The role of Payroll Tax Incentives on Youth Employment and Wages: Evidence from Italy

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February 14, 2025
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Abstract

This paper uses administrative data to analyze the impact of payroll tax incentives on young workers' employment and wages. I exploit the variation induced by a 2018 Italian policy, which implemented a 50% payroll tax cut to hire individuals under 35 years old with no prior spell of permanent employment. The policy defines an ideal setting for a quasi-natural experiment, with the eligibility criterion determined by the 35-year age threshold. I find a significant increase both for temporary and permanent hirings for eligible workers after the introduction of the policy. There is suggestive evidence that the policy improved job stability for young workers, as reflected by an increase in the use of permanent contracts relative to temporary ones. Additionally, the probability of transitioning to permanent employment for younger workers in the labor market increased. Finally, the analysis shows that the policy had small or no effects on workers' wages, suggesting no significant pass-through of the payroll tax incentive to the workers.

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1 Introduction

Over the last few decades, almost all European countries have experienced high levels of youth unemployment and job precariousness. Since the 1990s, high and persistent youth unemployment has been a significant challenge for OECD countries, with rates for individuals below 24 years of age being twice as high as those for individuals aged 25-64. Young adults often begin their careers with non-standard jobs, such as internships, part-time or seasonal work, and temporary contracts. These types of employment do not always serve as stepping stones to permanent jobs: they may trap young workers in a cycle of precarious employment, leading to dead-end situations. These labor market characteristics can have long-lasting consequences for young workers. Unemployment can lead to social misbehavior (Fougère et al., 2009) and result in lost income (Gregg, Tominey, 2005). Periods of unemployment early in life can reduce an individual's prospects of future employment and wage outcomes (Arulampalam et al., 2001; Cruces et al., 2012). In response to the problem of youth unemployment, EU countries have enhanced labor market flexibility by allowing employers to hire workers on a fixed-term basis and relaxing employment protection to lower labor costs. However, there is mixed evidence on the effectiveness of these reforms in increasing overall employment: young workers started to experience high levels of temporary employment, which typically pays less, is associated with lower job satisfaction in some areas, and provides less work-related training (Booth et al., 2002).

Cuts to the employer portion of payroll taxes have been used as an alternative policy to reduce labor costs, particularly for workers facing high unemployment rates such as low earners, the young, or the elderly. Studies on payroll tax reductions have shown mixed results regarding their impact on employment, varying with the scale and duration of the incentives. While there is a growing consensus on the effectiveness of these policies in increasing employment, there is little discussion about the quality of the jobs created. If tax incentives are applied to all types of contracts, employers might take advantage of them by hiring workers and keeping them employed until they are no longer eligible for the incentives, then replacing them with new eligible

workers. This practice could increase employment among the targeted population without necessarily leading to greater job stability.

The question then is how much payroll tax incentives are useful to favor stable employment for a certain targeted group. In this paper I focus on a large, long-lasting employer-borne payroll tax cut for young workers hired with a permanent contract in Italy, introduced in a 2018 Italian Budget Law. I analyze what is the effect of the policy both on temporary and permanent employment for the targeted group; I estimate proportional hazard models for the risk of finding a permanent job for eligible workers after the onset of the policy, compared to ineligible workers' risk probability. Then, I focus on workers' wages to understand if payroll taxes' incidence, even if nominally paid by employers, ultimately falls on workers' wages, leaving firms' gross labor costs unchanged.

The 2018 Italian budget law introduced incentives to promote the hiring of young people through payroll tax cuts for permanent contracts. Since January 1, 2018, private employers who hired under-35 years old people on a permanent basis could benefit from a 50% reduction in their social security contributions borne by the employer. Specifically, payroll taxes account for the 23.81% of the overall labor costs for a single worker; the policy benefit translates in a 11.95% decrease in total labor costs for the employer. The incentive had a 3,000 euros cap per year per hired worker and applied for a maximum period of three years. It was necessary that the worker had not previously had permanent employment relationship with the same or another employer. The incentive applied also if temporary contracts were converted into permanent contracts. Since January 1, 2021, the exemption on payroll taxes has been raised to 100% (cap set to 6,000 € per year) and the eligibility threshold went up to 36 years old, to face Covid-19 downturns. The motivation for the reform was to stimulate demand for young workers given high youth unemployment, making it more attractive for companies to prefer stable contracts over temporary ones. Furthermore, the increase in employment aimed to stimulate the economy, boosting internal demand and economic growth.

I evaluate the effects of the introduction of the program using administrative

data from CO (Comunicazioni Obbligatorie), collected by the Ministry of Labor and Social Policy. I have access to CICO (Campione Integrato Comunicazioni Obbligatorie) data, a sample providing information for every worker born between the 1st and the 10th day of every month. Data are collected for every worker hired in the private sector from 2010 to 2022. The dataset provides workers' and firms' unique identifiers, making possible to trace workers' previous employment history and providing detailed information on job characteristics, such as hiring date, termination date (if termination occurs), conversion date (if a change in the contractual form occurs), motivation for contract termination, occupation, contractual form, worker demographics and few firm characteristics.

In the first part of the analysis I test whether young eligible workers (under-35 years old, never employed with a permanent contract before) face higher permanent employment after the introduction of the policy: I show the evolution of the youth permanent hiring share compared to slightly older workers' in an event-study framework. My results show that a 50% to 100% payroll tax reduction raised the relative share of the permanent hirings for the targeted group by 2.4–3.9 percent during the five years following the policy setting. This effect is considerably higher than found in previous studies on payroll taxes (Anderson, Meyer, 2000; Bennmarker et al., 2009; Bohm, Lind, 1993; Gruber, 1997; Huttunen et al., 2013 ; Korkeamäki, Uusitalo, 2009) and in line with the most recent ones (Egebark, Kaunitz, 2018; Saez et al., 2019). I show that the relative policy incentive is effective not only for permanent hirings, but also increases the relative share of temporary hirings for young workers, even if the use of this type of contracts was not incentivized by the policy. The idea behind this result is that a temporary hiring for an under-35 years old has an option value attached on: an employer that cannot observe the ability of a potential employee could prefer to hire a slightly younger worker because, after a screening period, a temporary contract can be converted to a permanent one with lower costs.

Then, I test whether the policy was effective in increasing employment stability for younger workers. I exploit both a Difference-in-Difference and an event study

methodology: conditioning on the hiring event, I find that the probability of being hired with a permanent contract is higher for the targeted group in the years following the policy setting. To conclude the analysis on employment, I estimate proportional hazard models for the risk of finding a permanent job after a worker enters in the Labor Market (LM). Following Fasani et al.(2019) methodology, I show how the hazard rate increases for the young workers who entered in the LM before 2018 with respect to their older counterpart. In other words, after the policy has been set, the transition to permanent employment for the youth becomes faster.

Finally, the focus is on the impact of the policy on workers' wages. I reject the canonical prediction that market wages absorb the tax cut. Instead, I document a perfect pass-through to labor costs: average wages (measured as monthly gross wages) are smoothly increasing in age, but no discontinuity is found at the age cutoff where the payroll tax cut applies and in years after the policy is set. Though I don't dispose of net wages, this result brings suggestive evidence of the absence of a wage pass-through from the firm to the workers. The contrast between wages pre- and post-tax provides evidence for full incidence on firms.

This paper contributes to different strands of literature. First of all, it contributes to the already cited literature on the effects of hiring incentives on employment outcomes. The first contribution of the analysis is the focus on the use of payroll tax incentives to favour stable employment, while previous studies (Cahuc et al., 2019; Egebark, Kaunitz, 2018; Saez et al., 2021; Bíró et al.,2022) only focus on employment per se, which does not say much on the long-term effectiveness of the incentives on workers' career. Related to this point, the Italian context plays a key role, allowing me to measure the impact of the incentives in a Dual Labor Market context, where there is a pervasive use of temporary contracts (every year the use of temporary hirings is at leads three times the use of permanent ones) . This feature brings to another strand of literature which analyzes employment in dual labor markets (Güell, Petrongolo, 2007; Boeri, Garibaldi, 2007; Daruich et al., 2023). I find suggestive evidence that the role of Temporary Contracts (TC) changes after the Payroll Tax Incentive introduction. This interpretation is given by two considerations: the

increase in temporary hirings, combined to the even higher increase in permanent hirings, tells us that the probability of transitioning to a permanent condition becomes higher for the treated group; moreover, this transition becomes faster after the introduction of the policy, pointing out how the use of permanent contract takes the form of a screening device.

The paper is also related to the literature on payroll tax incidence on wages: the results align to several recent papers that have found less than full pass-through of employer SSCs to workers, with the generally proposed explanation that, depending on labor supply or demand elasticities, one could expect a wide range of pass-through estimates (Baicker, Chandra, 2006; Kugler, Kugler, 2009; Korkeamäki, Uusitalo, 2009; Cruces et al.,2010; Bozio et al., 2017; Saez et al., 2019; Zurla, 2021)

Finally, the paper adds contribution to the literature on hiring incentives in Italy (Ciani, De Blasio, 2015; Sestito, Viviano, 2016; Albanese et al., 2022; Citino, Fenizia, 2024): as far as I know, this is the first paper to analyze this specific policy, targeted to the use of permanent contracts for under-35 years old individuals.

2 Institutional Background and Data

2.1 The Italian Dual Labor Market

From the early eighties Italy has been an economy with high unemployment rate and low employment rate. Moreover, the Italian labour market has shown a large difference between youth unemployment and total unemployment, compared to the EU average. In fact, while the Italian unemployment rate has been aligned with the EU27 average over the period from 1992 to 2012, youth unemployment has been almost 10 per cent higher during the same period. To improve the Italian labor market condition, throughout the '90s and the beginning of 2000s the institutions set a series of reforms aiming to create and reinforce a dual labor market. The rational behind these reforms is that temporary contracts could ease the transition process between education and the working environment or encourage the selection of workers by employers and ease a better matching of job requirements to workers' needs/aspirations. In other words, they could facilitate entry in the labour market, particularly in those countries where vocational education and training is not sufficiently developed.

Italy is one of most prominent examples of labour market dualism. Over the last 20 years the Italian labour market underwent a significant reform process. Indeed, these reforms are partly responsible for the changes in the composition of the Italian labour force, like the increase in youth unemployment since 2009 and the widespread use of various forms fixed term contracts: The reform process mainly interested the gradual liberalization of temporary jobs, leaving unchanged the legislation for permanent contracts. Following the definition given by the literature on labour market reforms (Boeri, 2012), the Italian reform process is characterized by a marginal and asymmetric process, particularly from a generational standpoint: the labour market became more flexible for the entrants the LM, like youth and women. But prime aged workers were almost untouched by the reform process.

Four significant legislative changes contributed to spread the use of temporary contracts at the expense of permanent ones.

The 1997 Pacchetto Treu (Treu Bill) loosened the discipline concerning the con-

version of temporary contracts into permanent ones, reducing the sanctions in case of violation of the fixed term contracts' discipline; the conversion from temporary to permanent contract stopped being automatic and began to require a court ruling; new forms of temporary contract were added.

The 2001 reform established a further liberalization of the fixed term contract. From then on, temporary contracts became largely allowed as long as the motivation for their use was given in writing. In 2003, the legge Biagi introduced various other "atypical" labour contracts, trying to address firms' specific needs.

