Escaping Temporary Traps: Evidence for Young and Adult Workers*

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Abstract

This paper studies a 1997 Spanish reform that reduced non-wage labor costs for new open-ended (OE) contracts below age 30 and above age 45, leaving short-term (ST) contract costs unchanged. Using sector-level exposure and age-based discontinuities, we show that the reform generated large substitution from ST to OE contracts among workers under 30 but none among older workers. The implied elasticity of substitution is 7.1 for young workers and near zero for adults. The reform also strengthened young workers' outside options. Even in unsubsidized jobs, their wages rose by about 1.5% in ST contracts, reflecting improved bargaining positions. Temporary employment increased among workers older than 30, consistent with firms reallocating flexible tasks once young workers moved into permanent roles. Overall, the results reveal strong age asymmetries in substitution, wage responses, and task reallocation, informing policies aimed at reducing labor market duality.

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1 Introduction

The segmentation of workers between open-ended (OE) contracts and short-term (ST) contracts, also known as duality, is a characteristic of many labor markets in Europe and developing countries (Eichhorst et al., 2018; ILO, 2015). OE contracts are considered to be "good" jobs as they pay relatively high wages, entitle workers to severance payments, and offer job stability and promotion opportunities. In contrast, ST contracts are often viewed as "bad" jobs offering lower wages, less severance payments, and limited career advancement prospects (García-Pérez et al., 2019; Daruich et al., 2023). A common argument is that duality arises due to the differences in employment protection costs between OE and ST contracts (Blanchard and Landier, 2002). Thus, reducing the cost gap between the two contract types is often proposed as a policy solution to decrease the prevalence of ST contracts. This paper empirically investigates the validity of this proposition.

Since 1980, at least 128 reforms in Europe have reduced the statutory labor costs of OE contracts relative to ST contracts (Boeri, 2011).[1] We examine one such policy change implemented in Spain in 1997, which reduced the non-wage labor costs of *new* OE contracts by 9–12% of gross wages while keeping the costs of ST contracts unchanged. Approximately 76–85% of this reduction came from lower payroll taxes, with the remainder from reduced severance payments. The policy introduced two eligibility notches at the ages of 30 and 45, granting lower labor costs for new OE hires younger than 30 or older than 45.[2] This paper provides a unified analysis of both age-based notches, quantifying the employment and wage effects of the reform for young and older workers

Four features make this quasi-experiment an especially informative setting for studying dual labor markets. First, the reform simultaneously introduced two age-based eligibility thresholds—below 30 and above 45—allowing us to analyze how firms substitute between contract types for both young and older workers within a single institutional framework. Second, Spain had the highest incidence of ST employment among OECD countries: 33.6% in 1996, compared with an OECD average of 10.9%.[3] Third, Spain exhibited one of the largest gaps in employment protection between ST and OE contracts (Bentolila et al., 2012). We estimate this gap to be equivalent to about 6.4%-7% of an ST worker's labor costs before the reform.[4] Finally, not all new OE hires older

[1] Between 1980 and 2007, there were 178 reforms in Europe that changed the incentives to use OE and ST contracts. Of these, 72% reduced the costs of OE contracts relative to ST contracts. The data come from the fRDB-IZA Social Reforms Database, covering EU-15 countries. However, its coverage ends in 2007.

[2] Although eligibility was based on worker characteristics, the statutory reduction in labor costs benefited employers. The labor cost reduction for workers younger than 30 was 9% of gross wages, and for workers older than 45 was 12%. For young workers, 76% of the reduction came from lower payroll taxes, whereas for older workers it was 85%.

[3] In 2022, the OECD countries with the highest shares of ST employment were the Netherlands (27.7%), South Korea (27.3%), and Colombia (26.4%). Data from the OECD.

[4] Details of these calculations are provided in Section 3. The estimated gap should be interpreted as a lower bound on the true cost differential, as it excludes legal uncertainty and litigation costs associated with dismissals under OE

than 45 were eligible for the reduced-cost contract, as the policy imposed firm- and worker-level restrictions on access to the discounts.[5] Ineligible workers had to be hired under the standard level of statutory costs, which we refer to as the high-cost OE contract. We leverage this institutional feature to analyze the wage incidence of the policy.

Theoretically, the policy should be effective if OE and ST contracts are substitutes and if there is incomplete pass-through to wages. However, substitution may be imperfect if temporary contracts serve distinct purposes—such as covering short-term absences, managing seasonal demand, or containing labor costs (Garibaldi and Gomes, 2022; Del Bono and Weber, 2008; Daruich et al., 2023; Houseman, 2001). These differences are likely to vary across age groups. For young workers, who face greater screening uncertainty, reductions in OE costs might shift the margin toward permanent hiring. For older workers, whose productivity is already known but who may be adversely selected into temporary jobs, financial incentives may play a weaker role. Consistent with these predictions, we find that the reform induced substantial substitution from ST to OE contracts among young workers, but not among adults.

An additional theoretical prediction follows from the increase in OE employment for young workers. When permanent jobs become more accessible, the value of searching outside one's current match rises, strengthening young workers' outside options in wage bargaining. In search-and-matching and bargaining models, this increase in outside options should generate upward pressure on wages even for workers who remain in temporary or unsubsidized contracts. This mechanism is especially relevant in settings with monopsonistic features, where ST contracts may help firms depress outside options and sustain lower wages (Bassanini et al., 2024). By reducing duality and expanding access to OE jobs, the reform should therefore weaken firms' wage-setting power and lead to higher wages for young workers across contract types.

We begin the empirical analysis by evaluating the employment effect on young workers. For that, we exploit variation across sectors in their pre-policy reliance on temporary young employees. Sectors that employed a larger share of young workers under ST contracts before the reform were more exposed to the reduction in OE labor costs. Comparing these sectors to those less exposed allows us to assess how firms adjusted their employment composition when the relative cost of permanent hiring fell.

The results indicate that the reform increased transitions from ST to OE contracts, leading to higher OE employment and lower ST employment among young workers. Four years after implementation, a 1 percentage point (pp) increase in the pre-reform share of young ST workers is associated with a 1.2 pp increase in OE employment and a 0.81 pp decline in ST employment. Event-study estimates confirm that sectors with different exposure levels followed parallel pre-

contracts.

[5] Section 3 discusses these policy limitations.

trends. These results align with search-and-matching models of dual labor markets, where lowering the relative cost of permanent contracts encourages firms to convert more temporary matches into stable employment (Blanchard and Landier, 2002; Boeri and Garibaldi, 2024).

The evidence also indicates that the reform strengthened the outside options of young workers. Wages in ST contracts rise by nearly 1.5% for workers just below the age threshold relative to those just above it, and wages in high-cost OE jobs increase by about 1.9%. These patterns cannot be attributed to statutory pass-through—since neither ST nor high-cost OE workers receive any subsidy—and therefore reflect improved bargaining positions stemming from greater access to permanent employment. This interpretation is consistent with models of labor markets with monopsonistic features, in which ST contracts weaken workers' outside options and sustain lower wages by limiting access to stable jobs and credible outside offers (Boeri and Garibaldi, 2024; Bassanini et al., 2024; Daruich et al., 2023). This result helps explain why ST contracts persist even though the reform's cost reductions exceed the measured statutory cost gap between contracts.

The expansion in permanent jobs among young workers did not come at the expense of older employees. We find no evidence that the rise in OE employment for the young displaced adult workers in OE jobs. Instead, sectors that experienced the largest declines in ST employment among workers under 30 saw corresponding increases in ST employment among older workers, indicating a reallocation rather than a net reduction of temporary jobs. An interpretation consistent with this pattern is that some tasks previously carried out by young ST workers were not fully compatible with OE employment. Once these workers transitioned into permanent positions—and especially as their outside options improved—firms reassigned them primarily to core, stable duties, while genuinely temporary or flexible tasks still needed to be performed. Because employing young workers on ST contracts became relatively more difficult, firms increasingly staffed these remaining temporary tasks with adults. Consistent with this logic, the temporary positions absorbed by older workers take the form of smaller, more limited jobs, reflected in a rise in part-time ST contracts among workers older than 30.

To estimate the employment effects on adult workers, we use a different empirical strategy. Unlike the case of young workers, the share of ST contracts among adults varies little across sectors, making sectoral exposure an uninformative identification margin. Instead, we exploit the sharp eligibility notch introduced at age 45, which created discontinuous changes in labor costs for new OE hires. This design allows us to test whether the reform encouraged firms to substitute OE contracts for ST ones among older workers.

To do so, we proceed in two steps. The first step is to identify valid comparison groups. This is not straightforward because, near the notch, the reform also created incentives for firms to delay the conversion of temporary workers to permanent positions until they reached the eligible age. These timing distortions are visible in the employment distributions by age (Figure 4). To

isolate workers unaffected by such reallocation, we use methods from the notch-design literature (Kleven and Waseem, 2013; Kopczuk and Munroe, 2015) to construct counterfactual employment distributions and show that workers younger than 43 and older than 46 were not influenced by the bunching near the notch.[6]

In the second step, we estimate difference-in-differences models comparing workers aged 40–41 and 47–48, who lie on either side of the eligibility cutoff.[7] The evidence indicates that the reform did not trigger a significant substitution of OE contracts for ST ones among older workers. We find no increase in transitions from ST to OE contracts or in overall OE employment. While the number of low-cost OE workers rose by about 2 percentage points, employment in high-cost OE contracts fell by roughly 1.8 points, leaving total OE employment unchanged. This pattern suggests that the subsidized OE contracts primarily replaced existing permanent positions rather than creating new ones.

The absence of substitution for adult workers raises a natural question: did the labor-cost reductions simply translate into higher wages for adult workers, eliminating the incentives for firms to expand permanent hiring? To examine this, we next analyze the wage effects of the policy. We find substantial, albeit incomplete, pass-through of the incentives into higher wages—around 46% for both young and adult workers. Thus, although statutory labor costs fall, they do not fall by enough to explain the absence of substitution among older workers. Moreover, wage incidence is not constant over time: the initial pass-through reaches about 60% in the first post-transition quarters but declines thereafter, implying that treated workers experience slower wage growth. This dynamic pattern is consistent with models in which reduced employment protection weakens workers' threat point in wage bargaining (Boeri and Garibaldi, 2024). To estimate these effects, we exploit the policy restrictions that excluded some workers from access to low-cost OE contracts and compare the wage trajectories of ST workers transitioning into low- versus high-cost OE jobs.

To summarize the impact on ST-to-OE substitution, we combine the employment and wage estimates to obtain a substitution elasticity between OE and ST contracts for each age group. For young workers, the elasticity is 7.1, whereas it is 0.03 for adult workers.[8] These elasticities are estimated in the context of a reform that simultaneously altered firms' incentives for both young and adult workers and should therefore be interpreted as equilibrium responses to a policy that

[6] We construct counterfactuals using data from employees aged 37–40, assuming that, absent the notch, the share of workers aged 37–40 would reliably predict employment between ages 40 and 45. A placebo test based on pre-reform data supports this assumption.

[7] We obtain similar results when using alternative groups of workers aged 41–42 and 48–49.

[8] Cappellari et al. (2012) also measures a substitution elasticity between ST and OE contracts. They exploit firm-size discontinuities in employment protection with Italian data and estimate an elasticity around 1. Other papers include Centeno and Novo (2012) and Bratti et al. (2021). However, we are not aware of studies estimating substitution elasticities between ST and OE contracts using plausibly exogenous age variation.

reshaped labor demand across the age distribution.[9]

The difference between these two elasticities underscores that younger workers are closer to the margin between OE and ST employment, whereas for middle-aged workers these contract types are much less substitutable—a pattern consistent with strong adverse selection among adult ST workers and with the persistence of a sizable ST wage penalty documented in the mechanisms section.

This paper makes two key contributions. First, search-and-matching models of dual labor markets often assume perfect substitution between ST and OE contracts, implying that the prevalence of temporary jobs is tightly linked to the employment protection cost gap (Blanchard and Landier, 2002; Cahuc and Postel-Vinay, 2002; Boeri and Garibaldi, 2024). Our estimates qualify this view: substitution between ST and OE contracts is substantial for young workers but essentially zero for workers older than 45. This pattern confirms that large disparities in employment protection can trap young workers in temporary employment (Blanchard and Landier, 2002; Boeri and Garibaldi, 2024), while also highlighting the limits of monetary incentives for mid-career workers who are farther from the margin.

At the same time, the findings point to a complementary mechanism that helps explain why temporary contracts remain widespread even when cost gaps are reduced. In labor markets with monopsonistic features, ST contracts can depress workers' outside options—by limiting access to stable jobs, experience accumulation, and credible outside offers—and thereby strengthen firms' wage-setting power. Consistent with this view, empirical evidence shows a strong positive association between temporary employment and labor market concentration (Bassanini et al., 2024; Daruich et al., 2023). In this framework, duality persists not only because OE contracts are costly, but also because ST contracts themselves serve as a tool to weaken outside options and suppress wages.

The results directly speak to this mechanism. By expanding OE opportunities for young workers, the reform improved their outside options, generating measurable wage gains even among those who remained in temporary or unsubsidized jobs. This is precisely what models with imperfect competition predict when workers' bargaining positions strengthen. Taken together, the findings underscore the importance of incorporating life-cycle considerations and monopsony power into models of dual labor markets. Equipping young workers with access to permanent jobs not only improves their long-term skill accumulation (Garcia-Louzao et al., 2023) but also strengthens their bargaining position, whereas similar policies may be less effective for prime-age workers who

[9] In particular, the small elasticity estimated for adult workers does not imply that the ST–OE margin for this group is mechanically unresponsive to policy. Rather, it reflects limited substitution in an environment where labor demand for OE contracts among younger workers increased broadly following the reform. While different counterfactual policies might generate stronger substitution for adult workers, the estimates are especially informative for reforms that apply across age groups and operate through general equilibrium adjustments in contract demand.

lack the opportunity to rebuild human capital or renegotiate their place in the labor market.

Second, the results contribute to a growing literature on non-standard forms of payroll tax incidence (Saez et al., 2012, 2019; Bozio et al., 2023) and cases where payroll tax reductions do not translate into wage gains (Cahuc et al., 2018). For example, Saez et al. (2019) show that both non-eligible and eligible workers obtain higher wages after a payroll tax cut. Or Bozio et al. (2023), who find that when taxes are statutorily levied on employers -as in the reform we study- pass-through is limited. In contrast, we find significant but incomplete pass-through to wages for eligible workers. Unlike prior studies, we analyze a reform that specifically targeted distinct groups of workers: individuals younger than 30 and over 45 who were not in OE employment. The results suggest that when higher demand for eligible workers makes them relatively scarce, firms may compete to hire them, leading to at least partial wage incidence (Postel-Vinay and Robin, 2002; Cahuc et al., 2006; Altonji et al., 2013; Bagger et al., 2014). Additionally, the evidence is also consistent with Nash bargaining models, which predict slower wage growth for workers with weaker employment protection (Boeri and Garibaldi, 2024).

The paper is organized as follows. Section 2 introduces the dataset we use. Section 3 explains the institutional context and the reform. Section 4 presents the theoretical framework. Sections 5 and 6 discuss the empirical strategies and the employment and wage results. Section 7 describes the calculation of the elasticity of substitution between ST and OE contracts. Section 8 details the mechanisms that explain the results. Section 9 presents additional results and robustness checks. Finally, Section 10 explains the conclusions.

2 Data

We use data from the Continuous Sample of Work Lives (Muestra Continua de Vidas Laborales, MCVL), an administrative dataset constructed from Spain's Social Security records, population census, and tax administration files. The MCVL provides rich longitudinal information on employment and unemployment spells, including start and end dates, monthly wages (bottom- and top-coded), separation reasons, contract type (importantly, whether the contract benefited from a tax credit), firm size, sector, part-time status, and job location.[10] In addition, the MCVL contains detailed demographic information at the individual level, such as sex, education, date and province of birth, and citizenship, and details about household composition, including the sex and date of birth of all household members.

[10]For spells in which a worker initially held a short-term contract and subsequently transitioned to another short-term or an open-ended contract, the dataset records the final contract type along with the two preceding contracts within that job relationship. It also reports the exact start and end dates for each contract change, which are incorporated into our dataset.

