.76%
Other country	17.24%
Living arrangements	
With parents	40.08%
With partner	29.67%
Single	23.19%
Share housing	6.86%
Parenthood status	
Non-parent	89.75%
Parent	10.25%
Urban/rural area of residence	
Rural	14.66%
Urban	81.92%
Area of study	
No qualifications	12.22%
Industrial	16.80%
Tertiary	25.68%
General	41.30%
Health	4.00%

Note: The reported values are the sample means.

Table 2: Young people's probability of being employed before and during the initial COVID-19 lockdown period

	Before lockdown	During lockdown	Difference	p-value
Employment	0.725	0.706	-0.019	$<$0.001

Note: Values are means calculated over the time windows September 2019 to February 2020, for the before lockdown period, and March 2020 to July 2020, for the COVID-19 lockdown period. The p-values for differences was calculated using Student's t test.
Source: 2017 Génération survey.

Table 3: Event study: main results

	Employment
Month -6	0.004
	(0.004)
Month -5	0.003
	(0.004)
Month -4	0.002
	(0.004)
Month -3	0.004
	(0.004)
Month -2	0.001
	(0.004)
Month -1 (omitted)	-
	-
Month 0	-0.005
	(0.004)
Month 1	-0.025***
	(0.004)
Month 2	-0.029***
	(0.004)
Month 3	-0.020***
	(0.004)
Month 4	-0.009*
	(0.004)
N	25,164

Note: Control variables include gender, age, mother's and father's socio-occupational status, parents' country of birth, living arrangements, parenthood status, department of residence, urban/rural area of residence, area of study and month of departure from the educational system. Significance levels: $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.

Source: 2017 Génération survey.

Table 4: Event study: grouped pre-period

	Employment
Month 0	-0.007*
	(0.003)
Month 1	-0.027***
	(0.003)
Month 2	-0.031***
	(0.003)
Month 3	-0.022***
	(0.003)
Month 4	-0.011***
	(0.003)
N	25,164

Note: Control variables include gender, age, mother's and father's socio-occupational status, parents' country of birth, living arrangements, parenthood status, department of residence, urban/rural area of residence, area of study and month of departure from the educational system. Significance levels: $^{*}p < 0.1$,** $p < 0.05$,*** $p < 0.01$.

Source: 2017 Génération survey.

Table 5: Event study: correction for multiple hypothesis testing (Romano-Wolf)

	Employment
Month -6	0.004
	(0.314)
	[0.911]
Month -5	0.003
	(0.454)
	[0.911]
Month -4	0.002
	(0.583)
	[0.911]
Month -3	0.004
	(0.256)
	[0.911]
Month -2	0.001
	(0.856)
	[0.911]
Month -1 (omitted)	-
	-
Month 0	-0.005
	(0.243)
	[0.911]
Month 1	-0.025
	(<0.001)
	[0.001]
Month 2	-0.029
	(<0.001)
	[0.001]
Month 3	-0.020
	(<0.001)
	[0.003]
Month 4	-0.009
	(0.021)
	[0.387]
N	25,164

Note: Initial p-values are in parentheses, Romano-Wolf adjusted p-values in square brackets. Control variables include gender, age, mother's and father's socio-occupational status, parents' country of birth, living arrangements, parenthood status, department of residence, urban/rural area of residence, area of study and month of departure from the educational system. Significance levels: $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$.

Source: 2017 Génération survey.

Table 6: Event study: no anticipation assumption

	Employment
Month -6	0.003
	(0.004)
Month -5	0.002
	(0.004)
Month -4	0.001
	(0.004)
Month -3	0.004
	(0.004)
Month -2	-
(omitted)	-
Month -1	-0.001
	(0.004)
Month 0	-0.005
	(0.004)
Month 1	-0.025***
	(0.004)
Month 2	-0.029***
	(0.004)
Month 3	-0.020***
	(0.004)
Month 4	-0.010*
	(0.004)
N	25,164

Note: Control variables include gender, age, mother's and father's socio-occupational status, parents' country of birth, living arrangements, parenthood status, department of residence, urban/rural area of residence, area of study and month of departure from the educational system. Significance levels: $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.

Source: 2017 Génération survey.