After several minor reforms that abolished the use of those several atypical contracts, in 2015 the Jobs Act went even further in liberalizing temporary contracts, at the same time weakening permanent contracts' legislation, effectively making the use of temporary contracts not an exception, but the rule: the requirement for specifying reasons was removed for all temporary contracts, which therefore no longer needed to indicate the previously mandatory justifications (technical, organizational, production, and replacement reasons). Therefore, just two limits were established for the use of this type of contract: the maximum duration of 3 years (including extensions), and the limited use to the 20% of the total workforce within the firm. However, collective bargaining agreements on quantitative limits to the contract remained valid. The Jobs Act also introduced a very generous unconditional hiring incentive. It was established by the Financial Stability Law for 2015 covered all new permanent workers hired by any firm from January to December 2015. Also in this case, the incentive was a three-year exemption from social security contributions up to a threshold. Sestito and Viviano (2018) studied the effects of the Jobs Act reforms.

2.2   Social Security Contributions in Italy

In Italy, like in most of Western Countries, Social Security Contributions are mandatory payments made by both employers and employees to fund the country's social security system, which provides benefits such as pensions, unemployment insurance, healthcare, and other social assistance programs.

Payroll tax rates slightly vary depending on several factors, like the type of employment, the industry, and the employee's salary. The employer typically bears between 28.53 % and 35.83% of the employee's gross salary in payroll taxes, while the employee contributes approximately bearing 9.49% of the salary. The total payroll tax rate ranges from around 38% to 45% of the gross salary, depending on the sector and specific circumstances.

The policy of interest, by the way, affects only the part of Payroll Taxes dedicated to Social Security Contributions: from the total of the payroll taxes, the portion of contributions borne by the employee (9.49%) and all employer contributions that are not part of the pension contributions should be subtracted. In the end, the incentive applies to 23.81% (on average) of the employee's gross salary; if we consider that the average monthly gross wage for a full-time worker hired with a permanent contract is about 1437 €(1614 $), it means that the labor costs go down by 158€(177$) per month until 2020, and by 316€(355$) per month for the workers hired after January 2021.

2.3   Policy Incentive and Eligibility

To promote stable youth employment, the Italian government introduced a discount on payroll taxes borne by private employers who, starting from January 1, 2018, hired workers under permanent employment contract. The policy ensured, for a maximum period of thirty-six months (three years), a 50 percent exemption from the total social security contributions due from employers, excluding premiums and contributions owed to the National Institute for Insurance against Accidents at Work (INAIL), with a maximum annual limit of 3,000 euros, applied on a monthly basis. There were no changes in the calculation rate for the pension benefits.

Then, the 2021 Budget Law (Law No. 178 of December 30, 2020) provided an increase in the exemption from social security contributions to 100% (maximum annual limit raised to 6,000 euros), benefiting employers that decided to hire or convert to permanent contracts - in the biennium 2021-2022 - individuals who, at the time of the event, were below 36 years old threshold.

The full three-year exemption applied to individuals who, at the date of the hiring, were not yet 35 years old and had not been previously employed on a permanent basis by the same or another employer: if a worker, for whose permanent employment exemption had been partially utilized, was hired again on a permanent basis by other private employers, the benefit was granted to these employers for the remaining period necessary for full utilization. The incentive lasts 4 years in the most disadvantaged Italian regions (Abruzzo, Basilicata, Calabria, Campania, Molise, Puglia, Sardegna, Sicilia).

To prevent the possibility that employers would fire older workers or workers already employed on a permanent basis to replace them with eligible workers, the exemption from contributions has been granted to employers who did not proceed to individual firing for justified objective reasons or collective firings in the same production unit in the six months either preceding or following the hiring.

2.4   Data and Descriptive Statistics

The CICO sample (Campione Integrato delle Comunicazioni Obbligatorie) represents a subset of the Mandatory Communications System. The sampling process includes all mandatory notifications that employers submit to the Italian Ministry of Labour when they activated or terminated a contract between 2010 and 2022 for workers born on the 1st, 9th, 10th, and 11th of each month, so that the basic observation in the data is a job relationship with an employer within a calendar year. It consists of 13 percent of all workers' hired in this time period. The dataset includes 22.7 million job relationships, consisting in 1.5 million of observation per year. The sample also includes notifications for job relationships that started before 2010, but still ongoing at the time the CO was activated.

I can follow employees over time and have detailed information on their work histories: for each contract, the data records the start and the end dates, the gross monthly wage, the type of contract - full or part-time and permanent, temporary or apprenticeship –, the occupation, the reason for its ending (if the contract ends) and, if a temporary contract is converted into permanent, the date of conversion.

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I also have information on workers' demographic and personal characteristics – such as gender, year of birth and education level – and firm characteristics – such as industry. I focus on contracts in the non-agricultural private sector, from which I also exclude sectors where employers are households (e.g., hiring baby-sitters or home and health care workers) or supra-national organizations. This is a standard selection for the analyses on the Italian labour market because the contractual rules in these sectors are somewhat different from those of other sectors; this is the case for the policy I am studying, that did not include employees hired in the public sector, neither in the agricultural or home sector. A caveat for the analysis on employment is that I can't observe directly neither unemployment nor employment stocks, given the structure of the data, that allow me to work on entry and exit flows. For this reason, I focus on the effects of the policy on permanent and temporary hirings, and on the relationship between these two measures at the year level. I restrict the sample to individuals aged 20-65 years old, after having defined an eligibility variable that detects if a worker had never been hired with a permanent contract throughout her working history.

Table 1 reports summary statistics for the full sample and the sub-sample of eligible workers for the years 2014-2017, the period preceding the policy's introduction. The statistics for eligible employees notably differ from those of the full sample, both for the probability of being hired with a permanent contract and the average contract length. Intuitively, these differences can be attributed to the fact that, once a worker secures her first permanent job, it becomes easier for her to maintain a stable employment path. That's why I do not take into account the possibility to exploit the source of variation given by the difference between never employed with a permanent contract and already employed, focusing on age differences.

This intuition is corroborated by two additional descriptive tables: Table 2 shows that the probability of being hired with a permanent contract is significantly higher for workers who had already been employed in stable jobs at the time of their subsequent hirings. Table 3 illustrates that temporary contracts have lower average contract length and a higher number of spells per worker.

These three tables collectively provide suggestive evidence of significant labor

market segmentation in the Italian context.

2.5 Conceptual Framework

Let us consider a standard tax incidence model, where labor markets are perfectly competitive. Competitive wages are determined such that aggregate labor demand equals aggregate labor supply: the incidence of the tax credit both on employment and wages depends on the relative elasticity of the aggregate demand and supply for labor. When a payroll tax incentive is introduced, the after-tax labor cost borne by the firms changes discontinuously for every eligible worker the employer decides to hire. The after-tax labor cost that the firm has to borne for non-eligible workers, instead, does not change after the introduction of the tax credit A payroll tax reduction assessed on employers, therefore, leads to a downward parallel shift in the labor demand curve: the new demand curve reflects the fact that treated workers become cheaper to employers. Hence, employers hire more treated workers (and possibly lay off control workers if it is possible). With upward-sloping labor supply, these employment effects bid up the wage of treated workers until the labor costs of the two groups are again equalized. The new equilibrium should lead to a discontinuity both in wages and in employment rates between the two groups. Frictions and costs in recruiting, training, and lay-offs influence the slope of the Labor Demand, making it more inelastic. On the other hand, firms' monopsony power also plays a fundamental role in determining the elasticity of labor supply associated to a shift in firms' labor costs. I will discuss these elements examining the empirical effects of the payroll tax incentive introduction both on wages and hiring rates.

3 Payroll Tax Incentives and Employment

3.1 Permanent Hirings

After the introduction of the policy, an employer would have saved 11.95% of her labor costs in the three-year period 2018-2020 hiring with a permanent contract an

eligible young worker (35 years old or less, never employed permanently) rather than an ineligible older worker (above 35 years old or already permanently employed), leaving net wages unchanged. Labor costs saving become even more generous (23.81%) if the hiring occurs after 2021. The two groups of workers should be close substitutes if we just focused on the age dimension, restricting the analysis only on workers for which the three years eligibility threshold was not exceeded.

Profit maximizing firms should want to hire permanently more eligible workers or put more effort in retaining eligible workers relative to ineligible ones (the policy in fact is active also for conversions into permanent contracts). We should see employment effects given that firms care about labor costs when hiring a new worker. To analyze this, I first examine how hiring patterns for the targeted group change over time: I restrict the original sample to workers hired when they were between 33-37 years old and that had been employed with a permanent contract for less than three years; 35 years old cohort is excluded, because it is treated only in the years after 2020; workers hired in the public sector are also excluded. Workers aged 33-34 are in the treatment group and workers aged 35-37 are in the control group. As I will show later, worker characteristics are quite comparable across the two groups. The analysis is led for the years 2014-2022.

The policy could have modified the LM in two ways: first, it could have increased the probability that a younger worker, already active in the LM before the introduction of the Policy, is hired with a permanent contract or her temporary contract is converted into a permanent one; second, it could have incentivized firms to hire a higher share of young among the pool of "outsiders" (people never been in the LM).

In my analysis, a "young worker" is defined as a person who, in the year of hiring, was less than 35 years old. The sample consists of individuals hired between the age of 33 and 37, previously employed with a permanent contract for almost three years. The others are declared ineligible and thus excluded from the sample. The analysis covers the years from 2014 to 2022. This sample restriction is applied across all the hiring and wage analysis.

The first analysis consists of a "Differences in Time" regression: I focus on what is the probability that, conditional on the hiring event, the hired worker is young in

the years before and after the reform:

$$Y_{i,t} = \alpha + \sum_{t \in \{-m,...,0,...,n\}} \beta_t T_t + \gamma X_{i,t} + u_{i,t} \tag{1}$$

where $Y_{i,t}$ is the individual-level outcome of interest (under-35) of individual i,in year t, T_t is a set of Dummy Time Variables and $X_{i,t}$ is a set of control variables, such as gender, education level, occupation, type of job, region. In this case I restricted the sample only to Permanent hirings.

Figure 2 Figure 3 and plot the evolution of this probability in an event study format. The two groups of workers (young and old) maintain similar dynamics in terms of annual hiring percentages in the pre-reform period, but a clearly divergent pattern after the payroll tax incentive is introduced. The probability that a new hiring occurs for a young worker after 2017 increases. The increasing pattern is slightly attenuated when looking at the specification with the set of controls (education, gender, region of the job, industry at the 2-digit level, full/part-time), but the result is still consistent and significant at the 1% level. On average, eligible workers experience an increase of approximately 3% in the probability of being young among the hired.

3.2 Temporary Hirings

Employers may use Temporary Contracts (TCs) as a cheaper and more flexible production factor within the legal duration limits. These contracts demand for lower termination costs and allow employers to adjust their production factors more easily, especially during economic downturns.

This is not the only motivation behind the adoption of temporary contracts by the employers: TCs may be used as a screening device in cases in which the productivity of a job-worker pair is not directly observable upon hiring. In this perspective, job matches can be thought as an "experience good", a product or service whose quality or value can only be assessed after it has been consumed or used (Jovanovic, (1979, 1984)). In a high-firing-cost scenario, the use of TCs provides employers with the

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adequate instrument for experiencing the quality of a match within the legal limit.