The MCVL sample was first drawn in 2004, selecting 4% of all individuals who, in that year, were formally employed, receiving unemployment insurance (UI) or unemployment assistance (UA), or collecting a contributory pension. In absolute terms, this represented over one million individuals. Sampling was random and without stratification. The dataset provides each individual's complete labor history from their entry into the workforce, including all periods of employment, UI or UA receipt, and pension collection. New editions of the dataset are released annually, retaining all individuals originally sampled in 2004 unless they permanently exit the Social Security system (for example, due to UI exhaustion, inactivity without benefits, or death). When an individual exits, they are replaced by a randomly selected person with an active Social Security relationship that year, whose full retrospective labor history is incorporated into the dataset.

Our empirical analysis includes all individuals sampled in any edition of the MCVL between 2004 and 2012. Consequently, we use data from 2004–2012 to retrospectively analyze a policy implemented in 1997, which may raise concerns about the representativeness of the sample. However, Figure A1 in the Online Appendix shows that this is not a concern. Comparing the MCVL with the Spanish Labor Force Survey (SLFS, Encuesta de Población Activa), which provides a representative quarterly snapshot of the labor market, we find nearly identical employment trends for workers aged 25–30, 40–45, and 45–50. This close alignment indicates that both sources capture comparable labor market dynamics, validating the retrospective use of the MCVL for the key age groups analyzed in this study.[11] [12]

The MCVL also offers several advantages over the SLFS. A key one for our purposes is that it records workers' exact ages, which—as we show in Section 5.3.1—is crucial for analyzing behavior around the policy's age cutoff. By contrast, the SLFS reports age only in five-year intervals.[13]

3 Institutional Context

In 1996, Spain recorded the highest incidence of ST employment among OECD countries, with 33.6% of workers on ST contracts compared to an OECD average of just 10.9%. This prevalence

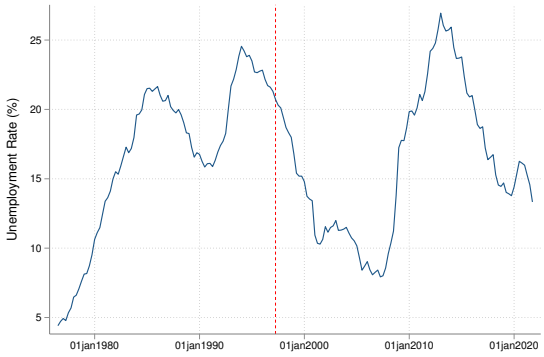
[11] The MCVL's sampling design likely explains its consistency with the SLFS. Importantly, inclusion in the MCVL does not require active employment, individuals receiving UI, UA, or a contributory pension are also sampled. In our context, the UA program for workers aged 52 and older is particularly relevant, as it provides indefinite benefits until retirement. For example, a worker who was 45 when the policy was implemented would be 52 by 2004 and could therefore be sampled while collecting UA benefits. Section B.5 of the Online Appendix provides further details on this program.

[12] Bonhomme and Hospido (2017) also exploit the retrospective nature of the MCVL and show that attrition is negligible over our study window and age range, largely due to low mortality and emigration rates. Attrition is somewhat higher for women, however, mainly due to career interruptions in their twenties and early thirties.

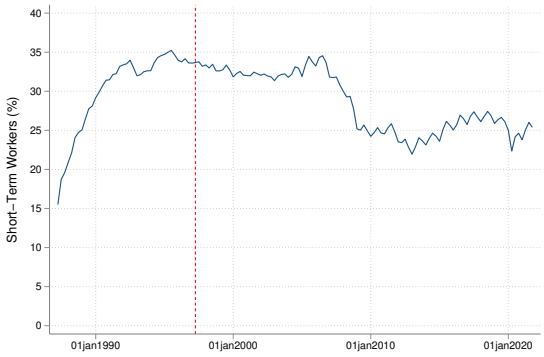
[13] Kugler et al. (2005) evaluate the same policy using the SLFS, comparing workers aged 45–64 with those aged 30–44. As we discuss in Section 5.3.1, finer age granularity is essential for accurately capturing behavioral responses around the notch.

Figure 1: Unemployment and Short-Term Employment Rates

(a) Unemployment rate



(b) Share of worker in ST contracts



Notes: The figures are based on data from the Spanish Labor Force Survey. Panel (a) depicts the evolution of the unemployment rate, and Panel (b) the share of workers employed under short-term contracts.

has its roots in the 1984 labor market reform, which liberalized the use of ST contracts.[14] Before the reform, ST contracts were restricted to genuinely temporary jobs, such as seasonal work or short-term replacements. The 1984 reform eliminated these restrictions, allowing ST contracts to be used across any sector and occupation. This led to a sharp expansion in their use (Figure 1, Panel (b)). ST contracts quickly became attractive to employers because they entailed no firing costs and shielded firms from wrongful dismissal claims. As a result, Spain's labor market became highly segmented, with a pronounced divide between OE employees and ST workers, the latter facing unstable employment and limited job security (Bentolila et al., 1994).

The remainder of this section describes the statutory labor cost gap between ST and OE contracts before the reform, outlines the policy changes that narrowed this gap, and explains the age-based discontinuities at 30 and 45 that support our empirical strategy.

3.1 The Difference in Severance Payments between OE and ST Contracts

Before the reform, the main distinction between OE and ST contracts stemmed from the higher severance payments owed to OE workers upon dismissal. Using pre-reform data, we estimate that this severance cost gap represented roughly 7% of the total labor cost of an equivalent ST worker. The methodology underlying this calculation is described below.[15]

For OE contracts, severance payments depended on whether a dismissal was classified as wrongful or fair. In cases of wrongful dismissal, employers owed 45 days of wages per year

[14] However, time-series data in Figure 1, Panel (a), suggest that the reform did not succeed in reducing unemployment.

[15] The estimate is based on data from January 1996 to April 1997, immediately prior to the reform.

of tenure, up to a maximum of 42 months. For fair dismissals, compensation was lower——20 days of wages per year of tenure, capped at one year's salary. To qualify as fair, the employer had to demonstrate either (i) the worker's inability to perform their duties or (ii) economic or technological grounds for the layoff. These cases could be challenged in court, and roughly 75% of disputes were resolved in favor of the employee (Bentolila, 1996). Regardless of the outcome, employers bore the legal costs, and if the dismissal was judged unfair, they were also liable for the worker's foregone wages during the trial. Given the high expected costs and legal uncertainty, fair dismissals were rare in practice. In our data, among young workers, 0.13% of separations are classified as fair, 71.17% as wrongful dismissals, and 28.70% as voluntary quits; among workers over 45, the corresponding shares are 0.43%, 77.94%, and 21.63%, respectively.

In contrast, ST contracts were strictly time-limited, with a maximum duration of three years. At the time of the reform, they entailed no firing costs upon expiration, and their termination could not be legally contested.[16] Given this institutional setting, and assuming that the average dismissal probabilities of OE workers approximate the separation risks that ST workers would face if converted to OE, we compute the expected severance cost gap for young workers as follows:

$$\frac{\text{Expected severance gap}}{\text{Gross annual wage}} = \frac{(w \times 45 \times 71.17\% + w \times 20 \times 0.13\%) \times \text{Duration}}{((1+\tau)w \times 365) \times \text{Duration}} = 6.40\%,$$

where w denotes the daily wage, τ the payroll tax rate (37.2%), and Duration the years of job tenure. On average, this implies a severance cost gap of 6.40% for young workers. Using the same approach and the observed separation risks for older workers, the corresponding gap is: $\frac{(w\times45\times77.94\%+w\times20\times0.43\%)}{((1+\tau)w\times365)} = 7.02\%$.[17]

This estimate likely represents a lower bound of the true statutory labor cost differential, as it excludes additional expenses associated with fair dismissals that are litigated, such as legal fees, procedural delays, and uncertainty.[18]

3.2 The 1997 Policy Change

Concerns about the dual structure of the Spanish labor market—particularly its adverse effects on earnings, employment, and productivity (Wilhelmi, 2021)—prompted the government to introduce targeted subsidies for certain OE contracts.[19] These early measures, however, had limited scope. A

[16] Severance payments for ST contracts were introduced later, in 2001.

[17] As shown in Section B.1 of the Online Appendix, the gap fluctuates between 6% and 8% during the first five years of tenure, and 86.5% of OE contracts last no more than five years. Beyond this period, the gap stabilizes at around 6%.

[18] Although difficult to quantify, these additional costs appear to be substantial. Most firms seem to avoid them by opting for wrongful dismissals instead, which is consistent with the fact that only 0.13% of separations among young workers and 0.43% among older workers were classified as fair, as well as with the discussion in Bentolila (1996).

[19] For instance, in 1992 subsidies were granted to firms hiring long-term unemployed workers younger than 25 or older than 45. Moreover, eligibility was limited to firms expanding their workforce, as summarized in Table B3.

major reform in 1997 substantially broadened access to these subsidies, leading to a sharp increase in the use of low-cost OE contracts. The details of this expansion are discussed below.

The 1997 reform simultaneously reduced both payroll taxes and severance payments for *new* OE hires within specific demographic groups. Payroll tax reductions were financed through the *Instituto Nacional de Empleo* (National Employment Institute) budget, ensuring that expenditures tied to social benefits remained unaffected. As is common in dual labor market reforms, the policy was marginal: it applied only to newly signed OE contracts, leaving existing ones untouched (Boeri, 2011).

Importantly, the reform introduced two sharp age-based discontinuities in labor costs, benefiting workers under 30 and over 45.[20] Under the new rules, firms hiring OE workers younger than 30 received a 25.38% payroll tax reduction, while those hiring workers older than 45 obtained a 38.06% reduction. In both cases, severance payments for wrongful dismissals were reduced from 45 to 33 days per year of tenure—a 26.7% decrease. Denoting the payroll tax reduction rate by r, the implied relative reduction in expected labor costs for young workers is:

$$\frac{\text{Expected reduction in OE labor costs}}{\text{Labor costs under an ST contract}} = \frac{w\tau \times r \times 365 + w[12 \times 71.17\%]}{w(1+\tau) \times 365} = 8.61\%.$$

Hence, the reform reduced expected labor costs by 8.61% for workers under 30. Applying the same calculation for older workers yields a 12.2% reduction: $\frac{w\tau \times 38.06\% \times 365 + w[12 \times 77.94\%]}{w(1+\tau) \times 365} = 12.2\%$.[21] [22]

Notably, the reductions in statutory labor costs exceeded the pre-reform employment protection gap of 6.40% for young workers and 7.02% for older workers. This implies that, for new hires, the reform more than eliminated the severance-related cost disadvantage of OE contracts relative to ST contracts. One might therefore expect ST contracts to disappear. However, this need not be the case. ST workers often face sizable wage penalties, as we show in Section 8, making them cheaper than OE workers even when statutory costs are equalized. Moreover, firing an OE worker still involves legal uncertainty and potentially substantial litigation costs, which are absent in ST contracts. As a result, firms may continue to rely on ST contracts despite the reduction in statutory labor costs for OE jobs. Nonetheless, employers had stronger incentives to offer OE contracts to eligible workers, likely contributing to a shift in the composition of new employment toward permanent positions.

[20] Dolado and Jimeno (2004) note that the government initially intended to reduce statutory labor costs for all new OE hires. However, such a broad reduction risked being ruled unconstitutional by the Spanish Constitutional Court. To comply with legal constraints, policymakers instead targeted groups considered more vulnerable to unemployment and temporary employment traps—specifically, workers younger than 30 and older than 45.

[21] For young workers, 1.7% of the labor cost reduction is due to lower severance payments, and 6.91% from lower payroll taxes. For older workers, these numbers are 1.87% and 10.33%, respectively.

[22] Table B3 reports the evolution of labor cost reductions over time for each eligible group.

The sharp discontinuities at ages 30 and 45 arose because eligibility was more restrictive for workers aged 30–45: they qualified only if they had been unemployed for at least one year or if they transitioned from an ST contract with the same employer at the time of the reform's approval. By contrast, eligibility was automatic for workers younger than 30 or older than 45. Additionally, labor cost reductions were more generous for workers over 45, as payroll tax cuts applied for the *entire duration* of the contract, whereas for all workers younger than 45 they expired after two or three years.[23] [24] Although minor adjustments were made to payroll tax reductions, the discontinuity at 30 and 45 remained intact.[25]

A last key feature of the 1997 reform is that it was explicitly designed to target marginal OE jobs——that is, workers who, absent the policy, would have remained on ST contracts or out of employment. To ensure this targeting, the law imposed several restrictions on eligibility. First, it applied only to *new* OE hires. Second, workers with an OE contract in the preceding three months were excluded, preventing firms from poaching existing OE employees and rehiring them at a discount. Third, workers rehired by the same employer were ineligible if they had held a permanent contract within the past 24 months. In all such cases, firms were required to hire workers under the pre-reform statutory labor costs. In addition, employers had to be current on their tax obligations to claim the subsidy.[26] Fourth, a new restriction was added in 1999: firms that wrongfully dismissed a worker hired under the tax credit became ineligible for future discounts.[27]

4 Theoretical Framework

Search-and-matching models of dual labor markets describe firms' hiring decisions as a choice between ST and OE contracts, each subject to distinct regulatory constraints and dismissal costs (Blanchard and Landier, 2002; Boeri and Garibaldi, 2024). OE contracts, which involve higher firing costs, are typically offered only when the expected productivity of a match exceeds a threshold that justifies the associated dismissal costs. Matches below this threshold are instead hired under ST contracts, which provide firms with greater flexibility but offer workers weaker long-term em-

[23] Using pre-reform data, we estimate that the average new OE hire aged 40–50 remained employed for 14 years. Restricting tax cuts to the first two years, therefore, greatly reduced their value.

[24] During the first two years, the reduction in labor costs was larger for workers older than 45—by 1.87–3.59 percentage points—as shown in Table B3, whereas the magnitude of the reduction was smaller for younger than 30.

[25] See section B.3 in the Online Appendix for a description of these legislative changes. Importantly, all adjustments affected payroll tax discounts, while severance payment reductions remained unchanged.

[26] Further restrictions included: the subsidies could not be used to hire relatives of the owner or managers; they could not be applied to managers themselves, individuals in prison, professional athletes, artists, or dockers employed by public entities. Finally, when combined with other programs, tax credits could not exceed 60% of the annual wage.

[27] This restriction applied for one year or until the firm hired as many workers as it had dismissed unfairly. In our empirical analysis, we use data up to 2001. Additionally, in the Online Appendix, we verify that our results hold when using only pre-1999 data, before any legislative changes.

ployment prospects. This institutional asymmetry generates a segmented labor market in which access to permanent employment depends on sufficiently high expected match quality.

Employment Effects. A central prediction of these models is that reducing the relative hiring cost of OE contracts increases the proportion of permanent employment. By lowering the productivity threshold required to justify a permanent hire, policies such as the one analyzed in this paper enable firms to offer OE contracts to workers whom employers would otherwise hire into ST positions. In such cases, temporary employment can function as a stepping stone toward stable jobs. Therefore, we expect the policy to generate an expansion in OE employment.

The magnitude of this expansion is likely to differ across age groups. In particular, the increase may be more pronounced among young workers than among adults. There are several reasons for that. On the one hand, firms often rely on ST contracts to cheaply screen inexperienced workers and acquire information about their productivity (Faccini, 2014). The reform narrows the employment protection gap across contracts providing firms' incentives to offer OE contracts sooner. On the other hand, dynamic complementarities in human capital accumulation may amplify these effects. Training and learning-by-doing are more likely under OE contracts, while firms have limited incentives to invest in workers who remain temporary. By increasing the likelihood of early conversion, the reform could also strengthen firms' incentives to train young workers, thereby reinforcing the transition toward permanent employment (Garcia-Louzao et al., 2023; Autor and Houseman, 2010; Booth et al., 2002; Cabrales et al., 2017).