Table 7: Event study: extension of the reference period

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Month -12							-0.009*
							(0.004)
Month -11						-0.002	-0.002
						(0.004)	(0.004)
Month -10					0.000	0.000	0.000
					(0.004)	(0.004)	(0.004)
Month -9				0.007	0.007	0.007	0.007
				(0.004)	(0.004)	(0.004)	(0.004)
Month -8			0.011**	0.011**	0.011**	0.011**	0.011**
			(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Month -7		0.005	0.005	0.005	0.005	0.005	0.005
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Month -6	0.004	0.004	0.004	0.004	0.004	0.004	0.004
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Month -5	0.003	0.003	0.003	0.003	0.003	0.003	0.003
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Month -4	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Month -3	0.004	0.004	0.004	0.004	0.004	0.004	0.004
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Month -2	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Month -1 (omitted)	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
Month 0	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Month 1	-0.025***	-0.025***	-0.025***	-0.025***	-0.025***	-0.025***	-0.025***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Month 2	-0.029***	-0.029***	-0.029***	-0.029***	-0.029***	-0.029***	-0.029***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Month 3	-0.020***	-0.020***	-0.020***	-0.020***	-0.020***	-0.020***	-0.020***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Month 4	-0.009*	-0.009*	-0.009*	-0.009*	-0.009*	-0.009*	-0.009*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
N	25,164	25,164	25,164	25,164	25,164	25,164	25,164

Note: Here the model is estimated with a progressively extended reference period, covering a longer timeframe, month by month. Control variables include gender, age, mother's and father's socio-occupational status, parents' country of birth, living arrangements, parenthood status, department of residence, urban/rural area of residence, area of study and month of departure from the educational system. Significance levels: $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.
Source: 2017 Génération survey.

Table 8: Difference-in-differences: main results

	Difference in probability of employment
Cohort × COVID-19	-0.016***
	(0.003)
N	69,911

Note: Control variables include gender, age, mother's and father's socio-occupational status, parents' country of birth, living arrangements, department of residence, urban/rural area of residence and area of study. Significance levels: $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.
Source: 2017, 2013 and 2010 Génération surveys.

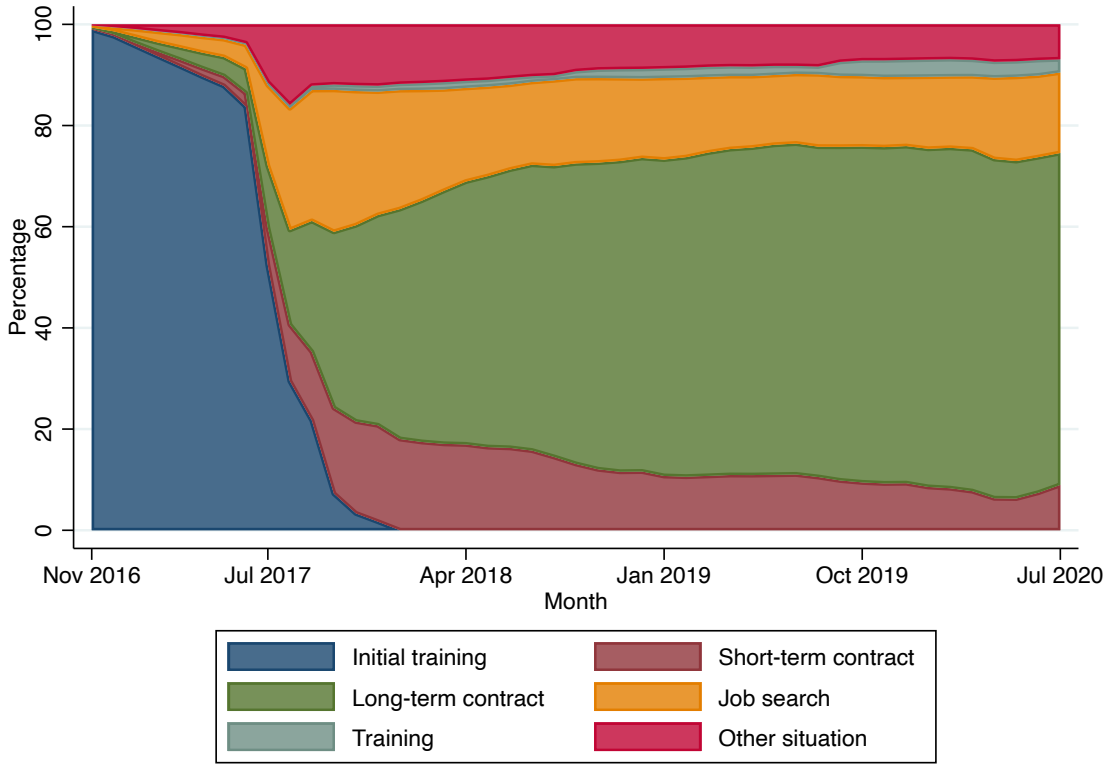
Table 9: Difference-in-differences: placebo test