Depending on their use, TCs can be divided in two categories: "Dead End" and "Stepping Stones" Contracts. The first type is made of jobs which are temporary by nature, like "seasonal and casual employment"; the second type can be thought as positions that could be filled by permanent employees as well, like "fixed term contracts". We can consider this latter category as being influenced by the screening component: employers can test, identify, and retain high-quality workers, who can then secure permanent positions. Temporary contracts (TCs) serve as an insurance against bad-quality matches.

Let us now put ourselves in the shoes of an employer: she has to fill a vacancy and there are two candidates, one slightly older than 35 years and the other slightly younger. They are identical in terms of other observable characteristics. The employer cannot observe the workers' abilities before hiring them. Assuming that the slight age difference does not correlate with a difference in workers' abilities or other unobservables, the employer should be indifferent between hiring the older worker or the younger worker, as they exhibit the same ex-ante ability distribution.

Now, let us introduce the payroll tax incentive: if the vacancy is for a seasonal job, for example, the employer would fill it using a "Dead End" temporary contract. In this case, the payroll tax incentive does not play any role in the choice between the young and the older worker, because when TC terminates, the probability that the contract is converted into a permanent one is zero (reminder that the incentive is attached to the use of permanent contracts). The employer will continue to be indifferent between the two workers.

What happens if the vacancy to be filled is a "Stepping Stone" job, where a TC serves as a screening device to test workers' abilities? In this context, the payroll tax incentive plays an important role because it acts as an option value. This refers to the value an individual (in this case, the employer) places on having the option to utilize a resource (conversion to PC) in the future, even if it is not used currently. The employer knows that both workers have the same probability of possessing a certain level of ability, but the younger worker has an attached option value that makes it less costly for the employer to convert the TC to a permanent position in

subsequent periods if the screening activity leads to a successful match.

In other words, if it is less costly for an employer to hire a young worker permanently in the future, she will internalize this advantage by preemptively hiring the young worker, being otherwise indifferent between the young and the older worker except for the discount provided by the payroll tax incentive. Thus, we can expect an increase in the share of young workers hired with a temporary contract if we consider a temporary position as an intermediate step to a permanent position.

To determine if this intuition is correct, we replicate the analysis performed for permanent hirings, but this time we focus exclusively on the evolution of temporary hirings across time. The econometric specification is the same in Equation (1), but this time we restrict the sample only to Temporary hirings.

Figure 4 and Figure 5 plot the evolution of the probability of hiring a young worker with a temporary contract in an event study format. In this case, the pattern is similar for the two groups of workers (young and old) before the policy is introduced, starting to diverge after the payroll tax incentive is implemented. The inclusion of control variables keeps the results stable. On average, eligible workers experience an increase of approximately 2% in the probability of being hired.

3.3   Do Young Workers Experience More Stable Employment?

Results so far have shown an increase both in the use of TCs and PCs to hire young workers. The policy, anyway, was thought to favor stable employment among the youth. The next step is to understand if effectively, young workers have increased their stability compared to older workers. To do so, I set a Difference in Difference methodology to analyze the probability of holding permanent contracts on overall hirings among young individuals compared to older individuals. I compare the treatment group (under-35 population) to the control group (over-35) before and after the introduction of the law. The specification is the following:

$$Y_{i,t} = \alpha + \beta Under_{i,t} + \delta Under_{i,t} \cdot Post_t + \gamma X_{i,t} + \tau_t + u_{i,t} \tag{2}$$

Where $Y_{i,t}$ is a Dummy that takes value 1 if the worker is hired with a Permanent Contract and 0 if she is hired with a TC; $Under_{i,t}$ is a dummy that takes value 1 for employees under 35 years old and 0 otherwise; T_t is a set of Dummy Time Variables and $X_{i,t}$ is a set of control variables, such as gender, education level, occupation, type of job, region. ; $Under_{i,t} \cdot Post_t$ is the interaction term whose coefficient δ is the treatment effect of our interest.

Table 4 presents the results for four different samples. In the first specification, I consider all workers hired between 2014 and 2022 who were 33-37 years old. The average treatment effect is about 1%, with and without controls. Anyway, when the sample is split according workers' education characteristics, it appears clear that the increase in stability is driven by workers with higher education: individuals with a high-school or college degree experience an increase in the probability of being hired with a permanent contract about 2.5 percentage points, while nothing changes for workers with primary or secondary lower education. The result is not affected by the controls.

Through an event study specification I check whether the parallel trend hypothesis is met. The equation is similar to (1):

$$Y_{i,t} = \alpha + \sum_{k \in \{-m,...,0,...,n\}} \beta_k(T_i \cdot \mathbf{1}(t = t_0 + k)) + \gamma X_{i,t} + u_{i,t} \tag{3}$$

In the baseline specification, T_i is equal to 1 if the worker was Under-35 years old in the year she was hired and 0 otherwise. Identification relies on the assumption that under and over workers would have had parallel trends in key outcomes absent the reform. This assumption can be assessed by evaluating the coefficients $\beta_k \leq 0$.

Figure 6 and Figure 7 present the results of the estimation of equation 3 for incumbents and entrants, respectively, where the outcome is the probability of being hired with a permanent contract (PC) conditional on the hiring event. Before the introduction of the payroll tax incentive, average permanent hirings followed the same trend in the two groups, supporting the parallel trends assumption. After the introduction of the policy, the average probability of permanent hiring increases for treated workers (Under-35) relative to control workers (Over-35).

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3.4 Payroll Tax Incentives and the Timing of the Transition to Permanent Employment

I have already shown that the probability of being hired with a PC is higher for eligible workers in the sample. However, it remains unclear if payroll tax incentives also affect the time it takes for a precarious worker to secure a permanent position. In other words, can temporary contracts shift their role from dead-ends to stepping stones? If this is the case, even with an increased use of temporary contracts for the targeted group, we should observe a change in the duration of precarious employment for eligible individuals: the time they remain in the LM before obtaining a permanent position should decrease after the policy introduction, as the incentive reduces the cost for employers if they decide to hire permanently a precarious worker.

To probe this intuition, I utilize both the information about the dates of entrance into the LM and permanent hiring, as well as the panel component of the dataset. I fit a maximum-likelihood model for the hazard rate of transition to permanent employment. Following most empirical applications of survival analysis (Van den Berg, 2001), I focus on the class of proportional hazard models, in which the hazard rate is the product of a common function of time-at-risk and an exponential function of observable covariates.

To do so, I create a panel dataset consisting of every worker who entered the LM between January 1st, 2014, and December 31st, 2017. Furthermore, I restrict the sample to people that entered the LM when they were between 25 and 40 years old. For each worker, I consider at most two observations: the first records their entrance into the LM (regardless of whether it was with a TC or a PC; the second observation is the eventual transition to permanent employment, if it occurs. Workers who enter the LM with a PC only appear once in the dataset. For workers who never transition, I create a new observation dated December 31st, 2022, the last available date in the dataset. Given that eligibility for each worker is time-varying (due to age eligibility and the timing of the reform), I fill the dataset with quarterly data from the first observation to the latter (if it occurs).In this way, I am able to assign the treatment to each worker as time progresses.

The estimating equation for the Cox proportional-hazard model is the following:

$$h(J \mid t, X) = \lambda(t) exp(\alpha_0 post_t + \alpha_1 under_{it} + \beta post_t \cdot under_{it} + \gamma X_i) \qquad (4)$$

where $h(J \mid t, X)$ is the hazard rate of transition after t quarters since entrance in the LM, conditional on a vector X, including a dummy *post* for the (calendar) period after the policy introduction, a dummy *under* for individuals in the treated group, the interaction between the two, and a vector of other observable time-non-varying characteristics X; finally, $\lambda(t)$ is a common function of the time-at-risk. Following the semi-parametric approach devised by Cox (1972), I leave the baseline hazard function $\lambda(t)$ totally unrestricted and estimate the other coefficients by partial maximum likelihood. In this way I take advantage of the tractability of the proportional hazard model, while allowing at the same time for significant flexibility in terms of functional form.

The estimated coefficient β captures the difference-in-differences between the hazard rate of transition to permanent condition for the treated and control groups, before and after the payroll tax incentive introduction, controlling for group-specific effects, calendar time periods, time-at-risk, and other individual characteristics.

Table 5 presents estimation results. The coefficient of the interaction term is positive, statistically significant (at the 99 percent confidence level), and very high in absolute value. The exponentiated coefficient suggests that the hazard ratio of eligibility status is about 26 percent. These findings are unaffected either when we add individual FE at the time of entrance in the LM reported in the data (column 2), and when we add industry FE at 2-digit level (column 3).

I plot the graphical representation of the table results to show when the pattern for the treated group starts to differ from the control group. Both in Figure 8 and Figure 9, the distinct pattern begins to emerge roughly one year after the individual enters the LM, and the difference in hazard rates (the probability of being hired with a PC conditional on not having experienced this condition before) increases with each period.

The evolution of this phenomenon suggests two key insights: firstly, there is an

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initial period during which there is no difference in the probability of being hired with a permanent contract. This likely occurs because the employer has no information about the worker's past history nor the opportunity to screen the worker directly, resulting in equal probabilities of transitioning to a permanent position for both treated and control groups at any point in time. The survival functions start to diverge after the worker undergoes a screening period in the LM. Once the employer can make decisions based on more information about the worker's past employment history or direct observation of the worker's ability, it is reasonable to expect that the choice will favor the eligible worker, who is significantly less costly for the employer.

In other words, the payroll tax incentive could help precarious workers in transitioning to permanent positions.

4   Effects on Wages and Labor Costs

To test the implications of the standard model, we should evaluate whether net wages versus gross wages are discontinuous by age around the eligibility threshold after the policy is implemented. In fact, both wage concepts cannot be continuous after the reform. Unfortunately, I do not have access to net wage data in my dataset, so the comparison cannot be conducted in the same manner as Saez et al. (2019). Nevertheless, I can artificially reconstruct the impact of the reform on payroll tax contributions to obtain suggestive evidence of how gross wages change relative to changes in pension contributions.

The wage analysis is restricted to individuals hired with a permanent contract, on which the tax benefit should have an impact. I consider every worker hired with a permanent contract starting from 2014 for whom I have information on gross wages. The wage is defined as the contracted monthly wage at the start of the job, adjusted for inflation using the Consumer Price Index (CPI).

Figure 10 shows the wage distribution for permanent jobs throughout the period 2014-2017. The dashed line indicates the threshold where the incentive is fully perceived by the employer (left of the line) or partially perceived, passing the amount of €3000 (€6000) per year. On the right side of the line, the incentive accounts

for less than 50% (100%), and the percentage decreases as we move further to the right-hand side of the distribution.

Figure 11 shows that payroll tax contributions are slightly increasing with age and across years before the reform. In the years after the reform a sharp, immediate discontinuity emerges in average employers' payroll contribution at the age threshold for the tax cut. This implies that the policy lowered relative labor cost of younger workers one to one, the slope changes noticeably until the 35 years old threshold compared to previous years. That's because the other eligibility criterion has much more weight when individuals are younger, so that the probability of having been employed with a permanent contract is much lower than for under-35 years old near the threshold.