For adult workers, these mechanisms are considerably weaker. Firms typically have better information about their productivity, so ST contracts might not function as screening devices. Instead, temporary jobs at older ages might reflect structural needs—seasonal demand, replacement roles, or project-based work—rather than uncertainty about match quality (Del Bono and Weber, 2008; Berton and Garibaldi, 2012; Garibaldi and Gomes, 2022). Moreover, adult workers face a higher probability of negative productivity shocks and shorter expected job durations, which reduce the surplus from long-term employment relationships. Even after severance and payroll costs fall, these factors limit the attractiveness of OE contracts for this group. As a result, the same cost reduction that substantially increases permanent employment among young workers might not generate more than a modest response among adults.

Spillover Effects. Beyond its direct effects on eligible workers, the reform may also have produced indirect or unintended consequences. One relevant channel is employment spillovers across age groups. If firms convert more young workers from ST to OE jobs, they may still require a reserve of flexible labor, potentially increasing the use of ST contracts among older workers.[28] Importantly, not all tasks previously performed by temporary workers might be fully compatible

[28] Spillover effects have been documented in other evaluations of labor market policies (Crepon et al., 2013; Cahuc et al., 2022), making them essential for interpreting reduced-form estimates.

with permanent roles: many ST workers might combine both permanent-type tasks and genuinely temporary or flexible tasks within the same job. Once they become OE employees—and especially as their outside option improves—firms are likely to reassign them primarily to stable, core tasks. However, the remaining flexible tasks do not disappear and must still be performed by someone. As a result, firms may increase reliance on ST contracts for older workers, often through part-time arrangements that minimize labor costs. At the same time, by lowering the cost of hiring eligible workers, the reform could also have expanded overall employment—beyond simple reallocation across contract types or age groups—if firms increased production in response to lower marginal labor costs.

Outside Options and Wage Effects. When the reform increases the number of OE jobs available to young workers it also raises the value of workers' outside options. In search-and-matching and bargaining models, a worker's wage depends not only on the surplus of the current match but also on the value of alternative employment opportunities (Boeri and Garibaldi, 2024). A higher probability of obtaining an OE job increases the expected payoff from searching outside the current job. As a result, for age groups where the reform induces ST-to-OE substitution, we should expect upward pressure on wages, even for workers who remain in temporary or unsubsidized positions.

Crowd-Out. Another possibility is crowding-out across contract types: firms could expand low-cost OE employment while reducing high-cost OE positions, effectively relabeling rather than increasing permanent jobs.

Wage Incidence. The reform may also have affected wages through its two components: payroll tax cuts and reductions in severance payments. In standard competitive models, payroll taxes are expected to be fully passed on to workers, since labor demand is assumed to be more elastic than labor supply. Under this view, any reduction in employer labor costs would be entirely offset by higher wages. However, recent evidence suggests that payroll tax incidence can be limited when they are formally levied on employers rather than directly tied to worker benefits (Bozio et al., 2023). In our setting, where the reduction takes this form, payroll tax pass-through might be close to zero.

Severance payments operate differently: they are paid by firms but accrue directly to workers upon separation. Because they constitute a valued benefit, reducing severance liabilities could be partially offset by higher wages, as discussed in Lazear (1990). Over time, however, this effect may diminish. Workers on low-cost OE contracts face weaker employment protection and reduced bargaining power, potentially resulting in slower subsequent wage growth (Boeri and Garibaldi, 2024; Bentolila et al., 1994).

5 Employment Results

5.1 Identification Strategies

In this section, we present descriptive evidence that motivates the identification strategies to estimate the reform's effects on employment. Because the institutional setting affected young and adult workers differently, we exploit three complementary sources of variation: sector-level exposure among young workers, discontinuities in employment patterns around the age-45 notch, and comparisons of workers above or below this notch. The descriptive patterns documented below provide a rationale for leveraging these margins in the specifications developed in Sections 5.2 and 5.3.

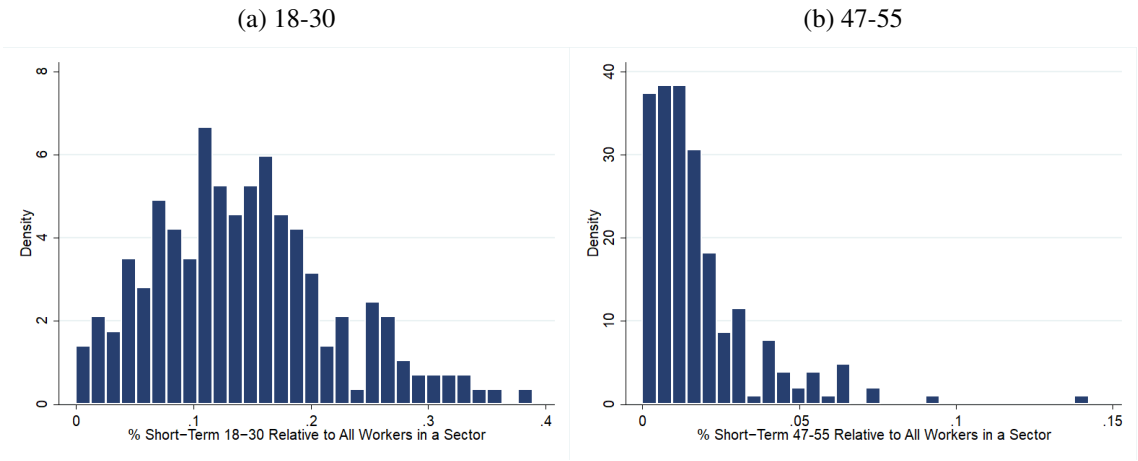
Sector-Level Variation. Although the reform was national in scope, its intensity varied across sectors depending on their pre-reform reliance on temporary contracts. This heterogeneity is particularly pronounced among young workers. We capture it using a continuous treatment variable, $\%ST_{s,96}$, defined as the 1996 share of workers aged 18–30 employed on ST contracts relative to total sectoral employment. Sectors with a higher initial prevalence of ST employment were more exposed to the reform's incentives to convert temporary jobs into subsidized permanent positions.

Figure 2 displays the distribution of this treatment variable across sectors. Panel (a) for workers aged 18–30 and Panel (b) for those aged 47–55. Among young workers, the average ST employment share is 15%, with substantial dispersion (standard deviation of 10 percentage points), indicating meaningful cross-sectoral variation. In contrast, among middle-aged workers, the incidence of ST employment is very low (on average 0.8%) with minimal dispersion, rendering sectoral variation an uninformative identification margin for this group.

Additionally, Panel (a) of Figure 3 plots the sectoral evolution of OE employment for 18–30-year-old workers, grouping sectors into four quartiles based on their exposure to the shock variable, $\%ST_{s,96}$. The figure suggests parallel pre-trends across sectors and a pronounced post-reform increase in OE employment for the most exposed sectors. This visual evidence further supports using sectoral variation in temporary-employment intensity as a credible identification margin for estimating the reform's effects on youth employment.

Variation Near the Notches: For older workers, the reform created a sharp discontinuity at age 45. Employers hiring workers just below this threshold could lower labor costs by delaying conversion from a ST to an OE contract until the worker became eligible for the subsidy, whereas those hiring workers just above could not. This differential incentive led to a visible concentration of employment just below the cutoff (Figure 4), consistent with firms adjusting contract timing in response to eligibility rules. We exploit this bunching using standard methods from the notch-design literature to quantify how the reform affected the timing of ST-to-OE transitions (Kleven and Waseem, 2013; Kopczuk and Munroe, 2015). In contrast, no discontinuity arises at age 30.

Figure 2: Histogram of the proportion of ST workers aged 18–30 and 47-55 in each sector relative to the total sector workforce in 1996 ($\%ST_{s,96}$)



Notes: Histogram presenting the distribution of the shock variable. The percentage of short-term workers aged 18-30 and 47-55 across sectors in 1996.

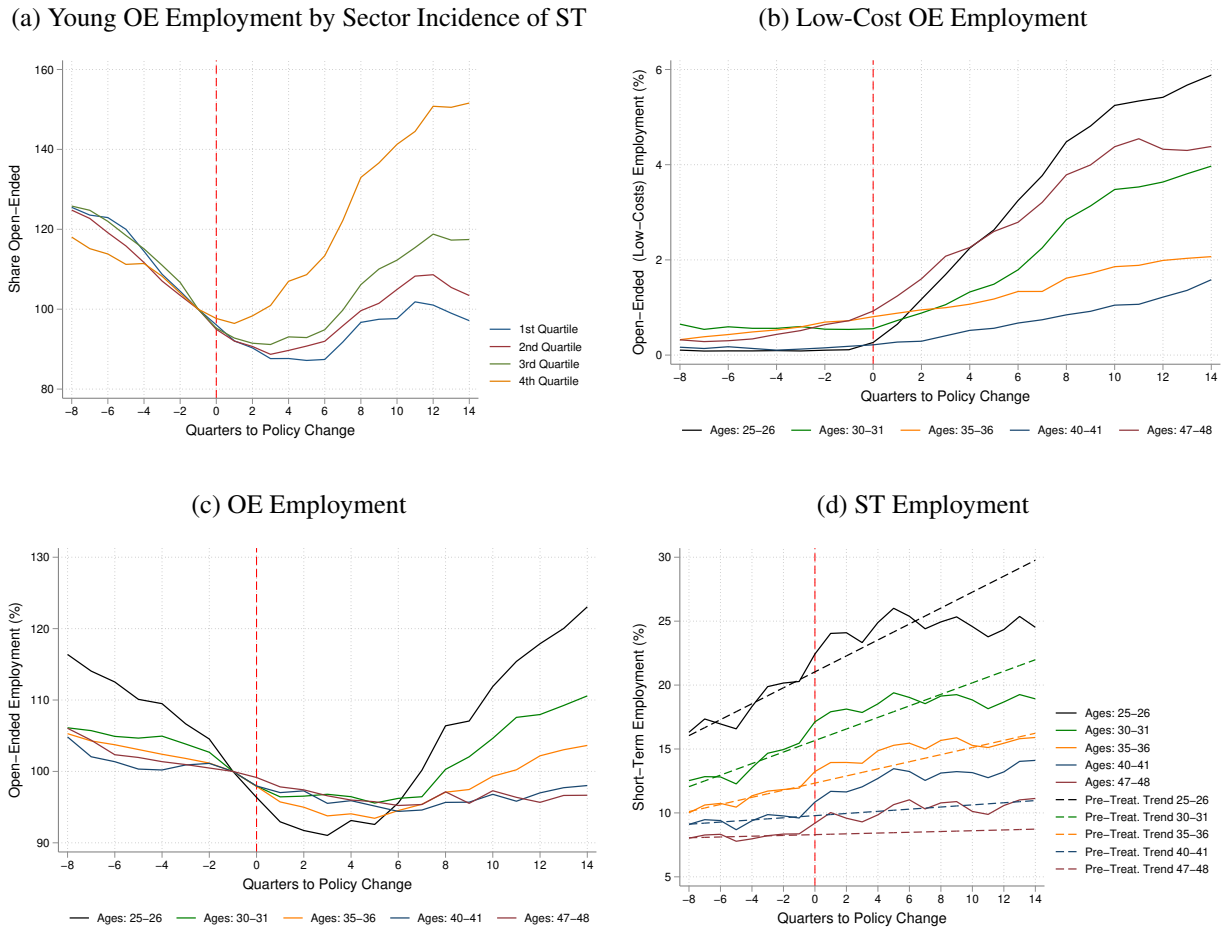
Because workers cannot "age into" eligibility, the reform applied uniformly to all individuals below the threshold, removing any incentive to delay conversions.

Variation Far from the Notches: We next examine whether workers far from the notches can serve as a credible source of identification for the employment effects among 45-year-olds. Figure 3, Panels (b), (c) and (d) plot the evolution of employment by contract type for workers aged 25, 30, 35, 40, and 47. Panel (b) shows low-cost OE employment, Panel (c) shows total OE employment (normalized to each group's employment level one quarter before the reform), and Panel (d) shows ST employment. Three main patterns emerge from these time series.

First, workers aged 47 and 40 provide a credible treatment–control comparison. Both groups are sufficiently distant from the 45-year-old notch and thus unaffected by the local employment distortions documented in Figure 4—a point we formally demonstrate in Section 5.3.2. Following the reform, low-cost OE employment rises sharply for 47-year-olds but remains flat for 40-year-olds, while total OE and ST employment exhibit parallel pre-reform trends (Panels (c) and (d)). These patterns support using these age groups to estimate the policy's effects on employment above the eligibility threshold.

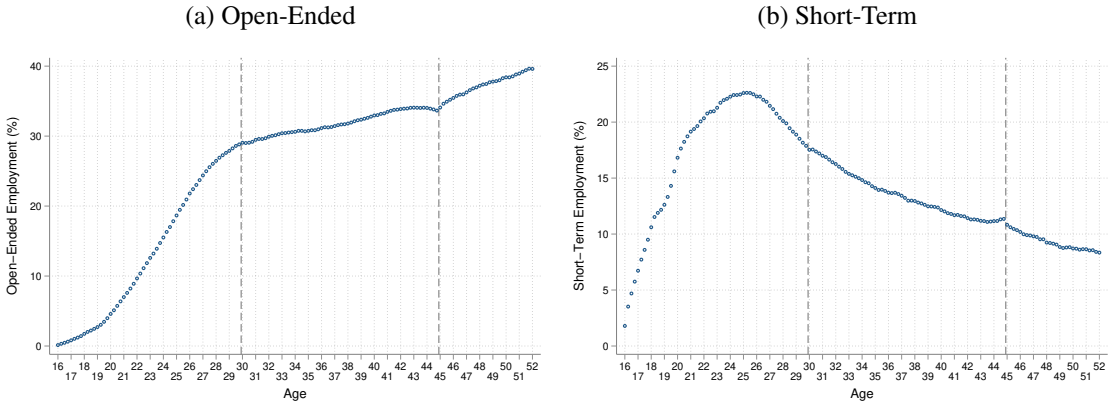
Second, there is no equally valid control group for young workers. As shown in Panel (c), OE employment among younger cohorts diverges sharply from that of older groups even before the reform. This divergence likely reflects the higher cyclical sensitivity of youth employment (Oreopoulos and von Wachter, 2012), which violates the parallel-trends assumption and renders older workers an unsuitable counterfactual. Consequently, to identify the employment effects for this population, we rely instead on sector-level variation in exposure.

Figure 3: Employment Time-Series



Notes: The figures show the raw time-series for OE employment by quartile of sectoral exposure to the reform, measured by the 1996 share of workers aged 18–30 employed on ST contracts (Panel (a)); Panels (b), (c), and (d) show low-cost OE employment, OE employment, and ST employment, respectively, for several age groups of workers. In Panel (d), the dashed lines display the pre-treatment trends for each group. The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered. In Panels (a) and (c) the series series are normalized to the OE employment share in the quarter preceding the policy's implementation.

Figure 4: Open-Ended and Short-Term Employment Share by Age



Notes: Employment shares by contract type and age. Panel (a) shows open-ended workers, and Panel (b) shows short-term workers. Vertical dashed lines indicate the labor cost notches.

Third, Panel (d) points to possible spillover effects on older workers. Following the reform, ST employment declined among young workers relative to its pre-reform trend but increased among older workers. This pattern is consistent with firms reallocating temporary positions from younger to older employees once conversion subsidies became available for the former. We formally investigate these spillover effects in Section 5.2.2.

Finally, we stress that the results for young and adult workers are identified in the context of a reform that simultaneously targeted both groups. While the effects might not generalize to a setting in which only one group was treated, they may be more informative for understanding reforms that extend across the entire age distribution.

5.2 Employment Effects of the Policy for Workers Younger than 30

Following the identification strategy proposed in Section 5.1, we estimate the policy's impact on young workers using sector-level variation in their pre-reform incidence of ST contracts. To quantify these effects, we estimate both dynamic and static difference-in-differences (DiD) specifications. The dynamic specification traces the evolution of the policy's impact over time and is estimated using the following model:

$$Y_{st} = \alpha + \delta_s + \delta_t + \sum_{j=-T,\neq -1}^{T} \beta_j \mathbb{1}[j=t] \times ST_{s,96} + \sum_{j=-T}^{T} \gamma_j \mathbb{1}[j=t] \times X_s + \varepsilon_{st}, \tag{1}$$

where Y_{st} denotes the employment or contract transition share for young workers in sector s at time t, normalized by the number of 18–30-year-olds employed in that sector in 1996.[29] Sector fixed effects (δ_s) control for time-invariant sectoral characteristics, while time fixed effects (δ_t) absorb aggregate shocks common to all sectors. The coefficients β_j measure the differential evolution of outcomes across sectors with varying baseline ST employment incidence, relative to the quarter immediately preceding its implementation in May 1997 ($j = -1$).