	Difference in probability of employment
Cohort × Placebo COVID-19	0.006
	(0.003)
N	47,707

Note: Control variables include gender, age, mother's and father's socio-occupational status, parents' country of birth, living arrangements, department of residence, urban/rural area of residence and area of study. Significance levels: $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.01$.
Source: 2013 and 2010 Génération surveys.

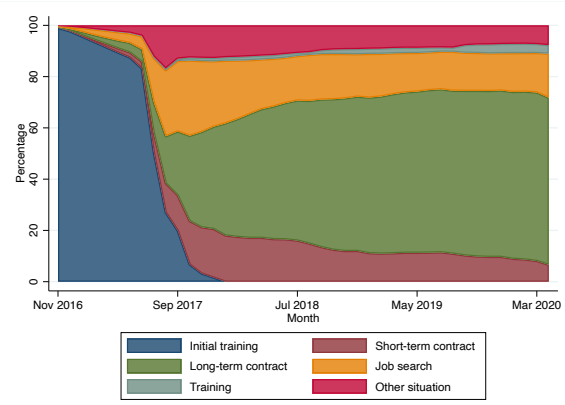
Appendix

Figure A1: Situation of young people in the first years after initial training

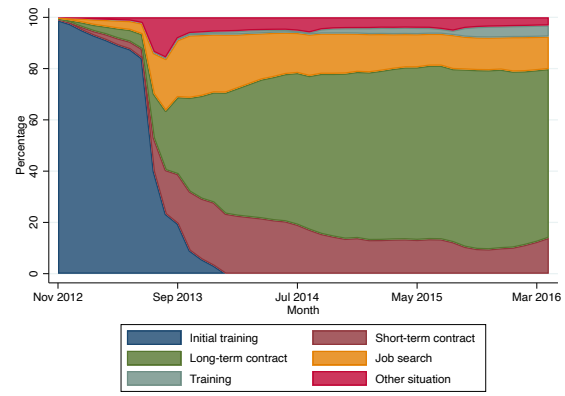


Note: The figure shows the monthly situation of young people who left the education system in France during the 2016-2017 school year, over that year and the following years, in terms of labor market integration. Number of respondents: 25,164.
Source: 2017 Génération survey.

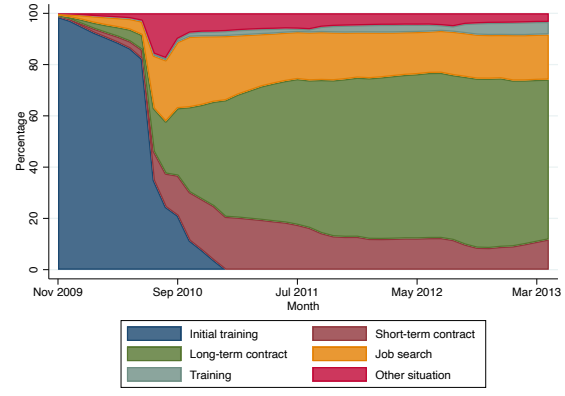
Figure A2: Situation of young people in the Génération surveys



(a) 2017 Génération survey



(b) 2013 Génération survey



(c) 2010 Génération survey

Note: The figure shows the monthly situation of young people leaving the education system in France in terms of labor market integration over 42 months. Number of respondents: 69,911.
Source: 2017, 2013 and 2010 Génération surveys.