Figure 12 shows that gross wages are smoothly increasing with age and across years before the reform. Importantly, gross wages do not exhibit any discontinuity at the age cutoff where the payroll tax cut applies, neither before nor after the reform. Gross wages of treated young workers do not adjust at all in response to the reform (relative to slightly older, ineligible workers).

These two figures show that the payroll tax cut has an effect on the net-of-payroll tax wages of young treated workers relative to slightly older untreated workers. This finding of full incidence on workers aligns with the prediction of the standard model discussed above, which predicts no discontinuity in gross wages but a discontinuity in net wages.

A more rigorous approach to the wage analysis mirrors the methodology used for the employment analysis. I use a Difference-in-Difference approach, with the same specification as in equation 2. This time, I restrict the sample to all eligible workers hired with a permanent contract to examine whether there has been an increase in gross wages for the treated group relative to the control group.

Table 6 reports the results for the same four different samples considered in Table 4. In the first specification, I consider all workers hired between 2014 and 2022 who were 33-37 years old. The average treatment effect (ATE) is 4% for the whole sample. This effect is significant at the 1% level, although when controls are added the coefficient of interest shrinks both in magnitude and significance. It is interesting

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to note that when we split the sample according to different categories of education, we find significant heterogeneity in the effect of the policy on workers' entry wages: individuals with primary and lower secondary education seem to be the ones that benefited more from the introduction of the policy when we look at wages. They experience an increase of 2.2% in their entry wage; the effect is significant at the 10% level, and it drives the results on the whole population. In fact, when we look at the impact of the policy on workers with high school or college education, the effect is almost zero, and statistically non significant.

However, when individual controls are added, the effect's magnitude reduces and becomes insignificant (or weakly significant for incumbents). Young workers hired after the policy's introduction do not experience a significant increase in wages when controlling for gender, education, occupation, and the region in which the firm is located.

5   Robustness, Placebo and Heterogeneity

5.1   Robustness Checks

One concern could be that the policy led to a substitution of slightly older workers with their younger counterparts: in a DiD analysis (or a difference in time, in this case), the control group should not be affected by the intervention; if such treatment spillovers exist, the measure of the difference between the reform outcome and the counterfactual outcome would be confounded with the difference of the control group deviation and its counterfactual outcome. The measurement of the effect would be the relative rather than the absolute effect of the reform. In this case, we would not necessarily observe an increase in the absolute number of hirings for the young workers, but a relative increase, possibly due to a decrease in the number of hirings among over-35 years old. To take into account this caveat, first of all, I plot the evolution of the number of hirings by age accross years. Figure A1 shows that the number of eligible individuals - workers employed with permanent contracts for less than three years - hired after 2017 is consistently higher than in the years

2014-2017, if we consider workers aged between 20 and 35 years old. There is no significant increase in the number of hirings for the over-35 years old population, but the absence of a decrease is reassuring. It seems that the hirings for the untargeted population stays more or less the same. This path doesn't change if we consider an even more restricted sample, taking into account just workers never employed with a permanent contract before the first permanent hiring (Figure A2). In both cases, the dashed gray line represents year 2015, when the hiring incentive was not targeted to any specific age characteristic; we can see how the shift in the number of hirings, in that year, is almost parallel to the previous' years path. From 2018 on, we can appreciate a local change in the slope for the age near the 35 years old threshold. Another possible check is based on the fact that the farther we go from the threshold, the less salient the substitution effect becomes between the counterfactual and the treatment group: using the same specification of equation (2), I check if there is a difference in the probability of being a worker just above the age threshold (ineligible for the policy) and older workers, still not eligible but with a lower probability of experience substitution with eligible workers (under-35 years old). In Figure A3 and Figure A4 is plotted the probability of being a 36-37 years old worker with respect the probability of being a 38-39 y.o. (Figure A3) or 46-47 y.o. (Figure A4)

The policy is designed to remain attached to the worker, following her throughout her job career. If a worker has been employed with a permanent contract but the employment spell lasts less than three years, the payroll tax incentive remains active, though it becomes less valuable from the employer's perspective. The reduced advantage an employer could face in hiring a worker with less than full three-year eligibility could lead to an underestimation of the effect of the incentive. To evaluate more precisely the effect of the policy for a fully three-year eligible worker, I restrict the analysis to the sample of workers never hired with a permanent contract: it is mechanical for them to have 1095 days left with reduced labor costs.

I use a more restrictive definition of eligibility (individuals who never experienced permanent employment) for equations (1) and (2). Figure A5 and Figure A6 show that the hiring patterns for workers with no prior spell of employment is very similar to that in Figure 2 and Figure 4, with almost the same magnitude. Similar results

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are found when we focus on the probability of being hired with a permanent contract conditional on the hiring event using this new eligibility definition (Figure A7).

5.2 Placebo

There could have been other reasons other than the policy that could have affected the probability of being a young worker hired with a permanent contract. As far as I know, this is the only policy introduced in 2018 that interested specifically under-35 years old workers, with a discontinuity at the 35 years old threshold. To check whether this changes can be linked with this specific policy with an increased degree of confidence, I run a placebo test where the "placebo year" in which the policy is introduced is 2014: Figure A8 shows no discontinuity in the probability of being an Under-35 years old hired with a permanent contract before and after the introduction of the fake policy in 2014. I also use the second specific eligibility dimension to run a placebo test, assessing whether the policy was effective for young workers who already experienced more than three years of permanent employment. Young non-eligible workers do not experience an increase in their hiring share, both for temporary and permanent positions: while for temporary workers there is no difference after the introduction of the policy in the probability of being young Figure A9, the same probability for permanent workers decreases after the introduction of the policy Figure A10. This result suggests that the detrimental effect of the policy could affect workers that already experienced permanent employment in the past.

5.3 Heterogeneity Analysis

So far, we have demonstrated that the probability of being hired increases for young workers following the introduction of the payroll tax incentive. However, the policy likely had varying impacts across different population groups. It has already been shown that some difference in the probability of getting a stable contract appears when we exploit heterogeneity in the level of workers' education: workers with primary or lower secondary education do not seem to experience higher stability after the policy is introduced; on the contrary, individuals with a high school or a college

degree see an increase in the probability of being hired with a permanent contract respectively of 2.1 pp and 2.6 pp. The opposite result is found when we focus on the effect of the payroll tax incentive on workers' wages: I find an increase of 1.1% in workers' gross wages, restricting the sample only to workers hired with a permanent contract When the I unpack the results, splitting the sample by education characteristics, it appears clearly that the effect on wages is driven by workers with low education. Heterogeneity by education is not the only dimension that can be exploited to address differences in the effectiveness of the policy. Another source of variation comes from the extended duration of the incentive for workers hired in firms located in disadvantaged (southern regions), that have access to an additional year of incentive from the policy: if a worker is hired with a permanent contract, the payroll taxes' benefit lasts at most for four years (instead of three), depending on the past history of the worker in question (like it has been highlighted in the section on the Institutional Framework). These differences in the potential length of the benefit could have led to a different magnitude of the effect in hiring patterns. Moreover, it is not only important the generosity of the bonus per se, but also the different impact that the incentive could in principle have in areas that are more or less economically developed.

The policy seems to have had a different impact in regions where the incentive lasts longer. Figure 11 shows that the probability of being a young worker hired with a permanent contract is higher in southern regions with respect to center-northern regions, especially in the years where the incentive consisted only of 50% of the payroll taxes paid by the employer. This finding is consistent with the fact that the time horizon of incentive is more generous in southern regions. Moreover, in disadvantaged regions firms' financial constraints could be more binding, so the incentive could have helped the employers that find more difficult to hire new workers. The opposite happens when we focus on the probability of being a young worker hired with a temporary contract Figure A12 plots the probability both for workers hired in the south and in the center-north, showing that the effect for temporary hirings is almost driven by center-northern regions. Contrary to the hiring patterns, it does not

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Furthermore, I show that there are no important differences when we consider workers that appear for the first time in the labor market (entrants) rather than workers with at least one spell of employment in the labor market (incumbents), suggesting that a change in the composition in the labor market (more young entrants looking for a job compared to older ones) is not the only channel through which the policy had an impact on the labor market (Figure A13 and Figure A14.

Young blue-collar and white-collar workers also experience a higher probability of securing a stable position, as evidenced by Figure A7. This effect is primarily driven by white-collar workers, likely because they are the group most capable of transitioning to permanent employment after a screening period.

6 Concluding Remarks

This paper provides a comprehensive analysis of the impact of payroll tax incentives aimed at promoting stable employment for young workers in Italy. The 2018 Italian Budget Law introduced a substantial reduction in employer payroll taxes for hiring individuals under 35 on permanent contracts. The results show a significant increase in both temporary and permanent hirings within the targeted group. Overall, the policy has proven to be effective in improving employment stability for young workers.

Additionally, the paper highlights the role of temporary contracts as a screening device, suggesting the policy has in some cases shifted their function from "Dead Ends" to "Stepping Stones." This is further supported by the duration analysis, which reveals a quicker transition from temporary to permanent employment for young workers following the policy's implementation.

These findings contribute to the broader literature on employment policies, particularly within dual labor markets where temporary contracts are prevalent. The evidence suggests that payroll tax incentives not only boost employment but also improve job quality and stability, providing young workers with a stronger opportunity to secure permanent positions.

However, while the policy has successfully boosted permanent employment, the analysis shows that its impact on wages remains neutral, with no significant pass-

through of payroll tax reductions to worker wages. This suggests that the benefits of the policy are concentrated in job creation rather than wage increases.

Overall, the study underscores the potential of targeted tax incentives to address youth unemployment and precarious employment, especially in contexts where temporary contracts dominate. Future research could explore the long-term effects of such policies on career progression and wage growth, providing a fuller picture of their impact on labor market dynamics.

Further analysis is needed to understand the factors influencing firms' behavior in hiring young workers and their wage-setting practices. In the paper has been partially highlighted the role that personnel economics plays in the effectiveness of the policy (heterogeneity in the results led by differences in education), and the importance of local labor market conditions, just superficially touched accounting for regional heterogeneity. Other several potential explanations could account for the observed effects on temporary employment and wage rigidity, including monopsony power, variations in local labor market conditions, or heterogeneity among firms. Unpacking these factors would help clarify the mechanisms driving the policy's impact on employment outcomes and wages.

References

Long-term effects of hiring subsidies for unemployed youths—Beware of spillovers. // . 2022.

Anderson Patricia M, Meyer Bruce D. The effects of the unemployment insurance payroll tax on wages, employment, claims and denials // Journal of public Economics. 2000. 78, 1-2. 81–106.

Arulampalam Wiji, Gregg Paul, Gregory Mary. Unemployment scarring // The Economic Journal. 2001. 111, 475. F577–F584.

Baicker Katherine, Chandra Amitabh. The labor market effects of rising health insurance premiums // Journal of Labor Economics. 2006. 24, 3. 609–634.

Bennmarker Helge, Mellander Erik, Öckert Björn. Do regional payroll tax reductions boost employment? // Labour Economics. 2009. 16, 5. 480–489.

Bíró Anikó, Lindner Attila, Prinz Daniel, Branyiczki Réka, Márk Lili. Firm heterogeneity and the impact of payroll taxes. 2022.

Boeri Tito, Garibaldi Pietro. Two tier reforms of employment protection: a honeymoon effect? // The economic journal. 2007. 117, 521. F357–F385.