To strengthen identification, we include interactions between time dummies and a rich set of sector-level baseline covariates, X_s, which account for potential confounders correlated with both treatment intensity and outcomes. These covariates include sectoral averages of wages, firm size, educational attainment, and job duration, as well as the incidence of part-time contracts, the share of managerial positions, and the proportion of male workers. We also control for labor market concentration, measured using a weighted Herfindahl-Hirschman Index across province-sector cells.

In addition to these specifications, we also estimate a static DiD model:

$$Y_{st} = \alpha + \delta_s + \delta_t + \beta_1 ST_{s,96} + \beta_2 Post_t + \beta_3 (ST_{s,96} \times Post_t) + \sum_{j=-T}^{T} \gamma_j \mathbb{1}[j = t] \times X_s + \varepsilon_{st}, \quad (2)$$

where β_3 captures the average post-reform differential effect across sectors with varying baseline exposure.

5.2.1 Effects on 18-30-Year-Old Workers

We begin the empirical analysis by examining the impact of the reform on employment dynamics and job transitions. Panel (a) of Figure 5 shows that sectors with a higher initial share of young workers on ST contracts experienced a larger increase in transitions from ST to OE contracts following the reform. Before the reform, the estimated coefficients fluctuated around zero and were statistically insignificant, indicating no differential pre-trends. In other words, reducing OE labor costs increases the number of ST contracts that work as stepping stones to more stable employment, consistent with the predictions of search-and-matching models of dual labor markets (Blanchard and Landier, 2002; Boeri and Garibaldi, 2024).

Panels (c) and (e) present transitions into low-cost and high-cost OE contracts, respectively. There is no evidence of significant pre-trends before the reform in either case, supporting the validity of the identification strategy. Following the reform, the coefficients for transitions into

[29] All employment outcomes are expressed as ratios: the number of workers employed in quarter $\times$ year (t) divided by the total number of workers in each sector under ST or OE contracts in 1996. Transition variables are defined analogously, as the number of transitions into a given contract type in quarter $\times$ year (t), normalized by the number of new hires under OE contracts in 1996 (for transitions into OE contracts) or under ST contracts in 1996 (for transitions into ST contracts).

low-cost OE contracts (Panel c) increase steadily and become statistically significant, indicating a positive policy effect. Importantly, there is no evidence of transitions into high-cost OE contracts being displaced (Panel e).

The estimates in Table 1, Panel A, Columns (1)–(3), align closely with the patterns observed in the event study figures. A one standard deviation increase in the baseline share of young workers on temporary contracts is associated with a 28.3% (2.829×0.1) increase in transitions from ST to OE contracts. Column (2) shows that this effect is almost entirely driven by transitions into low-cost OE contracts, which rise by 23.8%. At the same time, Column (3) reveals a small and statistically insignificant increase in transitions into high-cost OE contracts.

Next, we examine the impact of the reform on employment outcomes. Panel (a) of Figure 6 shows that sectors with a higher initial share of young ST workers experienced a larger increase in the number of young workers employed under open-ended OE contracts following the reform. Sixteen quarters after implementation, the estimates suggest that a 1 percentage point increase in the baseline share of young workers on temporary contracts is associated with a 1.40% increase in OE employment.

The impact on ST jobs is illustrated in Panel (e), where the estimate in quarter 16 is negative, and equal to -0.92%. This suggests that the relative reduction in OE labor costs enables some workers to transition out of temporary jobs (Blanchard and Landier, 2002; Boeri and Garibaldi, 2024; Booth et al., 2002). Panel (f) shows that the overall effect on OE and ST jobs is statistically insignificant and close to zero, indicating that the policy did not increase employment of young workers in the most affected sectors.[30]

Approximately 42% of the impact in OE employment is explained by the increase in low-cost OE employment (Panel (b)), while the remaining 58% happens through high-cost OE employment (Panel (c)). At first glance, the sizable role of high-cost OE contracts might seem surprising, since the policy directly subsidized only low-cost ones. To understand this pattern, we examine two possible mechanisms.

First, low-cost OE contracts may have acted as pathways into high-cost OE contracts. To test this possibility, we check whether the overall rise in OE employment is mirrored by the fraction of workers who at some point held a low-cost OE contract. Figure 6, Panel (d), provides supporting evidence: by the end of the study period, a 1 pp increase in the shock variable corresponds to a 1.02 pp rise in the share of workers who have ever been employed under a low-cost OE contract—an estimate closely aligned with the overall increase in OE employment. This suggests that most of the expansion in permanent jobs passed through the subsidized entry point.

[30] We removed sector-specific linear trends using pre-treatment data for the endogenous variables ST employment and overall employment (Panels (e) and (f) in Figure 6. We follow this approach because employment on ST contracts exhibits a pre-treatment trend. We also provide results without detrending the data in the Appendix.

Table 1: Effects of the Reform on Employment Outcomes and Transitions

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Short-Term Employment and Low-Cost Open-Ended transitions					
	Short-Term to Open-Ended	Short-Term to Low-Cost OE	Short-Term to High-Cost OE	Low- to High-Cost Open-Ended	Low- to High-Cost Open-Ended (Different Firm)	Low- to High-Cost Open-Ended (Same Firm)
Post $\times \%ST_{s,96}$	2.829***	2.383***	0.446	0.167	0.090	0.077
	(0.934)	(0.799)	(0.525)	(0.113)	(0.068)	(0.080)
Observations	32,116	32,116	32,116	32,116	32,116	32,116
	Panel B: Employment Outcomes					
	Open-Ended Low-Cost	Open-Ended (High-Cost)	Open-Ended All	Ever Low-Cost Open-Ended	Short-Term	Open-Ended and Short-Term
Post $\times \%ST_{s,96}$	0.292*	0.410**	0.703**	0.318*	-0.344	0.042
	(0.171)	(0.186)	(0.306)	(0.190)	(0.394)	(0.716)
Observations	3,4091	34,091	34,091	34,091	34,091	34,091
	Panel C: Employment Transitions from Non-Employment					
	Non-Employment to Low-Cost OE	Non-Employment to High-Cost OE	Non-Employment to Any OE	Non-Employment to Short-Term		
Post $\times \%ST_{s,96}$	0.106	0.003	0.105	0.010		
	(0.076)	(0.110)	(0.137)	(0.029)		
Observations	32,116	32,116	32,116	33,619		

Notes: This table reports difference-in-differences estimates of the effects of reduced non-wage labor costs on labor market outcomes, using sector and time fixed effects (Equation 1). Panel A shows contract transitions, Panel B employment outcomes (with Columns 5–6 detrended to remove pre-reform trends), and Panel C further explore contract transitions. All regressions include interactions between quarter dummies and baseline sector-level controls—average earnings, market concentration, managerial share, education, total employment, job duration, part-time share, and male share—and are weighted by the baseline population of young workers. Robust standard errors clustered at the sector level are reported; significance: *10%, **5%, ***1%.

Second, we study transitions from low-cost to high-cost OE contracts. Panel (b) of Figure 5 shows that many workers who started on subsidized OE contracts eventually moved into high-cost OE positions. Estimates in Table 1 reinforce this finding: a one standard deviation increase in the baseline share of young ST workers is associated with a 1.67 percentage point increase in transitions from low-cost to high-cost OE contracts (Column 4). 53.9% of these transitions involve workers moving to an OE contract at a different firm (Column 5), and relative to OE-to-OE transitions at baseline this implies an increase of 164%, suggesting that the reform improved young workers' outside options, a mechanism we examine in more detail in Section 5.2.3.[31] The remaining transitions from low- to high-cost OE contracts occur within the same firm and coincide with the expiration of payroll tax discounts after 12 quarters of job duration, as illustrated in Panel (e) of Figure 5.

Overall, the evidence presented in this section shows that reducing the statutory cost of OE contracts relative to ST contracts increases the share of short-term positions that function as stepping stones to stable employment for young workers. As a result, the policy leads to a sustained rise in OE employment.

5.2.2 Spillovers on Workers Older than 30

We now turn to the question of whether the reform generated spillover effects on workers older than 30. Our analysis is guided by two main questions. First, did the rise in OE employment among young workers reflect a reallocation away from OE positions held by older workers? Second, consistent with the time-series evidence in Figure 3, Panel (d), did the decline in ST employment among young workers coincide with a rise in ST employment among older workers?

To address these questions, we re-estimate Equation 2 for different age aggregates (18–65, 18–30, and 30–65), normalizing all outcomes by the number of 18–65-year-old workers in each sector in 1996.[32] This approach allows us to compare the reform's effects across age groups while keeping the scale of employment outcomes consistent.

The results, reported in Table 2, show positive spillover effects on both OE and ST employment for older workers. Among the 18–30-year-old group directly targeted by the policy, a one-percentage-point higher baseline incidence of young workers in ST contracts is associated with a 0.042% increase in OE employment and a -0.068% change in ST employment, the latter being statistically insignificant. Extending the analysis to all workers aged 18–65, the corresponding OE effect rises to 0.064%, about 1.5 times larger than for the targeted group. These findings suggest that the expansion of permanent jobs among young workers did not come at the expense of older

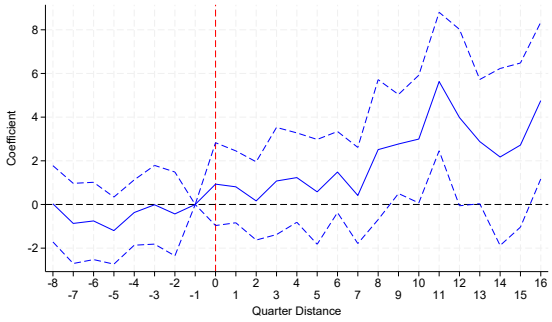
[31] At baseline, OE-to-OE transitions are 5.5% of OE hires.

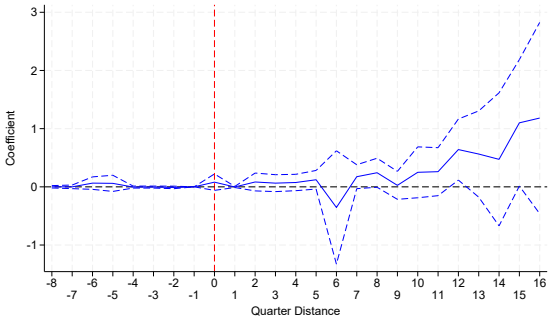
[32] This normalization explains differences in coefficient magnitudes between Tables 1 and 2; signs and patterns remain consistent.

Figure 5: Effects of the Reform on Employment Transitions

(a) Short-Term to Open-Ended

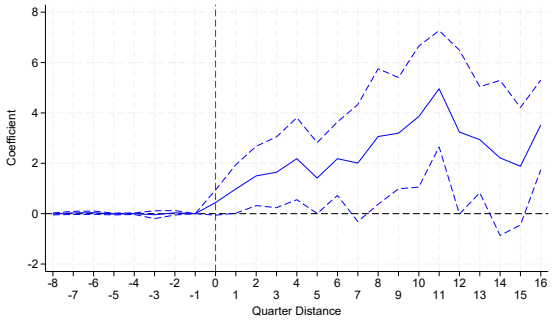
(b) Low- to High-Cost Open-Ended

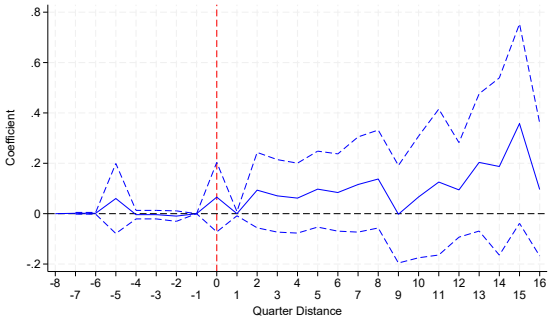




(c) Short-Term to Low-Cost Open-Ended

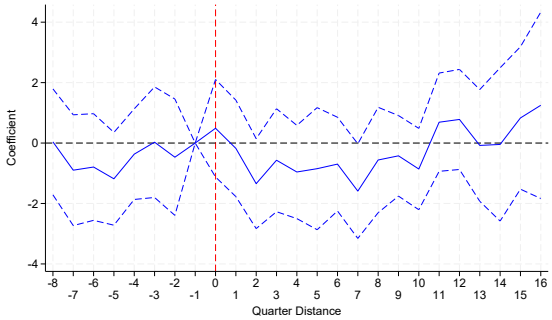
(d) Low- to High-Cost OE (Different Firm)

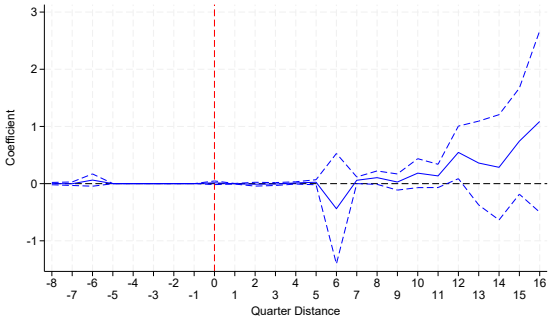




(e) Short-Term to High-Cost Open-Ended

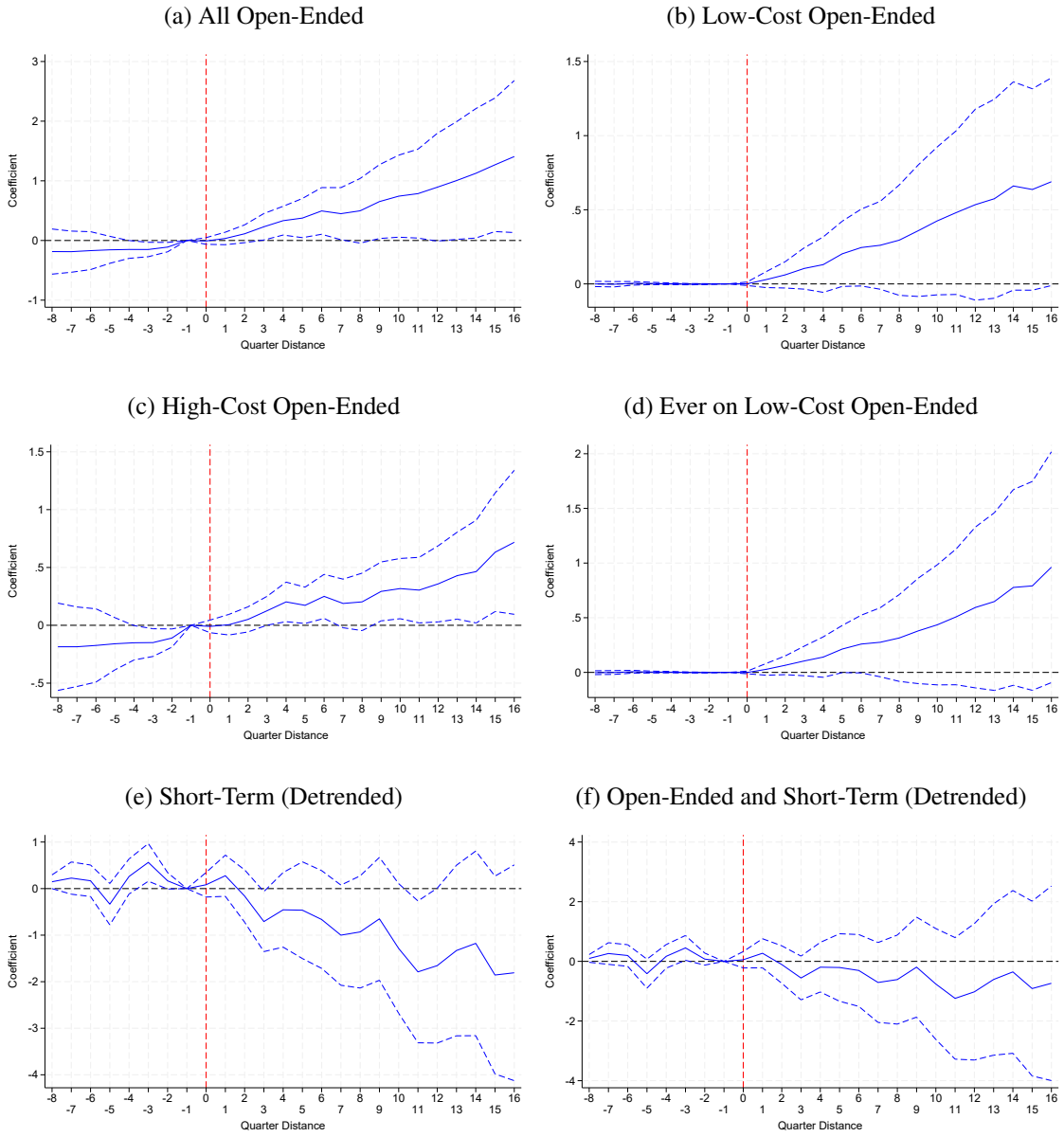
(f) Low- to High-Cost OE (Same Firm)





Notes: This figure presents event-study estimates of transition effects based on Equation 1, with coefficients (blue solid lines) and 95% confidence intervals shown in blue dashed lines. Panels (a)–(b) report transitions from low-cost to high-cost open-ended contracts (any firm or within the same firm), while panels (c)–(f) show transitions from non-employment to low-cost, high-cost, all open-ended, and short-term contracts, with the last two detrended using pre-treatment data. The vertical red dashed line marks the reform quarter. Regressions include interactions between quarter dummies and baseline sector-level controls—average wage, market concentration, managerial share, education, total employment, job duration, part-time share, and male share—and are weighted by the baseline population of young workers.