Bohm Peter, Lind Hans. Policy evaluation quality: A quasi-experimental study of regional employment subsidies in Sweden // Regional Science and Urban Economics. 1993. 23, 1. 51–65.

Booth Alison L, Francesconi Marco, Frank Jeff. Temporary jobs: stepping stones or dead ends? // The economic journal. 2002. 112, 480. F189–F213.

Bozio Antoine, Breda Thomas, Grenet Julien. Incidence of social security contributions: evidence from France // Paris School of Economics Working Paper. 2017.

Cahuc Pierre, Carcillo Stéphane, Le Barbanchon Thomas. The effectiveness of hiring credits // The Review of Economic Studies. 2019. 86, 2. 593–626.

Ciani Emanuele, De Blasio Guido. Getting stable: an evaluation of the incentives for permanent contracts in Italy // IZA Journal of European Labor Studies. 2015. 4. 1–29.

The (In) effectiveness of Targeted Payroll Tax Reductions. // . 2024.

Cruces Guillermo, Galiani Sebastian, Kidyba Susana. Payroll taxes, wages and employment: Identification through policy changes // Labour economics. 2010. 17, 4. 743–749.

Cruces Guillermo, Ham Andrés, Viollaz Mariana. Scarring effects of youth unemployment and informality: Evidence from Brazil // documento de trabajo del CEDLAS, Facultad de Ciencias Económicas, Universidad Nacional de la Plata, Argentina. 2012.

Daruich Diego, Di Addario Sabrina, Saggio Raffaele. The effects of partial employment protection reforms: Evidence from Italy // Review of Economic Studies. 2023. 90, 6. 2880–2942.

Egebark Johan, Kaunitz Niklas. Payroll taxes and youth labor demand // Labour economics. 2018. 55. 163–177.

Fasani Francesco, Mastrobuoni Giovanni, Owens Emily G, Pinotti Paolo. Does Immigration Increase Crime? 2019.

Fougère Denis, Kramarz Francis, Pouget Julien. Youth unemployment and crime in France // Journal of the European Economic Association. 2009. 7, 5. 909–938.

Gregg Paul, Tominey Emma. The wage scar from male youth unemployment // Labour Economics. 2005. 12, 4. 487–509.

Gruber Jonathan. The incidence of payroll taxation: evidence from Chile // Journal of labor economics. 1997. 15, S3. S72–S101.

Güell Maia, Petrongolo Barbara. How binding are legal limits? Transitions from temporary to permanent work in Spain // Labour economics. 2007. 14, 2. 153–183.

Huttunen Kristiina, Pirttilä Jukka, Uusitalo Roope. The employment effects of low-wage subsidies // Journal of Public Economics. 2013. 97. 49–60.

Korkeamäki Ossi, Uusitalo Roope. Employment and wage effects of a payroll-tax cut—evidence from a regional experiment // International Tax and Public Finance. 2009. 16. 753–772.

Kugler Adriana, Kugler Maurice. Labor market effects of payroll taxes in developing countries: Evidence from Colombia // Economic development and cultural change. 2009. 57, 2. 335–358.

Saez Emmanuel, Schoefer Benjamin, Seim David. Payroll taxes, firm behavior, and rent sharing: Evidence from a young workers' tax cut in Sweden // American Economic Review. 2019. 109, 5. 1717–1763.

Saez Emmanuel, Schoefer Benjamin, Seim David. Hysteresis from employer subsidies // Journal of Public Economics. 2021. 200. 104459.

Sestito Paolo, Viviano Eliana. Hiring incentives and/or firing cost reduction? Evaluating the impact of the 2015 policies on the Italian labour market // Evaluating the Impact of the 2015 Policies on the Italian Labour Market (March 18, 2016). Bank of Italy Occasional Paper. 2016. 325.

Zurla Valeria. Firm Responses to Earned Income Tax Credits: Evidence from Italy // Available at SSRN 4630620. 2021.

7 Tables

	Table 1: Summary Statistics					
	Full Sample (1)		Partially Eligible (2)		Fully Eligible (3)	
	mean	sd	mean	sd	mean	sd
Average Wage	1246.171	721.040	1264.997	711.794	1303.290	731.877
First Wage	1096.578	646.715	1081.248	636.801	1083.377	643.703
Total Days Worked	231.962	418.428	151.076	263.479	181.438	353.107
Age at Entry	35.163	11.702	33.723	11.394	33.638	11.418
Age	38.144	11.381	37.034	11.474	36.941	11.807
Share of Under-25	0.133	0.340	0.163	0.370	0.184	0.388
Share of Under-35	0.423	0.494	0.470	0.499	0.477	0.499
Share of Over-50	0.189	0.392	0.171	0.377	0.180	0.384
Female	0.455	0.498	0.462	0.499	0.488	0.500
Permanent Job	0.219	0.414	0.143	0.350	0.124	0.330
Full Time	0.682	0.466	0.701	0.458	0.721	0.449
# jobs per career	4.302	14.042	4.844	16.259	4.568	16.869
Eligibile	0.585	0.493				
Observations	5971004		4686044		3491603	

Table 2: Probability of being Hired with a Permanent Contract after #n contracts

	(1) Eligible Workers mean	(2) Uneligible Workers mean
#1	0.421	
#2	0.239	0.538
#3	0.179	0.485
#4	0.148	0.447
#5	0.123	0.412
...	...	...
#10	0.053	0.275
...	...	...
#15	0.032	0.186
...	...	...
#20	0.023	0.134
Average	0.195	0.346
Observations	14623808	8077390

Table 3: Descriptive Statistics for Permanent and Temporary Hirings

	(1) Temporary Contract mean	(2) PermanentContract mean
Average Wage	1304.210	1099.555
First Wage	1137.304	1049.123
Total Days Worked	143.189	644.795
Age at Entry	35.065	35.298
Age	37.918	38.950
Share of Under-25	0.143	0.098
Share of Under-35	0.432	0.392
Share of Over-50	0.187	0.199
Female	0.461	0.434
Full Time	0.725	0.541
jobs per career	5.924	2.035
Observations	4663771	1307233

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	All Workers (1)	Low Education (2)	Medium Education (3)	High Education (4)	All Workers (5)	Low Education (6)	Medium Education (7)	High Education (8)
Under	0.015*** (0.001)	0.011*** (0.002)	0.008** (0.003)	0.038*** (0.005)	0.009*** (0.001)	0.009*** (0.002)	0.005 (0.002)	0.017*** (0.004)
Post	-0.017*** (0.001)	-0.024*** (0.002)	-0.030*** (0.003)	0.020*** (0.005)	-0.017*** (0.001)	-0.024*** (0.002)	-0.026*** (0.002)	0.014** (0.004)
Under x Post	0.010*** (0.002)	0.001 (0.003)	0.025*** (0.003)	0.024*** (0.006)	0.009*** (0.002)	-0.001 (0.003)	0.021*** (0.003)	0.026*** (0.006)
Constant	0.139*** (0.001)	0.119*** (0.002)	0.146*** (0.002)	0.165*** (0.004)	0.445*** (0.011)	0.369*** (0.027)	0.406*** (0.018)	0.582*** (0.021)
Gender	No	No	No	No	Yes	Yes	Yes	Yes
Industry 2-digits	No	No	No	No	Yes	Yes	Yes	Yes
Region Job	No	No	No	No	Yes	Yes	Yes	Yes
Occupation 1-digit	No	No	No	No	Yes	Yes	Yes	Yes
Full-Time/Part-Time	No	No	No	No	Yes	Yes	Yes	Yes
N	952329	288377	252096	90180	952320	288371	252094	90180

Table 4: Duration Analysis for the Incumbents

	Base	Controls	Controls
	(1)	(2)	(3)
Treatment	**0.262**	**0.257**	**0.254**
	(0.012)	**(0.013)**	**(0.013)**
Under	0.128	0.030	0.028
	(0.008)	(0.009)	(0.009)
Post	-0.049	-0.018	-0.010
	(0.011)	(0.012)	(0.012)
Worker FE	No	Yes	Yes
Firm FE	No	No	Yes
N	5397238	4405740	4391168

99% confidence intervals in parentheses.

	All Workers (1)	Low Education (2)	Medium Education (3)	High Education (4)	All Workers (5)	Low Education (6)	Medium Education (7)	High Education (8)
Under	0.018***	-0.011	-0.008	0.038*	0.002	0.004	-0.003	-0.014
	(0.005)	(0.009)	(0.011)	(0.020)	(0.004)	(0.008)	(0.009)	(0.016)
Post	0.001	-0.032***	0.012	0.142***	-0.027***	-0.031***	-0.025***	0.016
	(0.006)	(0.010)	(0.011)	(0.020)	(0.004)	(0.008)	(0.010)	(0.016)
Under x Post	0.039***	0.041***	0.016	-0.049**	0.011*	0.022*	-0.005	-0.008
	(0.008)	(0.014)	(0.015)	(0.025)	(0.006)	(0.011)	(0.013)	(0.020)
Constant	6.771***	6.872***	6.882***	7.119***	7.232***	7.250***	7.251***	7.267***
	(0.004)	(0.006)	(0.008)	(0.016)	(0.020)	(0.034)	(0.043)	(0.075)
Gender	No	No	No	No	Yes	Yes	Yes	Yes
Industry 2-digits	No	No	No	No	Yes	Yes	Yes	Yes
Region Job	No	No	No	No	Yes	Yes	Yes	Yes
Occupation 1-digit	No	No	No	No	Yes	Yes	Yes	Yes
Full-Time/Part-Time	No	No	No	No	Yes	Yes	Yes	Yes
N	104314	25554	22307	11879	104308	25553	22306	11879

	All Workers (1)	Ceter-North (2)	South (3)	All Workers (4)	Ceter-North (5)	South (6)
Under	0.014*	0.014	0.013	-0.004	-0.007	0.002
	(0.008)	(0.010)	(0.012)	(0.006)	(0.008)	(0.010)
Post	-0.020**	0.005	-0.087***	-0.032***	-0.017**	-0.062***
	(0.008)	(0.010)	(0.013)	(0.006)	(0.008)	(0.011)
Under x Post	0.046***	0.044***	0.053***	0.011	0.008	0.018
	(0.011)	(0.014)	(0.018)	(0.009)	(0.011)	(0.015)
Constant	6.779***	6.811***	6.722***	7.665***	7.878***	7.489***
	(0.006)	(0.007)	(0.009)	(0.032)	(0.043)	(0.050)
Gender	No	No	No	Yes	Yes	Yes
Industry 2-digits	No	No	No	Yes	Yes	Yes
Region Job	No	No	No	Yes	Yes	Yes
Occupation 1-digit	No	No	No	Yes	Yes	Yes
Full-Time/Part-Time	No	No	No	Yes	Yes	Yes
N	51948	34407	17523	51946	34407	17521

8 Figures

Figure 1: Probability of being a Young Worker Hired with a Permanent Contract - Baseline
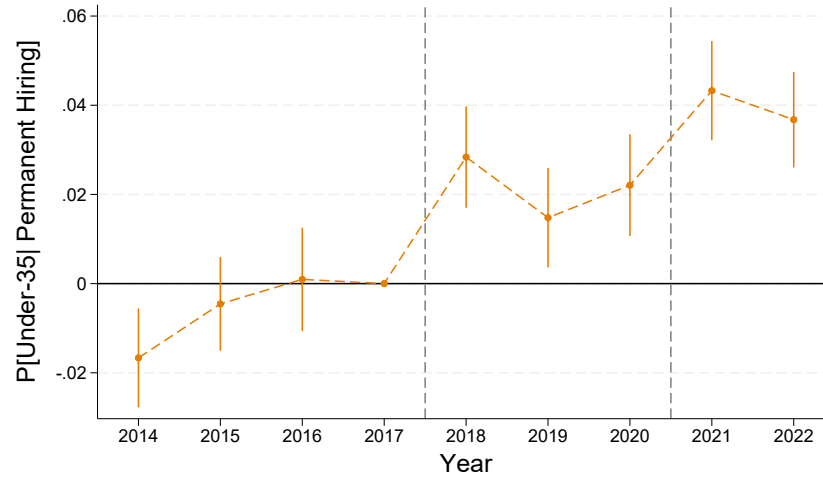
Figure 2: Probability of being a Young Worker Hired with a Permanent Contract - With Controls
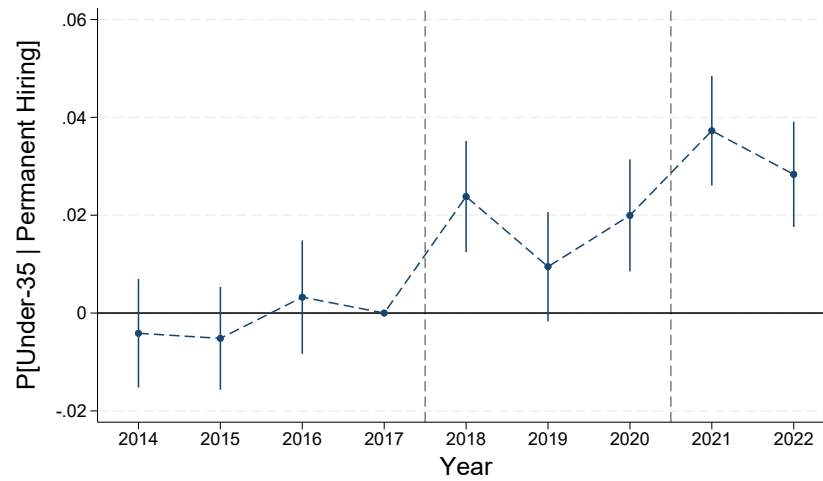
Figure 3: Probability of being a Young Worker Hired with a Temporary Contract - Baseline
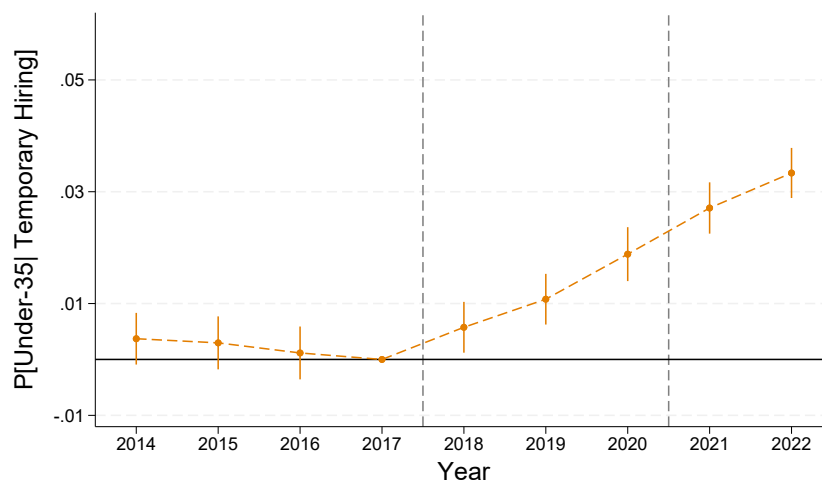
Figure 4: Probability of being a Young Worker Hired with a Temporary Contract - With Controls
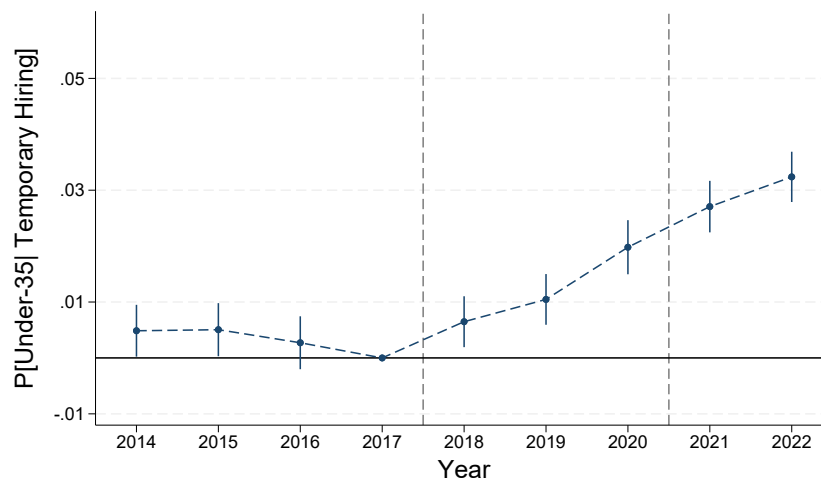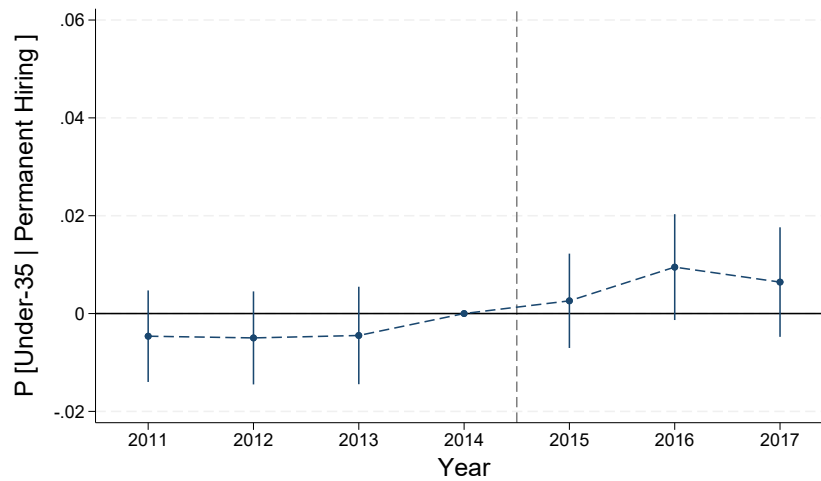
Figure 5: Probability of being Hired with a Permanent Contract - Baseline
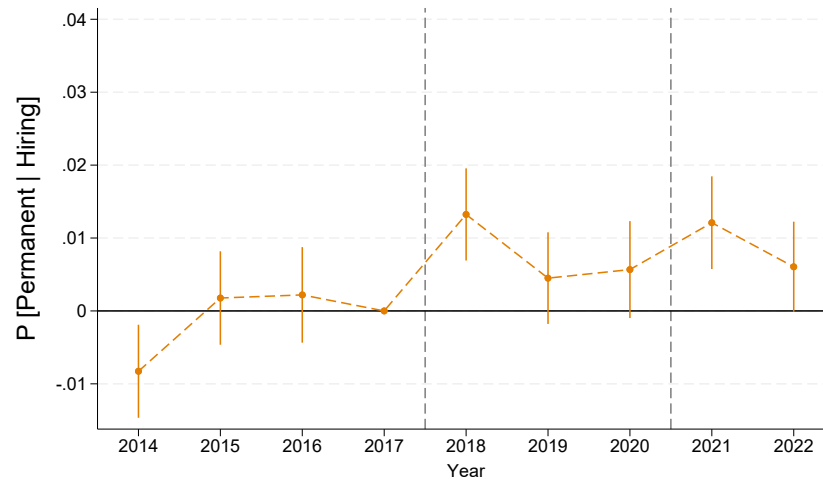
Figure 6: Probability of being Hired with a Permanent Contract - With Controls
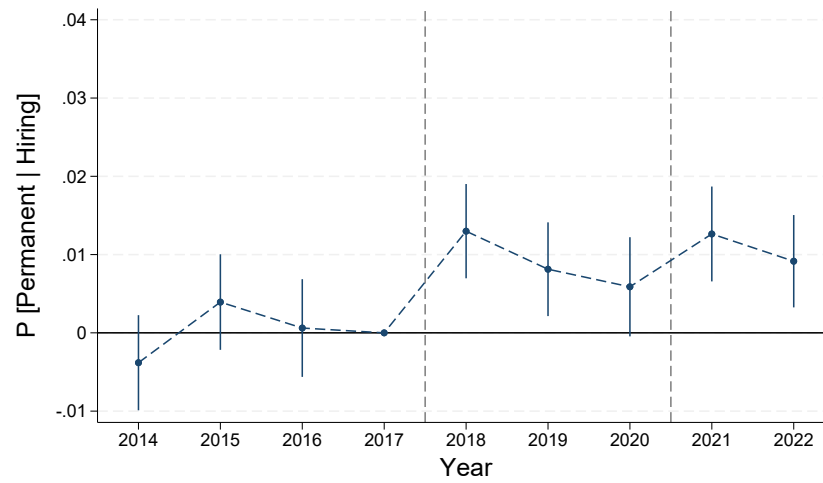
Figure 7: Covariate-adjusted (for Under and Post) survivor functions
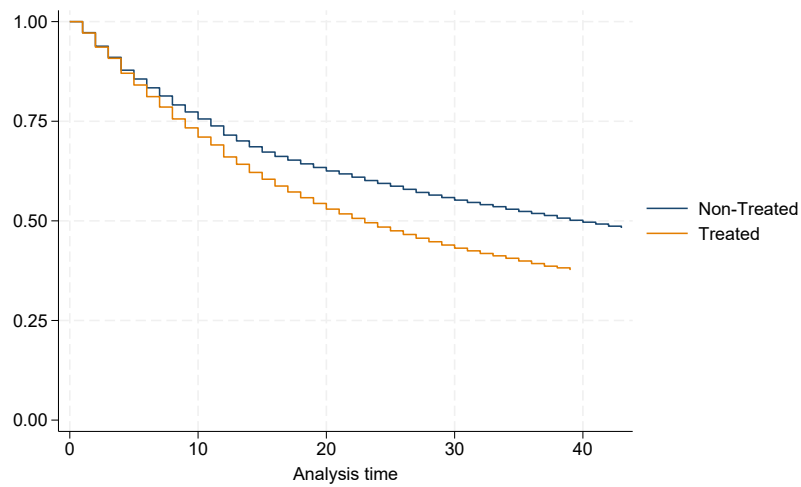
Figure 8: Covariate-adjusted (for Under, Post and Individual FE) survivor functions
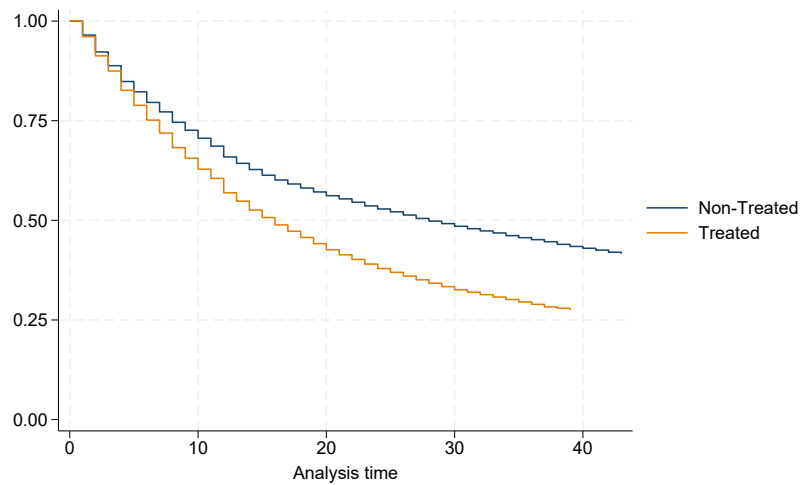
Figure 9: Monthly Wage - Permanent Contracts
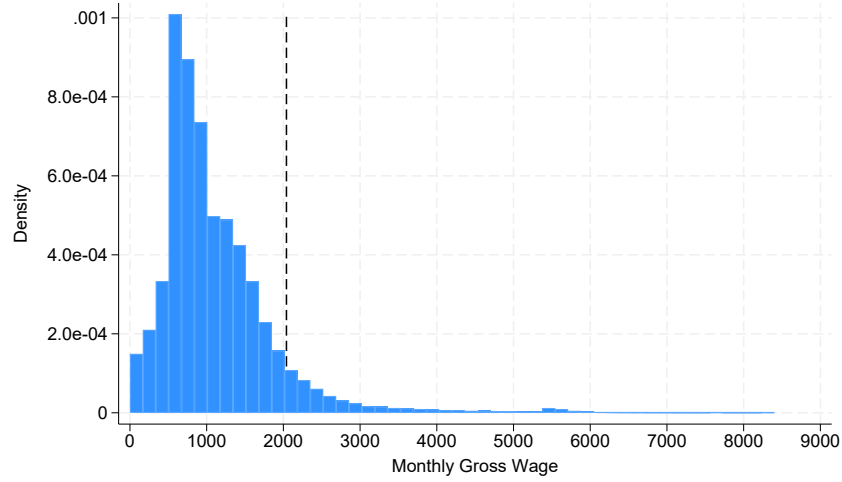
Figure 10: Average Deflated INPS Contribution for Permanent Hirings
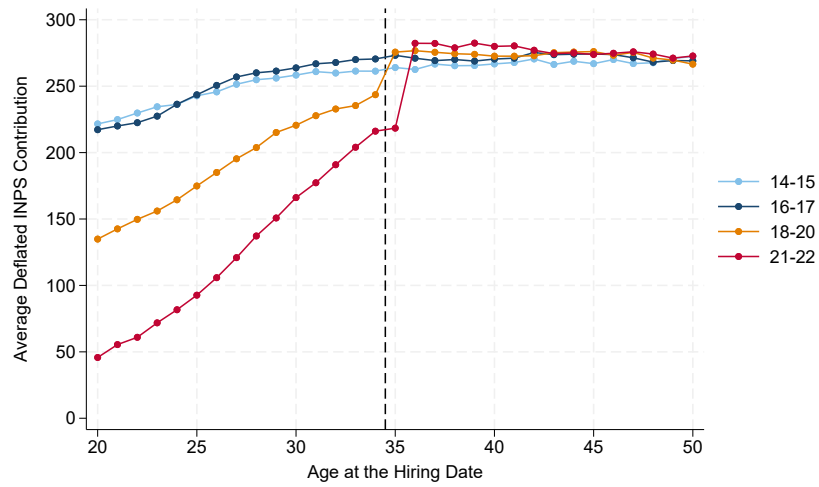
Figure 11: Average Deflated Wage for Permanent Hirings
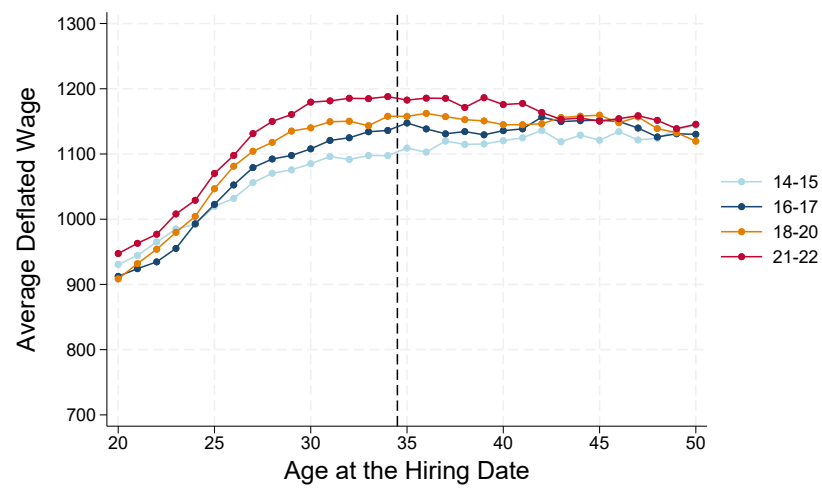
9   Appendix