Figure 6: Effects of the Reform on Employment Outcomes



Notes: The figure presents event-study estimates of the employment effects based on Equation 1. Blue solid lines show coefficient estimates with 95% confidence intervals in dashed blue. Panels (a)–(c) report results for total, low-cost, and high-cost open-ended employment, respectively; panel (d) for workers ever holding a low-cost contract; and panels (e)–(f) for short-term employment and the sum of short-term and open-ended employment (both detrended using pre-treatment data). The vertical red dashed line marks the reform's implementation quarter. All regressions include interactions between quarter dummies and baseline sector-level controls—average wage, market concentration, managerial share, education, total employment, job duration, part-time share, and male share—and are weighted by the baseline population of young workers in each sector. Robust standard errors clustered at the sector level are reported in parentheses. Significant at the 10% level; ** 5% level; *** 1% level.

workers. Rather, permanent employment increased across age groups, indicating that the reform generated broad-based gains in OE employment rather than a mere reallocation of positions.

Table 2: Effects of the Reform on Older Workers' Employment Outcomes

	(1) Open-Ended Employment	(2) Short-Term Employment	(3) High-Cost OE Employment	(4) Open-Ended & Short-Term Employment
	Panel A: Workers 18-65 Years Old (Relative to All Workers in a Sector)			
Post $\times \%ST_{s,96}$	0.064	-0.031	-0.004	0.103
	(0.062)	(0.073)	(0.035)	(0.143)
	Panel B: Workers 18-30 Years Old (Relative to All Workers in a Sector)			
Post $\times \%ST_{s,96}$	0.042*	-0.068	-0.015	-0.007
	(0.023)	(0.066)	(0.011)	(0.086)
	Panel C: Workers 30-65 Years Old (Relative to All Workers in a Sector)			
Post $\times \%ST_{s,96}$	0.021	0.037	0.010	0.110
	(0.043)	(0.027)	(0.035)	(0.075)
Observations	52,751	52,751	52,751	52,751

Notes: This table reports difference-in-differences estimates of the impact of lower non-wage labor costs on various labor market outcomes, using sector and time fixed effects (Equation 1). Coefficients are multiplied by 100 for interpretation in percentage points. Panels A–E report results by age group: all workers (18–65), 18–30, 30–65, 30–40, and 40–50. Dependent variables are expressed relative to baseline sectoral employment. All regressions include interactions between quarter dummies and baseline sector-level controls—average earnings, market concentration, managerial share, education, total employment, job duration, part-time share, and male share—and are weighted by the baseline population of young workers. In Columns 2 and 4 we detrended the outcome variable using pre-treatment data. Robust standard errors clustered at the sector level are in parentheses; * p<0.10, ** p<0.05, *** p<0.01.

Turning to temporary employment, the picture is also consistent with positive spillovers. For the 30–65-year-old group, a one–percentage-point higher baseline share of young ST workers is associated with a 0.037% increase in ST employment, implying that sectors more exposed to the reform experienced a partial offset of the ST contraction among young workers through increased temporary hiring of older workers. As a result, the decline in aggregate ST employment for the 18–65 population is less than half as large as that for young workers alone.

This pattern is consistent with a reallocation of temporary jobs from younger to older workers, rather than a one-for-one contraction in overall ST employment. The evidence suggests that some tasks previously performed by young ST workers were not fully compatible with OE contracts. As firms converted young workers into OE positions, task assignments were reorganized: permanent contracts absorbed core, stable duties, while genuinely temporary tasks remained. Because the reform intensified competition for OE jobs among young workers, firms increasingly filled these remaining temporary tasks with older workers. An implication of this mechanism is that only a subset of tasks previously performed by young ST workers required replacement; the resulting ST jobs for adults should therefore be smaller in scope and more likely to take the form of part-time

contracts. Consistent with this prediction, Section C.11 of the Online Appendix documents an increase in part-time ST employment among older workers.[33]

Figure 7 complements these results by displaying the event-study estimates for OE and ST employment across the 18–65, 18–30, and 30–65 age groups. The figures show clear evidence of parallel pre-trends, supporting the validity of the identification strategy, and the post-reform dynamics align closely with the magnitudes reported in Table 2. The spillover effects on ST employment among 30–65-year-olds appear somewhat less persistent than those for OE employment. This likely reflects the inherently transitory nature of temporary contracts, as these jobs are more prone to turnover. This could explain why the time-series patterns in Figure 3, Panel (d), which aggregate workers by age rather than by sector, display more persistent spillover effects.

5.2.3 Outside Options and Wage Effects for Workers Younger than 30

We have shown that the reform substantially increased the probability that young workers obtain OE jobs. Beyond its direct employment effects, this expansion of permanent opportunities can affect wages by strengthening workers' outside options. When access to stable jobs improves, young workers can more credibly threaten to search outside their current match, reducing firms' wage-setting power and putting upward pressure on pay, even for workers who remain in non-subsidized contracts (Boeri and Garibaldi, 2024).

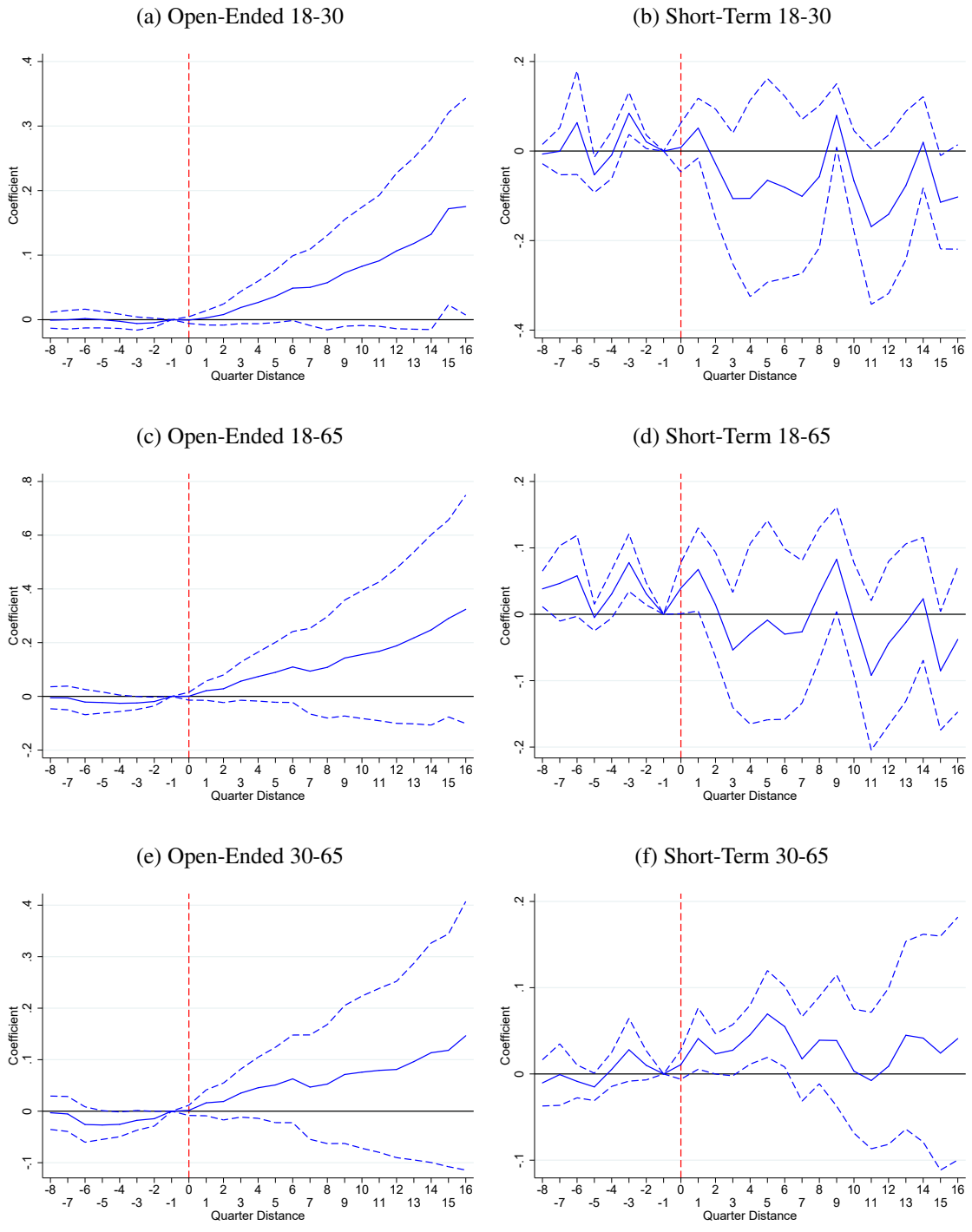
This mechanism is especially relevant in labor markets where temporary contracts play a role beyond flexibility (Bassanini et al., 2024; Daruich et al., 2023). By limiting access to stable employment and weakening alternative job prospects, ST contracts can depress outside options and sustain lower wages. A reform that expands OE hiring opportunities therefore has the potential to raise wages broadly among young workers, not through statutory pass-through, but through changes in bargaining positions.

We test for this channel by examining wage responses among groups not directly subsidized by the reform. ST workers do not benefit from payroll tax cuts or reductions in severance payments, so any wage increase for this group cannot reflect mechanical pass-through. Similarly, workers hired under high-cost OE contracts are not subsidized and therefore provide an additional margin through which to detect wage effects driven by improved outside options rather than lower labor costs.

To identify these effects, we compare wage dynamics around the age-30 eligibility threshold. Specifically, we study wages of ST workers and high-cost OE workers on either side of the cutoff,

[33] Appendix Figure B1 presents complementary time-series evidence on ST employment by age that does not distinguish between full-time and part-time contracts. Short-term employment among workers aged 18–30 was rising prior to the reform, flattened at implementation, and declined thereafter, while ST employment increased for workers aged 30–40 and 40–50. Over the first 10 quarters after the reform, the decline in ST jobs for young workers was largely offset by increases among older workers, consistent with a reallocation of temporary tasks across age groups.

Figure 7: Spillover Effects on Open-Ended and Short-Term Employment



Notes: The figure shows the event-studies that analyze the employment effects on workers 18 to 30 years old (top panels), 18 to 65 (middle panels) or 30 to 65 (bottom panels). The specification is Equation 1. The blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 to be interpreted as percentage points. The vertical red-dashed line represents the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered. The regressions include interactions between quarter dummies and baseline sector-level controls. The controls are average wage, labor market concentration, the share of managerial positions, the proportion of workers with a college degree, average number of workers per firm, average job duration, the proportion of part-time contracts, and the share of male workers. The regressions are weighted by the population of young workers in each sector at baseline.

using age windows 25–35.[34] We estimate the following event-study specification:

$$Y_{it} = \alpha + \delta_s + \delta_p + \delta_t + \sum_{j=-T,\, j\neq -1}^{T} \beta_j \mathbf{1}[j = t]\text{Treatment}_i + \gamma X_{it} + \varepsilon_{it},$$

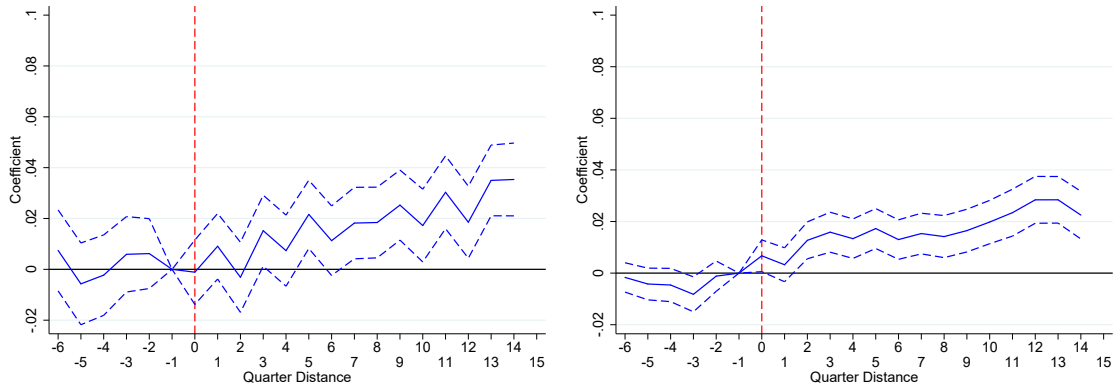
where the dependent variable is the log daily wage, and Treatment equals 1 for workers younger than 30. The coefficients β_j trace differential wage dynamics relative to the quarter before the reform. The specification includes sector, province, and quarter fixed effects; age-by-gender fixed effects; and controls for education, citizenship, disability, pre-reform experience in ST and OE jobs, firm size, and province-year effects. We also estimate a static difference-in-differences specification with treatment, post-reform, and interaction terms.

The event-study results are reported in Figure 8. Pre-treatment wage trends for both ST and high-cost OE workers are flat, supporting the validity of the design. After the reform, wages begin to diverge: ST wages increase by nearly 4% fifteen quarters after implementation, while wages in high-cost OE contracts rise by about 2%. Table 3 presents the corresponding two-way fixed-effects estimates. In our preferred specification, workers younger than 30 earn 1.5% higher wages in ST jobs and 1.9% higher wages in standard OE jobs.

These results indicate that the reform raised wages for young workers through improved outside options rather than statutory pass-through. By increasing the relative cost of employing young workers in ST contracts, these wage effects likely contributed to the reallocation of temporary jobs toward older workers documented in Section 5.2.2.

Figure 8: Evolution of ST and OE Wages Before and After the Reform (Notch at 30)

(a) Short-Term 25-30 Vs. 30-35 (b) Open-Ended 25-30 Vs. 30-35



Notes: The figure presents event-study estimates of wage dynamics in ST and OE jobs. Panel (a) compares ST wages on either side of the age-30 notch. Panel (b) compares high-cost OE wages on either side of the age-30 notch. The treatment group are workers 25 to 30 years old. The control group are workers 30 to 35 years old. Control variables include gender, education, citizenship status, disability status, months spent in ST employment between January 1990 and April 1997, and months spent in OE employment over the same period. The specification also includes age-by-gender fixed effects, as well as occupation, sector, and province-by-year fixed effects.

[34] Appendix Section C.2 shows that the results are robust to using wider age ranges (20–40).