Figure A1: Number of Permanent Hirings by Year - Workers with Less than 3 years
of Tenure in a Permanent Position
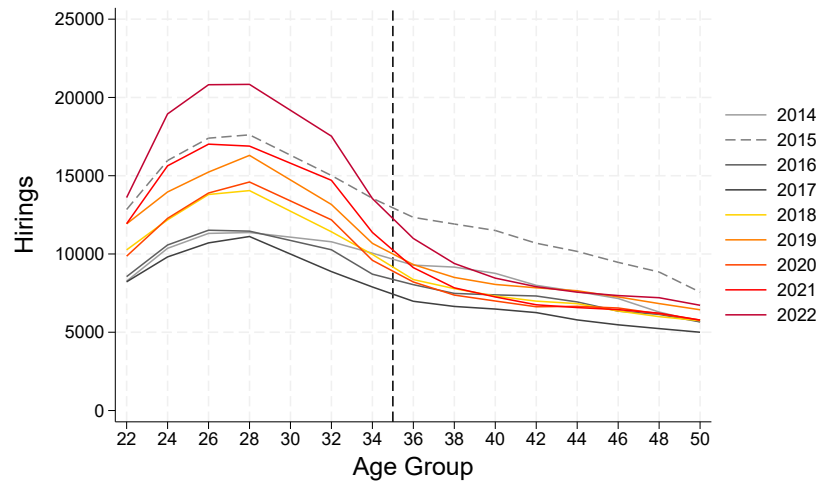
Figure A2: Number of Permanent Hirings by Year - Workers Never Employed with
a Permanent Contract
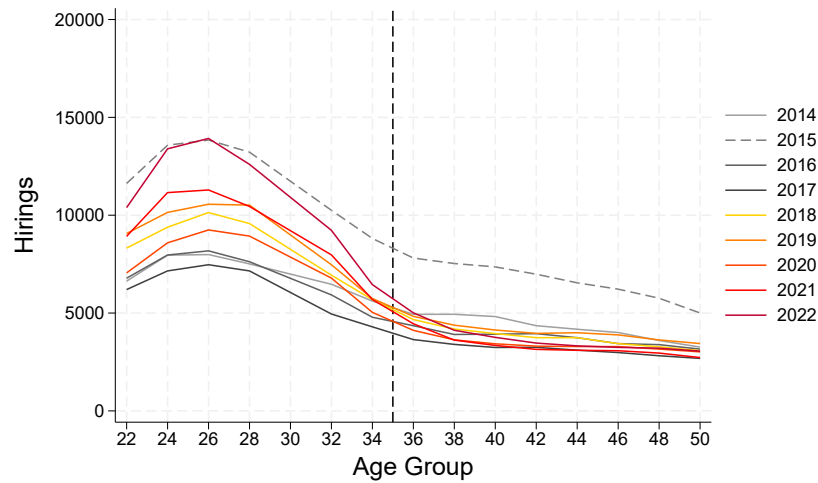
Figure A3: Probability of Hiring a 36-37 Worker with a Permanent Contract (vs 38-39 years old)
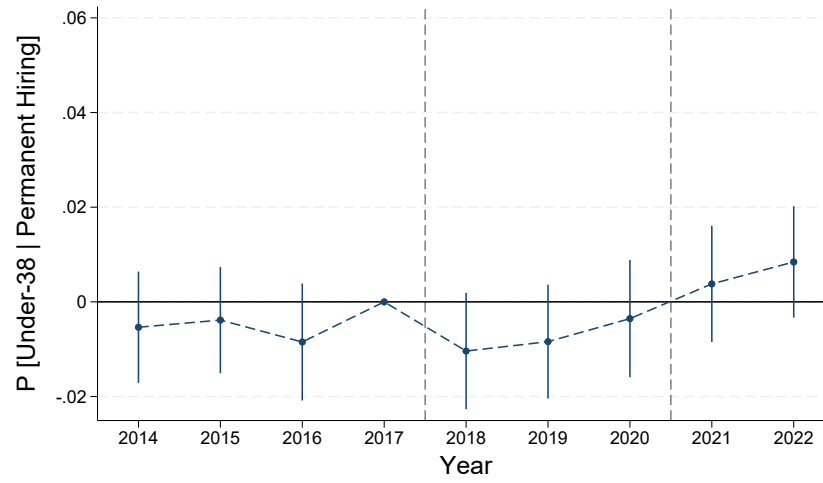
Figure A4: Probability of Hiring a 36-38 Worker with a Permanent Contract (vs 46-48)
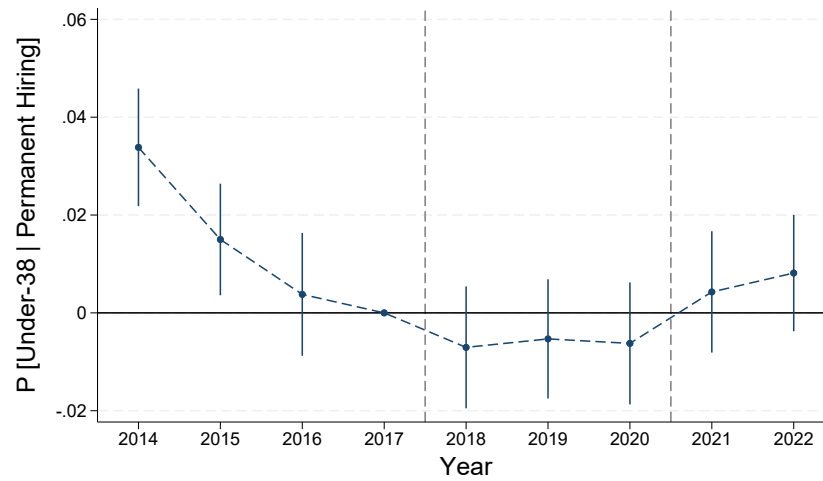
Figure A5: Probability of Hiring a Young Worker with a Permanent Contract - No Prior Spell of Permanent Employment
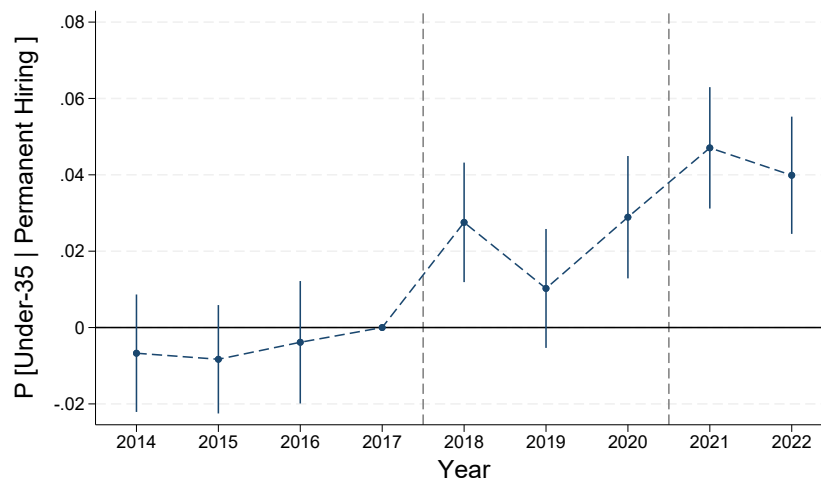
Figure A6: Probability of Hiring a Young Worker with a Temporary Contract - No Prior Spell of Permanent Employment
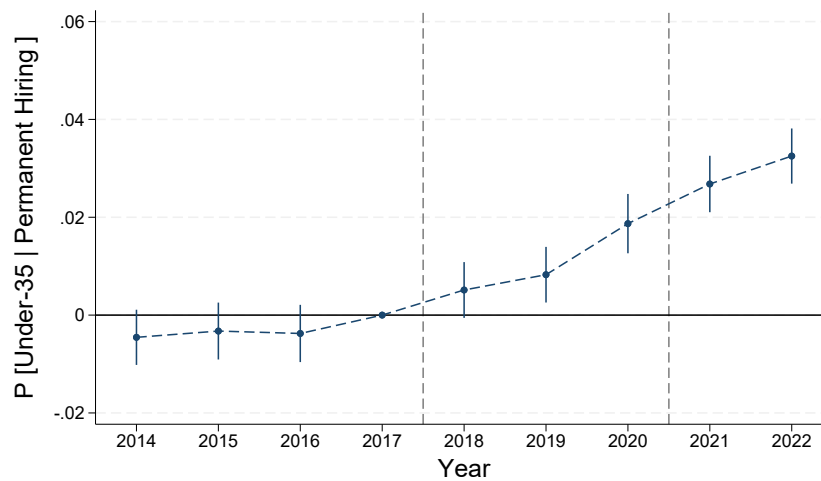
Figure A7: Probability of being Hired with a Permanent Contract - No Prior Spell of Permanent Employment
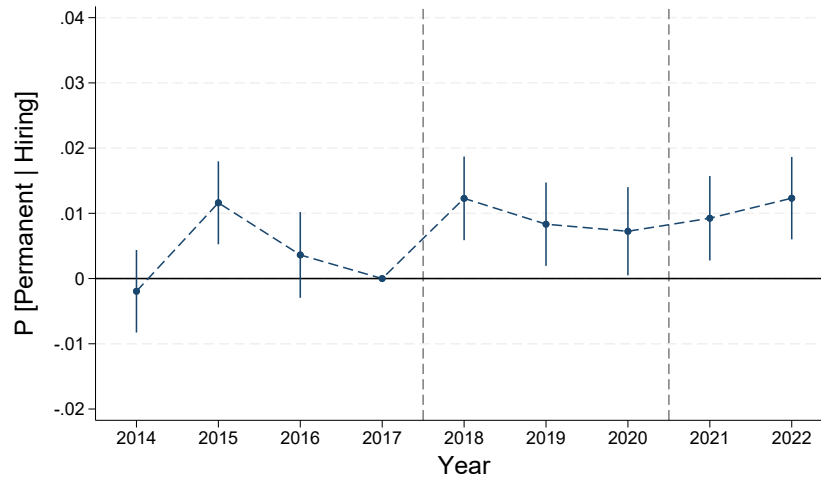
Figure A8: Probability of being a Young Worker Hired with a Permanent Contract - Placebo

Figure A9: Probability of being Hired with a Temporary Contract - 3 Years Placebo
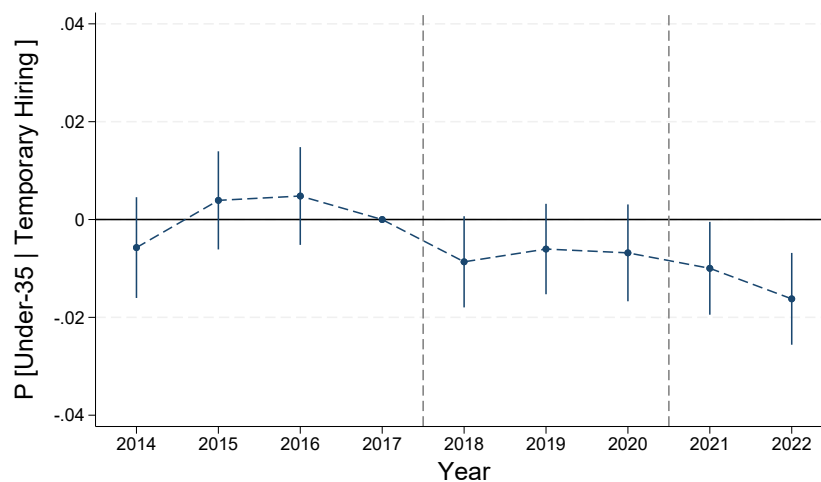
Figure A10: Probability of being Hired with a Permanent Contract - 3 Years Placebo
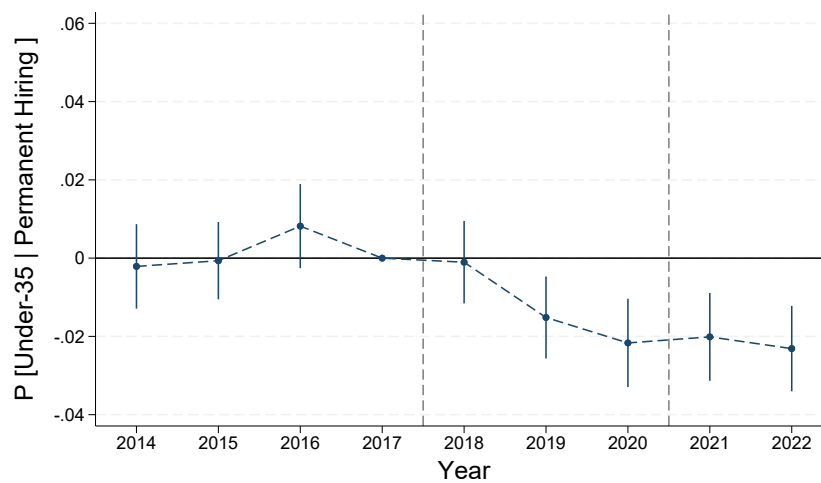
Figure A11: Probability of Hiring a Young Worker with a Permanent Contract - Southern vs Non-Southern Regions
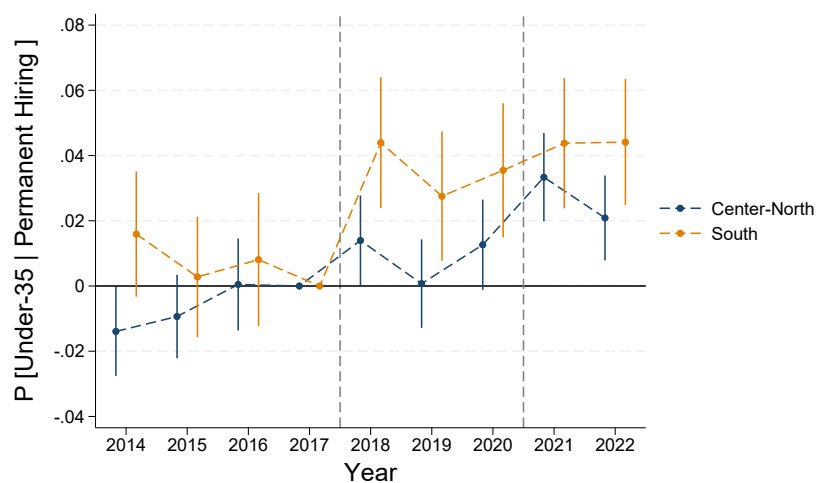

Figure A12: Probability of Hiring a Young Worker with a Temporary Contract - Southern vs Non-Southern Regions
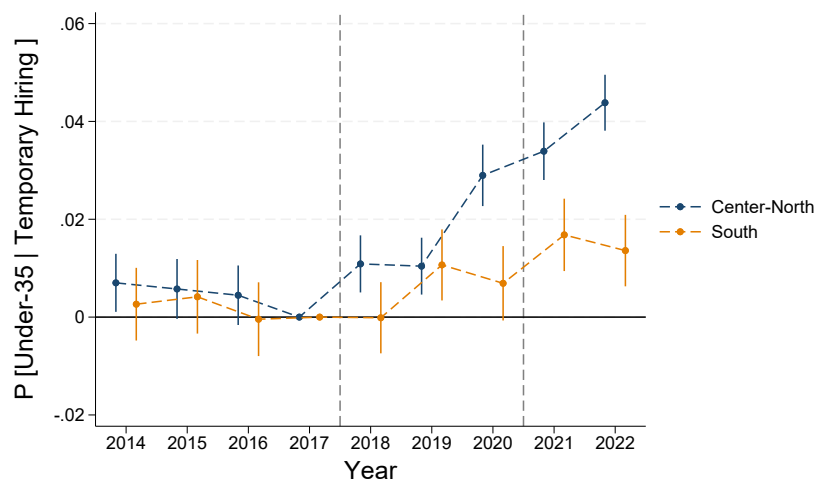
Figure A13: Probability of Hiring a Young Worker with a Temporary Contract - Entrants vs Incumbents
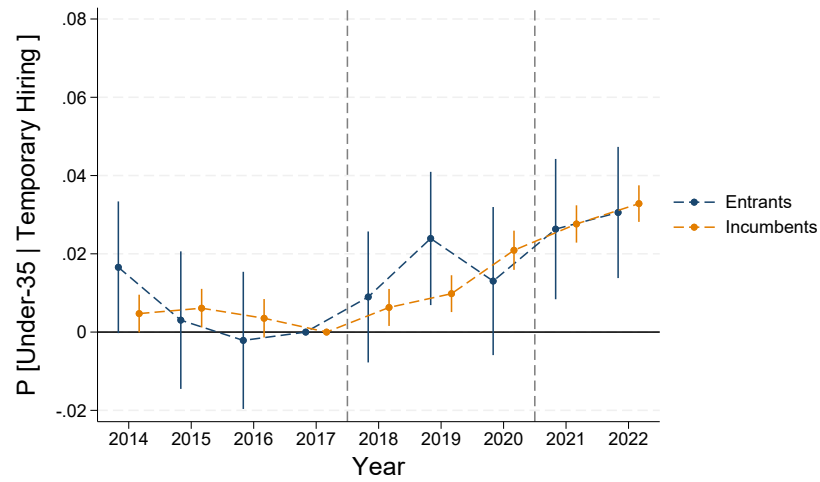

Figure A14: Probability of Hiring a Young Worker with a Permanent Contract - Entrants vs Incumbents