Table 3: Evolution of ST and OE Wages, Young Workers

	(1)	(2)
	Log Daily Wage	
Treatment x Post	0.015***	0.019***
	(0.004)	(0.003)
Observations	780,795	1,184,879

Notes: The table reports wage differences in ST and OE jobs before and after the reform. Treatment equals one for workers younger than 30. Column (1) compares ST wages for ages 25–35. Column (2) examines OE wages for non-subsidized OE workers using the 25–35 comparisons. All regressions control for gender, education, citizenship, disability status, months spent in ST and OE jobs between 1990 and 1997, and include age-by-gender, occupation, sector, and province-by-year fixed effects. Standard errors are clustered at the individual level. * significant at 10%; ** significant at 5%; *** significant at 1%.

5.3 Employment Effects of the Policy for Workers Older than 45

The objective of this section is to assess whether the reform led firms to substitute ST contracts with OE contracts among older workers. As shown in Figure 4, however, the sharp employment notch at age 45 distorts observed employment rates around the threshold. As a result, a simple comparison of workers just below and above the cutoff would not yield a valid measure of substitution between contract types.

To address this issue, we proceed in two steps. First, we analyze employment patterns around the discontinuity to quantify the distortions induced by the age-45 threshold and to identify the age ranges that remain unaffected. Second, we restrict the analysis to these unaffected groups to evaluate whether the reform systematically shifted workers from ST to OE contracts.

5.3.1 Employment Responses Near the Notch

Empirical Methodology.— What is the expected effect of the policy on workers just before their 45th birthday? The notch creates an incentive for firms to delay converting ST contracts into OE contracts until the worker crosses the threshold. Consider a 44-year-old ST worker who, in the absence of the reform, would have transitioned to an OE contract before turning 45. After the reform, this transition is postponed until the worker reaches age 45, allowing the firm to benefit from lower payroll taxes and severance costs. We refer to this behavioral response as a transition delay (d), which raises ST employment just before the threshold while symmetrically reducing OE employment.

The policy may also induce firms to favor hiring workers just above age 45 over slightly younger candidates, generating across-notch substitution. We denote this effect by s_{oe} for OE contracts and s_{st} for ST contracts. In contrast to transition delays, which raise ST employment just below the threshold, across-notch substitution reduces both OE and ST employment in that range.

We use the term across-notch to distinguish this mechanism from substitution between contract types among workers already above the threshold, which we examine separately in Section 5.3.2.

Empirically, our goal is to quantify the magnitudes of transition delays (d) and across-notch substitution (s_{oe}, s_{st}). Let $\hat{c}_{jk}$ denote the counterfactual employment distribution, where j indexes age and $k \in oe, oeh, st$ indicates contract type. Specifically, oe includes all OE contracts, oe_h denotes OE workers with high labor costs, and st represents all ST workers. The observed employment distribution is c_{jk}, and deviations from the counterfactual are defined as $\hat{m}_{jk} = \frac{c_{jk} - \hat{c}_{jk}}{\hat{c}_{jk}}$. Accordingly, for workers just before the notch ($j = 44.75$, i.e., one quarter before turning 45), we expect:

$$\hat{m}_{-1,oe} = -d - s_{oe} < 0, \tag{3}$$

indicating fewer OE workers than in the counterfactual without the notch. The prediction for ST employment is ambiguous, as the two effects operate in opposite directions:

$$\hat{m}_{-1,st} = d - s_{st} \lessgtr 0. \tag{4}$$

Combining the two components allows us to isolate the across-notch substitution effect:

$$\hat{m}_{-1} = \hat{m}_{-1,oe} + \hat{m}_{-1,st} = -s_{oe} - s_{st} < 0 \tag{5}$$

We estimate $\hat{m}_{j,oe}$, $\hat{m}_{j,st}$, and $\hat{m}_j$ for $j \in (40, 40.25, \ldots, 47]$, using three-month age bins. This approach allows us (i) to quantify the impact of the notch on employment distributions and (ii) to identify the ages at which employment patterns diverge significantly, thereby indicating the extent of the affected population. These age groups are influenced by transition delays and across-notch substitution and are therefore unsuitable as comparison groups.

The methodology used to measure $\hat{m}_{j,oe}$, $\hat{m}_{j,st}$, and $\hat{m}_j$ can be intuitively described as follows. We construct counterfactual OE and ST employment distributions ($\hat{c}_{jk}$) using data from younger workers (those below age a_L) who are unlikely to be affected by the notch. In our preferred specification, we fit a polynomial to the empirical density for $a_L = 40$, ensuring that the counterfactual excludes both transition delays—since ST contracts last at most three years—and the strongest across-notch substitution effects.[35] [36]

Our identification strategy rests on the assumption that, in the absence of the notch, employment distributions would evolve smoothly around age 45. We assess the validity of this assumption using historical data from a period when the notch was not in effect, verifying that no systematic deviations appear around the same age threshold.

[35] As a robustness check, we also report results using alternative values of a_L.

[36] Nevertheless, we cannot rule out the possibility that the counterfactual may still be influenced by more diffuse reallocation effects occurring farther from the discontinuity.

Finally, we estimate the counterfactual by regressing observed employment shares on age, excluding observations for ages above a_L. The fitted values from this regression provide the smooth employment profiles that serve for quantifying deviations associated with the notch.

$$c_{jk} = \beta_k a_j + \sum_{i \geq a_L} \gamma_{ik} \mathbb{1}[a_j = i] + v_{jk}, \tag{6}$$

where c_{jk} represents employment shares for contract type k at age bin j. Since employment distributions are highly linear before the notch (see Panels (a) and (b) in Figure 4), we use a linear specification. The counterfactual estimates are the predicted values excluding the contribution of the dummies in the excluded range:

$$\hat{c}_{jk} = \hat{\beta}_k a_j \tag{7}$$

The displacement effect is then measured as the difference between observed and counterfactual employment. We report measures both in absolute and relative terms: $\hat{M}_{jk} = c_{jk} - \hat{c}_{jk}$ and $\hat{m}_{jk} = \frac{c_{jk} - \hat{c}_{jk}}{\hat{c}_{jk}}$.

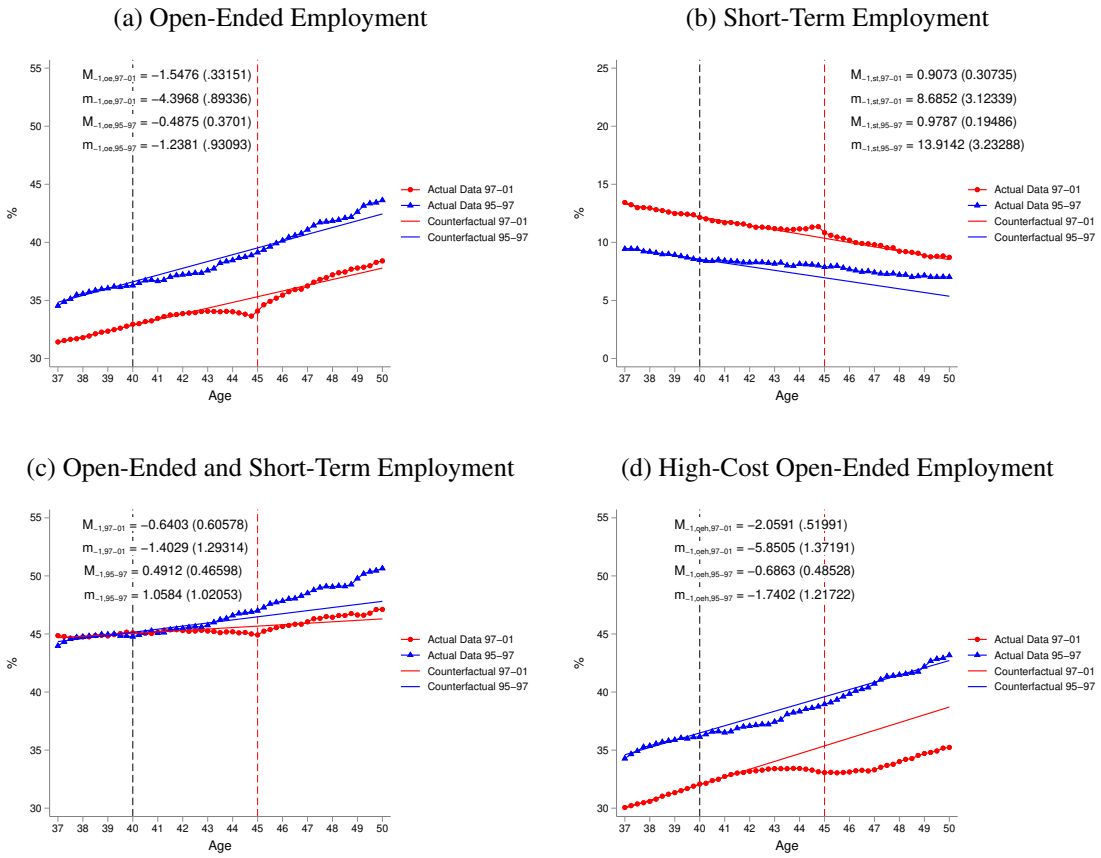
Standard errors are obtained via bootstrap. Specifically, residuals from Equation 6 are resampled with replacement to generate simulated age–employment distributions, and the standard deviation of the resulting estimates is reported as the standard error.

Results.- The empirical analysis yields four main findings. First, the reform delayed ST-to-OE transitions for workers approaching age 45, producing a local increase in ST employment and a corresponding decline in OE employment immediately below the notch. Second, the estimated substitution of older workers for younger ones is small and statistically insignificant, indicating limited across-notch substitution. Third, the policy crowded out OE contracts associated with high labor costs. Finally, workers younger than 43.5 and older than 45.5 appear unaffected by reallocation responses near the notch. We now turn to a detailed discussion of each result.

Figure 9 summarizes the visual evidence. Panels (a)–(d) presents observed and counterfactual employment rates by age for OE contracts, ST contracts, both contract types combined, and high-cost OE contracts, respectively. The red series corresponds to the period from May 1997 to March 2001, when the labor cost notch was most pronounced. Dotted lines depict observed data, while solid lines represent the counterfactual. The blue series covers January 1995 to April 1997, when the notch was weaker; blue triangles indicate observed data, and solid lines show the corresponding counterfactual.

The estimates confirm that the notch reduces OE employment just below the threshold ($\hat{m}_{-1,oe} < 0$). Specifically, OE employment is 1.55 percentage points (pp), or 4.4%, lower than it would have been in the absence of the notch. This effect is statistically significant at the 1 percent level and is consistent with both substitution and transition delays, as both mechanisms operate in the same direction in this case. By contrast, pre-period data show no evidence of a "V"-shaped pattern around

Figure 9: Empirical and Counterfactual Distributions



Notes: The figures show the empirical distribution of employment (red dots and blue triangles) and the respective counterfactual distribution (red and blue solid lines). The red data is for the policy period (May 1997 to February 2001), and the blue data is for the pre-policy period (January 1995 to April 1997). The counterfactual is estimated by fitting a linear polynomial to the empirical distribution in the ages between 37 and 40. Panel (a) depicts open-ended employment, Panel (b) short-term employment, Panel (c) joint open-ended and short-term employment, and Panel (d) high-cost open-ended employment. The figures also display the employment measures $M_{j,k,t}$ and $m_{j,k,t}$, where $j = -1$ is for workers at most one quarter away from the threshold at 45, t is either the pre-policy or the policy period, and k is each contract type, as explained in section 5.3.1. The black-dashed line shows the upper bound used to build the counterfactual. The red-dashed line represents the labor cost notch.

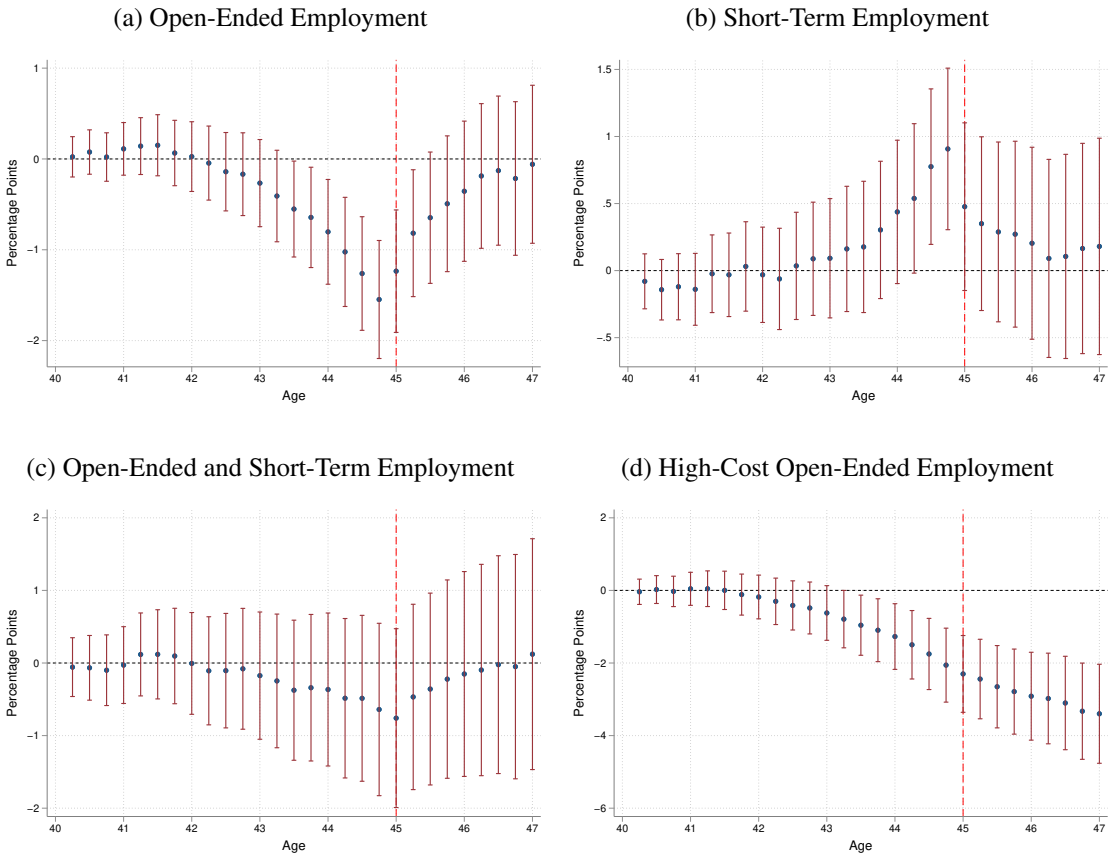
the threshold, and the estimates of missing mass are statistically indistinguishable from zero.

For ST employment, the estimates are positive and statistically significant—0.91 pp, or 8.69%—indicating that transition delays dominate substitution responses ($d > |s_{st}|$). We also detect effects of similar magnitude in the pre-policy period; however, the pre-period data do not show the inverse "V" shape around the threshold that characterizes delayed conversions. This suggests that the pre-period effects are spurious, likely reflecting a nonlinearity in the data rather than a discontinuity at age 45.[37]

In Panel (c) of Figure 9, we combine OE and ST employment rates to measure across-notch substitution, $\hat{m}_{-1} = \hat{m}_{-1,oe} + \hat{m}_{-1,st}$, and to assess whether total employment declined just be-

[37] Inspection of the pre-period data reveals a change in slope around age 41, which the linear projection based on workers younger than 40 fails to capture.

Figure 10: Age Effects Relative to Counterfactual



Notes: The blue dots in the figures show the difference between the empirical distribution of employment and the counterfactual distribution. The red-capped lines are the confidence intervals. Panel (a) depicts open-ended employment, panel (b) short-term employment, panel (c) joint open-ended and short-term employment, and panel (d) high-cost open-ended employment. The vertical red-dashed line represents the labor costs notch.

low the threshold. The estimate is negative but statistically insignificant, with a missing mass of –0.64 pp (–1.4%). Consistent with the ST employment results, this finding indicates minimal across-notch substitution, implying small s_{oe} and s_{st}. Estimates for the pre-period are similarly insignificant.[38]

Next, we show that the introduction of the new low-cost OE contract induced substitution away from high-cost OE contracts ($\hat{m}_{-1,oe_h} < 0$). Panel (d) of Figure 9 presents the evidence for OE workers who did not benefit from statutory labor cost reductions. We estimate a crowding-out effect of –2.06 pp (–5.9%) just below the notch, whereas the corresponding estimates for the pre-reform period are statistically insignificant.

Finally, Figure 10 plots the difference between observed and counterfactual employment for

[38]Figure B3 in the Online Appendix (Section C) provides further evidence that the primary effect of the policy near the notch is to delay ST-to-OE transitions.

OE and ST contracts. These deviations become statistically significant around age 43.5 for OE employment and 44.5 for ST employment, indicating that younger workers are largely unaffected by transition delays or across-notch substitution. Both responses dissipate within a few months after workers turn 45. Accordingly, in the next section, we focus on workers aged 40–41 and 47–48 to study the policy's impact far from the threshold, specifically whether it increased the incidence of marginal OE jobs and overall OE employment.

5.3.2 Employment Responses Far from the Notch

Building on the previous section, we will now examine workers far from the notch to assess whether the reform led firms to replace OE contracts with ST contracts.

Methodology.- We estimate the following specification:

$$y_{ijt} = \alpha + \eta Above45_i + \delta post_t + \beta Above45_i \times post_t + \gamma X_{it} + \rho_t + \varepsilon_{it}, \tag{8}$$

where y_{ijt} represents two dummy variables. The first indicates whether worker i transitions from ST employment or non-employment to an OE contract in period t. The second indicates whether worker i was employed under contract j in period t, where j can be an OE contract, a low-cost OE contract, a high-cost OE contract, or an ST contract. $Above45_i$ is a dummy variable equal to 1 for workers aged 47–48 and 0 for those aged 40–41.[39]

$post_t$ is a dummy variable equal to 1 for periods after May 1997, when the policy was implemented. X_{it} is a vector of controls that includes sector of employment, education, citizenship, sex, disability status, and part-time status. ρ_t denotes month fixed effects, and ε_{it} is the error term, clustered at the worker's age level. The main specification covers eight quarters prior to treatment and fifteen quarters following it.[40]

An important feature of this analysis is that workers aged 40 and 47 are unlikely to be affected by transition delays or across-notch substitution near the discontinuity. This setup allows us to test whether the policy induced ST-to-OE substitution through three channels: (i) higher ST-to-OE transitions, (ii) higher non-employment-to-OE transitions, and (iii) increases in overall OE employment. The approach is analogous to a difference-in-differences design, although we avoid that terminology because spillovers from policies targeting workers under 30 also affected ST employment for older workers on both sides of the notch.

To assess whether parallel trends hold in the pre-treatment period, we estimate an event-study

[39] Throughout this section, references to workers aged 47 or 40 correspond to workers aged 47–48 and 40–41, respectively.

[40] In the Online Appendix (Table B12), we report results restricting the post-treatment window to six quarters, as later policy changes may have affected ST-to-OE conversions. The results remain unchanged. Details of the legal modifications are provided in Section B.3 of the Online Appendix and summarized in Table B2.

specification:

$$y_{ijt} = \alpha + \delta post_t + \rho_t + \sum_{t=-T, t\neq -1}^{T} \beta_{jt} Above45_i + \gamma X_{it} + \varepsilon_{it} \tag{9}$$

Results.— We first examine whether the policy increased transitions into OE jobs. Figure 11 reports event-study estimates for transitions from ST to OE contracts with the same employer (left column) and from non-employment to OE contracts (right column).[41]

The top panels depict transitions to low-cost OE contracts, the middle panels to all OE contracts, and the bottom panels to high-cost OE contracts. Pre-treatment trends are parallel across groups. The policy increased transitions from ST to low-cost OE contracts (top-left panel) but had no effect on transitions to all OE contracts (middle-left panel), as it simultaneously reduced transitions from ST to high-cost OE contracts (bottom-left panel). Consequently, the policy did not increase the overall number of ST workers transitioning to OE contracts, contrary to the theoretical predictions of Blanchard and Landier (2002) and the evidence for workers younger than 30.

Similarly, we find that the reform increased transitions from non-employment into OE contracts for older workers. Inspection of the event studies in Figure 11 reveals that this response is driven by a clear rise in transitions into low-cost OE contracts (top-right panel). At the same time, transitions from non-employment into high-cost OE contracts decline slightly (bottom-right panel), suggesting a partial crowd-out across OE contract types. Consistent with this reallocation, the event study for transitions from non-employment into overall OE contracts (middle-right panel) displays only mild net effects. Corresponding estimates are reported in Table 4, Panel C.

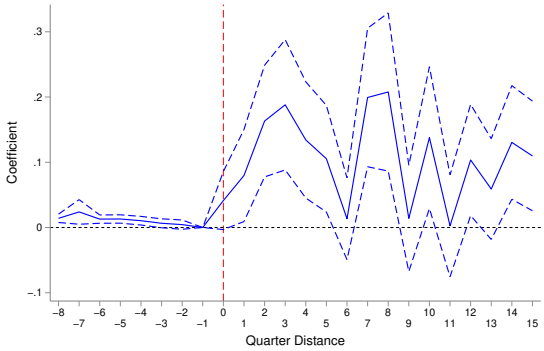
Consistent with these findings, we observe no permanent increase in overall OE employment among older workers (Figure 12, Panel a). Table 4, Panel D, Column (1), reports a small and statistically insignificant effect of 0.213 pp. By contrast, the policy did raise low-cost OE employment (Figure 12, Panel b): six quarters after implementation, the share of workers in low-cost OE contracts increased by 2 pp. However, this gain was entirely offset by a decline in high-cost OE contracts (Panel c), leaving total OE employment unchanged. Table 4, Panel D, Columns (2) and (3), corroborate this pattern.

Temporary spikes in OE employment observed in quarters 3 and 10 were short-lived. Although low-cost OE hires increased (Figure B4, Panel b), these gains were offset by declines in high-cost OE hires (Panel c), particularly in quarters 4 and 8. Further adjustment occurred through higher separations of high-cost OE workers (Figure B5, Panel c). This pattern aligns with the "honeymoon effect" (Boeri and Garibaldi, 2007), whereby lower-cost contracts generate only temporary employment gains before natural turnover dissipates them.

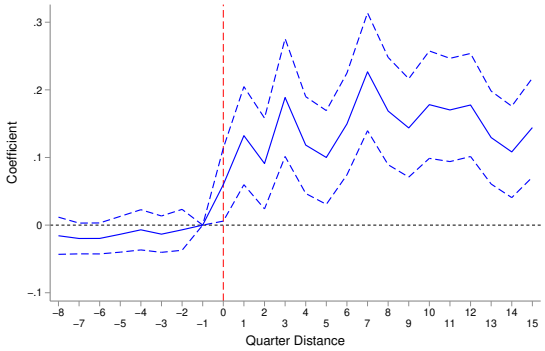
[41] Figure **??** in the Online Appendix includes ST-to-OE transitions involving firm changes, showing similar results. Corresponding estimates are reported in Table 4, Panel B.

Figure 11: Effects of the Reform on Employment Transitions

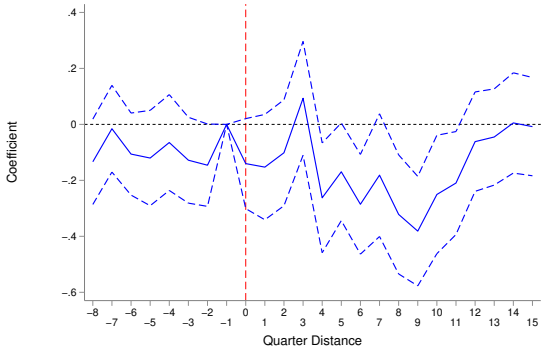
(a) Short-Term to Open-Ended (Low-Cost) (Same Employer)



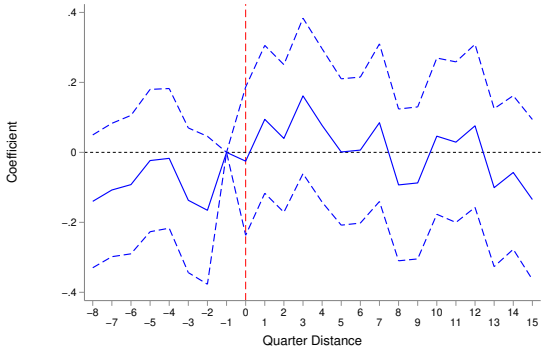
(b) Non-Employment to Open-Ended (Low-Cost)



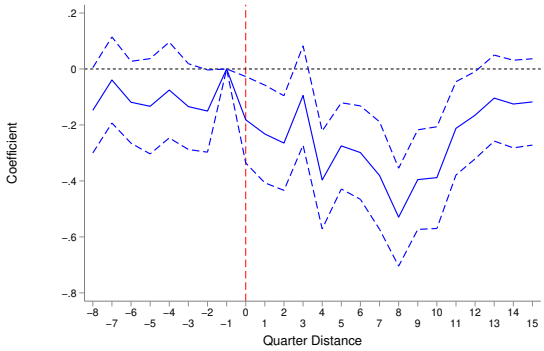
(c) Short-Term to Open-Ended (Same Employer)



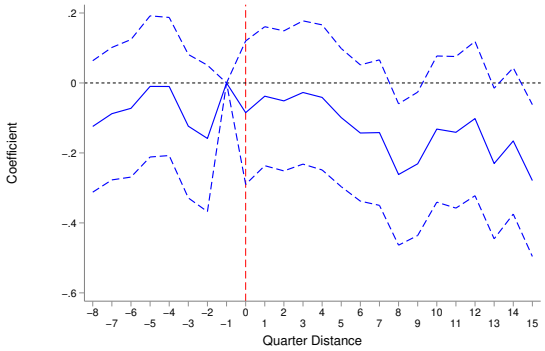
(d) Non-Employment to Open-Ended



(e) Short-Term to Open-Ended (High-Cost) (Same Employer)

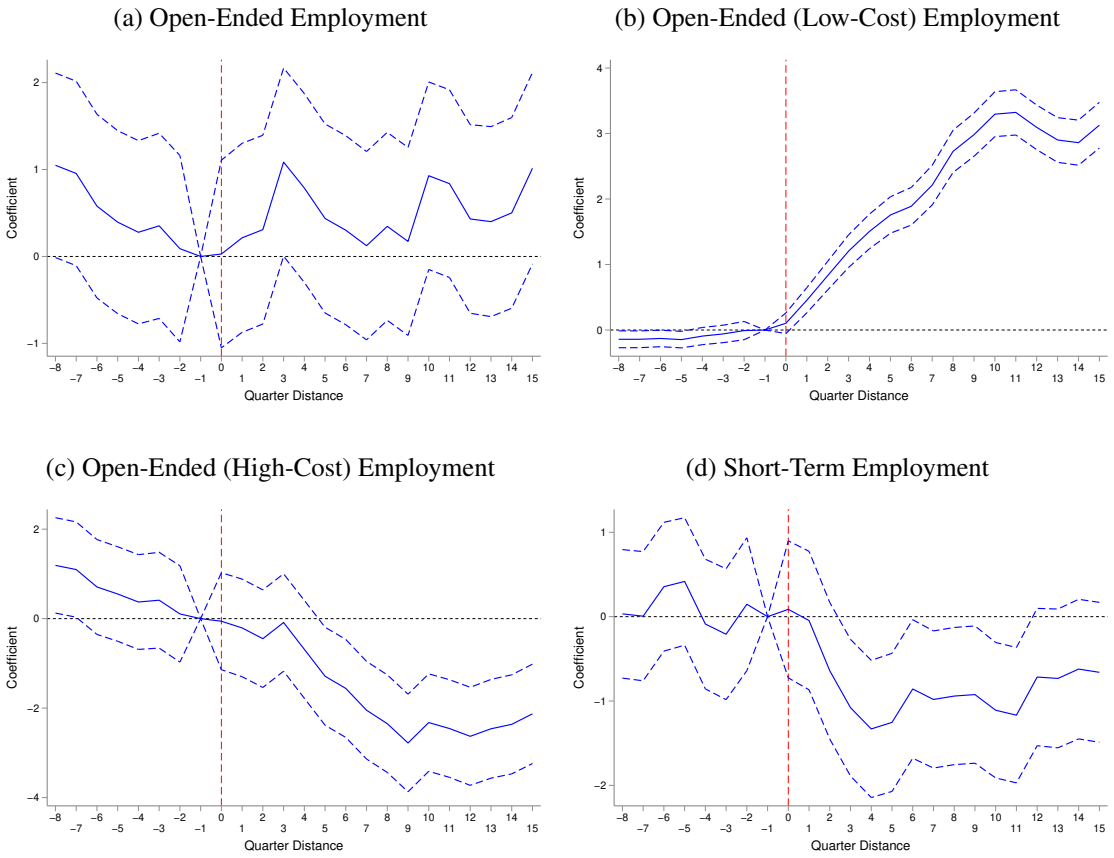


(f) Non-Employment to Open-Ended (High-Cost)



Notes: The figure shows the event-studies that analyze the effect on marginal open-ended jobs. The specification is Equation 9. The blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panels (a), (b) and (c) display short-term conversions with the same employer: towards a low-cost open-ended contract (a), towards any type of open-ended contract (b), and towards high-cost open-ended contracts (c). Panels (d), (e) and (f) depict transitions from non-employment to low-cost open-ended contracts (d), towards any type of open-ended contract (e), and towards high-cost open-ended contracts (f). The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

Figure 12: Effects of the Reform on Employment Outcomes



Notes: The figure shows the event-studies that analyze the employment effects. The specification is Equation 9. In Panels (a)-(d), the blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel (a) depicts the results for open-ended employment, Panel (b) for open-ended employment in low-cost contracts, Panel (c) for open-ended employment in high-cost contracts, and Panel (d) for short-term employment. The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

We draw two main conclusions from the evidence on OE flows and employment. First, the policy primarily benefited inframarginal workers—those who would have obtained OE contracts even in the absence of the reform—but were instead hired at lower cost to firms. Second, the reform failed to stimulate ST-to-OE transitions among middle-aged workers. Consequently, overall OE employment did not increase.[42]

Next, we turn to the effects on ST employment among older workers. The point estimate indicates a decline of 0.746 pp (Table 4, Panel D, Column 4; Figure 12, Panel D). This negative coefficient, however, should not be interpreted as a literal contraction in ST employment. As shown in Figure 3, Panel (d), ST employment increased for both 40- and 47-year-olds after the reform. Consistent with this pattern, Section 5.2.2 documents positive spillovers on ST employment in sectors more exposed to the reform, and Appendix Section C.1 shows that these spillovers extend across a broad age range. The negative estimate therefore reflects differential spillovers by age: ST employment rose for both groups, but more strongly for workers around age 40 than for those at 47.

Examining employment far from the notch provides a key insight: reducing the labor cost gap between OE and ST contracts did not induce substitution of OE for ST contracts among workers over 45.[43] This raises important questions: Were reductions in statutory labor costs offset by wage increases? Are ST and OE contracts inherently distinct rather than substitutable? Are ST workers around age 45 too far from the productivity threshold needed to transition into OE contracts?

6 Wage Incidence

Based on the predictions developed in Section 4, reductions in severance payments should be passed through to wages, whereas payroll tax cuts—because they are weakly linked to individual benefits—are not expected to generate comparable wage responses. Consequently, wages should rise only by the portion of the labor cost reduction attributable to the fall in employment protection: roughly 1.7% for young workers and 1.87% for adult workers. Importantly, if wage incidence for adult workers were to exceed this benchmark, the effective labor-cost reduction would be smaller

[42]The absence of an increase in OE employment for workers over 45 should be interpreted in light of the interaction between policy-induced incentives across age groups. Because the reform simultaneously altered firms' hiring incentives for younger and older workers, the estimated responses reflect equilibrium adjustments to these interacting changes rather than the effect of a stand-alone policy for older workers. In a counterfactual setting without the policy for young workers, firms might have expanded OE employment among older workers to a greater extent.

[43]This result does not imply that ST and OE contracts constitute separate labor markets for older workers. The evidence indicates that the policy primarily affected inframarginal OE employment—workers who would have been hired under OE contracts even in the absence of the reform. Some of these hires originate from ST contracts, indicating that the two contract types remain connected for adult workers. However, both the evidence far from the notch and the behavior observed near the age-45 cutoff suggest that the reform altered this margin only inframarginally, without inducing additional substitution from ST to OE employment.

Table 4: Effects on Transitions and Employment. Workers 47-48 and 40-41 years old.

	(1)	(2)	(3)	(4)
	Panel A: Transitions to Open-Ended			
	Short-term to Open-Ended (Same Employer)	Short-term to Low-Cost OE (Same Employer)	Short-term to High-Cost OE (Same Employer)	
Above45 x Post	-0.021	0.118***	-0.138***	
	(0.025)	(0.010)	(0.022)	
Observations	751,019	751,019	751,019	
	Panel B: Transitions to Open-Ended			
	Short-term to Open-Ended (Any Employer)	Short-term to Low-Cost OE (Any Employer)	Short-term to High-Cost OE (Any Employer)	
Above45 x Post	-0.007	0.167***	-0.173***	
	(0.033)	(0.007)	(0.030)	
Observations	751,019	751,019	751,019	
	Panel C: Employment Transitions from Non-Employment			
	Non-Employment to Open-Ended	Non-Employment to Low-Cost OE	Non-Employment to High-Cost OE	
Above45 x Post	0.119**	0.156***	-0.037	
	(0.044)	(0.012)	(0.035)	
Observations	751,019	751,019	751,019	
	Panel D: Employment Variables			
	Open-Ended All	Open-Ended Low-Cost	Open-Ended High-Cost	Short-Term
Above45 x Post	0.213	2.038***	-1.792***	-0.746***
	(0.221)	(0.043)	(0.224)	(0.192)
Observations	751,019	751,019	751,019	751,019
	Panel E: Hires			
	Open-Ended All	Open-Ended Low-Cost	Open-Ended High-Cost	Short-Term
Above45 x Post	0.231**	0.391***	-0.161*	-0.085
	(0.085)	(0.013)	(0.076)	(0.053)
Observations	751,019	751,019	751,019	751,019
	Panel F: Separations			
	Open-Ended All	Open-Ended Low-Cost	Open-Ended High-Cost	Short-Term
Above45 x Post	0.370***	0.183***	0.193**	-0.090
	(0.072)	(0.009)	(0.066)	(0.074)
Observations	751,019	751,019	751,019	751,019

Notes: The table shows the effects of lower non-wage labor costs on several labor market variables. *Above*45 equals 1 for workers aged 47-48, and 0 for workers aged 40-41. The estimation period includes 4 quarters before treatment and 12 after it. Estimates are multiplied by 100 and interpreted as percentage points. Panel A focuses on transitions from ST to OE with the same employer; Panel B shows transitions from ST to OE for any employer; Panel C shows transitions from non-employment; Panel D reports employment on OE and ST contracts; Panels E and F show transitions in and out of OE and ST contracts, respectively. Standard errors clustered at the worker's age level are in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

than intended, potentially helping to explain why firms did not substitute ST for OE contracts for this group. The remainder of this section examines these predictions empirically.

To study wage incidence, we construct a panel dataset of workers aged 18–30 and 45–55 who transitioned from ST to OE contracts between May 1997 and February 2001. We analyze two main groups: (i) workers who did not remain with the same employer throughout the observation window and (ii) those continuously employed by the same firm across all 24 quarters.[44] For each group, we follow wage trajectories from eight quarters before the transition to six quarters after for younger workers, and up to sixteen quarters after for older workers. The shorter post-transition window for young workers reflects the shorter duration of the subsidies for this group, whereas for older workers the subsidies applied for the entire duration of the employment spell, allowing us to track wage dynamics over a longer horizon.[45]

The presence of both types of transitions reflects restrictions on the use of low-cost OE contracts, as detailed in Section 3. Firms that wrongfully dismissed a worker hired under a low-cost OE contract were barred from using the subsidized contract again. Similarly, employers who were behind on tax payments or who had hired the same worker under an OE contract in the previous three months were ineligible. In addition, firms could not rehire workers under a low-cost contract if the employee had been employed on an OE contract in the same firm within the past 24 months.

The empirical strategy is a two-way fixed effects regression. The dynamic specification is:

$$Y_{it} = \alpha + \delta_i + \delta_t + \delta_a + \sum_{j=-8,\neq -1}^{16} \beta_j \mathbb{1}[j=t] Treatment_i + \sum_{j=-8}^{16} \gamma_j \mathbb{1}[j=t] X_i + \rho X_{it} + \varepsilon_{it} \qquad (10)$$

where δ_i, δ_t, and δ_a represent individual, time, and age fixed effects, respectively. The time effects are measured relative to the quarter in which the transition occurs. $Treatment_i$ is a dummy that equals 1 for workers who transition to low-cost OE contracts, and 0 for those who transition to high-cost contracts. The β_j are the coefficients of interest, capturing the effect of treatment each quarter. Y_{it} is the logarithm of the daily gross wage.[46]

A key concern is the potential endogeneity of worker selection into low-cost OE contracts, since worker and firm characteristics may jointly influence both the type of transition and subsequent wage dynamics. Although individual fixed effects absorb time-invariant differences, challenges remain if these characteristics shape wage growth differentially after conversion. For in-

[44] Among younger workers (18–30), the first sample includes 15,804 transitions to low-cost OE contracts and 8,398 to high-cost OE contracts, while the second comprises 10,368 and 4,941 transitions, respectively. For older workers (45–55), the corresponding figures are 3,075 and 1,558 in the first sample, and 1,650 and 697 in the second.

[45] We also analyze the wage incidence for workers who transition from non-employment into an OE job. The results are similar to those based on transitions from ST-to-OE contracts. The details of the estimation are in the Appendix, Section C.5.

[46] The wage includes paid holidays.

stance, high-productivity firms may share more rents with workers. If such firms are also more likely to adopt low-cost contracts, our incidence estimates may confound contract effects with underlying firm wage-setting policies.

To mitigate this concern, we interact baseline worker and firm characteristics with quarter dummies, capturing heterogeneous wage dynamics across workers and firms. Individual controls include gender, education, citizenship, disability status, and pre-1997 employment history. Firm controls allow for flexible wage trends by sector, firm size, age, and legal structure. We also include age dummies and the provincial unemployment rate. As a benchmark, we estimate a static two-way fixed effects specification:

$$Y_{it} = \alpha + \delta_i + \delta_t + \delta_a + \kappa Treatment_i \times Post_t + \sum_{j=-8}^{16} \gamma_j \mathbb{1}[j = t] X_i + \rho X_{it} + \varepsilon_{it} \tag{11}$$

where $Post_t$ equals one for quarters following the transition.

We present the event study outcomes in Figure 13, with the interaction term coefficient κ from Equation 11 shown in Table 5. The top panels of Figure 13 are 18-30-year-old workers, and the bottom ones for 45-55-year-old workers. Panels (a) and (c) are for the full sample of workers in each age group, and Panels (b) and (d) are for the samples of workers who stay in the same job post reform.

In all figures, there is no observable pre-treatment trend, and wages for those entering a low-cost OE contract rise significantly once the new contract begins. In addition, there is a second feature of these figures that is worth highlighting. The wage effects shrink after contract conversion. The decline of the wage impact is consistent with treatment workers experiencing less wage growth after the transition than control workers because their threat point in wage bargaining is lower. This is consistent with wage bargaining models Boeri and Garibaldi (2024) and insider-outsider theories of the labor market Bentolila et al. (1994).

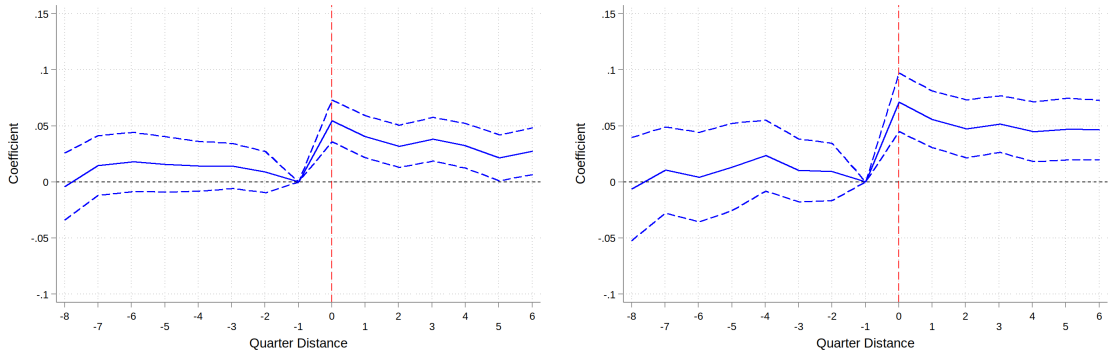
In Table 5, we report the estimates. Panels A and B correspond to workers aged 18–30, and Panels C and D to workers aged 45–55. Column 5 presents our preferred specification, which includes the full set of worker and firm controls. The estimated wage effects range from 3.1–4% for young workers and 4.2–5.7% for adult workers. Importantly, the coefficients are remarkably stable across specifications—whether we add sector controls, firm controls, or restrict the sample—suggesting that endogeneity concerns are limited.

The wage effects are also larger than the mechanical reduction in severance payments (1.7% for young workers and 1.87% for adult workers). This indicates that the incidence we estimate cannot be explained solely by reductions in benefits accruing to workers (Bozio et al., 2023). Instead, the results are consistent with standard models in which tax incidence depends on market forces that shape individual wages. When firms compete more intensely to hire workers eligible for

Figure 13: Wage Dynamics After Contract Transition: Low-Cost vs. High-Cost OE Employees

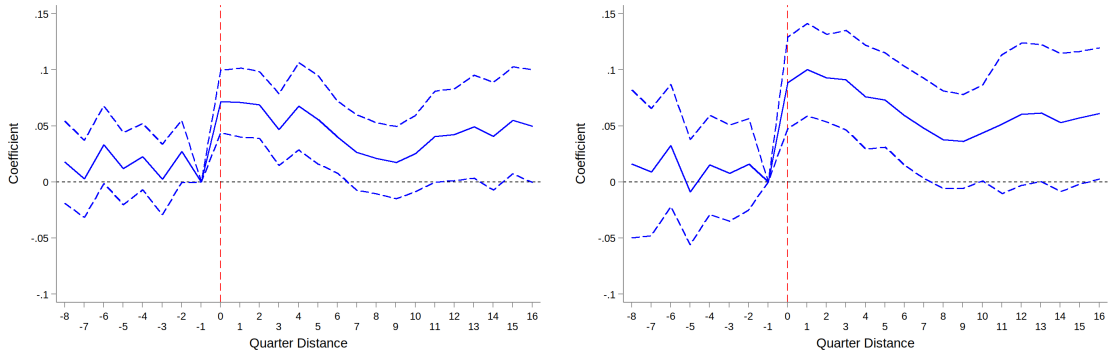
(a) 18-30-year-old Workers

(b) 18-30 Workers who Stay in the Same Job Post Reform



(c) 45-55-year-old Workers

(d) 45-55 Workers who Stay in the Same Job Post Reform



Notes: This figure presents event-study estimates analyzing the wage incidence of the reform. The specification follows a difference-in-differences approach with individual and time-fixed effects, as described in Equation 10. The solid blue lines represent the coefficient estimates, while the dashed blue lines indicate the 95% confidence intervals calculated using clustered standard errors at the individual level. The top panels are for 18-30-year-old workers. The bottom panels are for 45-55-year-old workers. Panels (a) and (c) include all workers of each age group, regardless of whether they lose or change jobs in the post-reform period. Panels (b) and (d) restrict the sample to workers of each age group who remain continuously employed with the same employer after transitioning to an OE contract. The model includes interactions of quarter dummies with a set of controls: sector, firm size, company age, firm's legal status, gender, education, disability status, citizenship status, part-time work, the number of employees in the company, the number of months worked in ST contracts over the seven years before the reform, and the number of months worked in OE contracts over the same period. Additionally, we control for age dummies and the province-level unemployment rate.

discounts, the perceived value of employment rises, and alternative job offers strengthen workers' outside options, pushing wages upward (Postel-Vinay and Robin, 2002; Cahuc et al., 2006; Altonji et al., 2013; Bagger et al., 2014).

The implied pass-through rates are substantial: between 36–46% for 18–30 year-olds and between 34–46.7% for 45–55 year-olds. Despite being large, these rates fall short of full pass-through. Thus, the absence of OE employment growth among adult workers cannot be attributed solely to wage incidence. Moreover, because the policy primarily affected inframarginal OE workers, the labor cost reductions applied mainly to individuals who would have been employed even without the subsidy.

7 Elasticity Estimation

The policy we analyze provides a unique opportunity to estimate the elasticity of substitution between ST and OE employment. Specifically, we estimate:

$$\sigma = -\frac{\Delta \ln\left(\frac{L_{OE}}{L_{ST}}\right)}{\Delta \ln\left(\frac{W_{OE}}{W_{ST}}\right)}, \tag{12}$$

where σ denotes the elasticity of substitution between OE and ST labor. L_{OE} and L_{ST} represent the quantities of labor employed under each contract type, while W_{OE} and W_{ST} denote their corresponding labor costs. Equation (12) indicates that a change in the relative cost (W_{OE}/W_{ST}) induces an opposite change in relative employment (L_{OE}/L_{ST}), with the magnitude determined by σ. A higher σ indicates that firms can more readily substitute between the two contract types in response to changes in relative labor costs.

To compute the numerator, we use the estimated changes in OE and ST employment reported in Sections 5.2 and 5.3. For young workers, following Equation 2, we define the dependent variable as the sectoral share of OE and ST employment in each quarter, expressed relative to the sector's baseline employment in 1996. This results in an estimated change of approximately 0.303 log points.[47]

For older workers, we use the estimated effect on OE employment reported in Table 4. As discussed in Section 5.2.2, and consistent with the evidence presented in Appendix Section C.1, we

[47] In Table 1, Panel B, the dependent variables are expressed relative to both baseline OE and ST employment levels. To obtain the average effect, we multiply each by the average sectoral share of fixed-term contracts (see Equation 2). Specifically, $\frac{L^1_{OE}}{L^0_{OE}+L^0_{ST}} = \frac{L^0_{OE}}{L^0_{OE}+L^0_{ST}} + 0.15 \times 0.703$ and $\frac{L^1_{ST}}{L^0_{OE}+L^0_{ST}} = \frac{L^0_{ST}}{L^0_{OE}+L^0_{ST}} + 0.15 \times (-0.344)$. Using the average baseline share of OE contracts across sectors, $s_{OE} = \frac{L^0_{OE}}{L^0_{OE}+L^0_{ST}} = 0.4823$, we obtain $\Delta \ln\left(\frac{L_{OE}}{L_{ST}}\right) \approx 0.3027$.

Table 5: Wage Incidence

	(1)	(2)	(3)	(4)	(5)
	Log Daily Wage				
Panel A: Transition from ST to OE and Stay at Same Firm (30 years old)					
Treatment x Post	0.011	0.049***	0.048***	0.042***	0.040***
	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)
Observations	77,347	77,347	77,347	77,347	77,347
Panel B: All Transitions from ST to OE (30 years old)					
Treatment x Post	0.002	0.038***	0.036***	0.032***	0.031***
	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	131,727	131,727	131,727	131,727	131,727
Panel C: Transition from ST to OE and Stay at Same Firm (45 years old)					
Treatment x Post	0.009	0.065***	0.065***	0.065***	0.057***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.014)
Observations	47,110	47,110	47,110	47,110	47,110
Panel D: All Transitions from ST to OE (45 years old)					
Treatment x Post	-0.001	0.046***	0.046***	0.046***	0.042***
	(0.012)	(0.011)	(0.011)	(0.012)	(0.011)
Observations	75,801	75,801	75,801	75,801	75,801
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	Yes	Yes
Province Unemployment	No	Yes	Yes	Yes	Yes
Sector Controls	No	No	Yes	Yes	Yes
Firm Size	No	No	No	Yes	Yes
Other Firm Controls	No	No	No	No	Yes

Notes: The table shows the wage effects of the reform. The specification is a difference-in-differences, as in Equation 11. We focus on workers who transition from an ST contract to an OE contract, either low- or high-cost. We analyze 18-to 30-year-old workers (Panels A and B) and 45-to 55-year-old workers (Panels C and D). Panels A and C are for a sample of people continuously employed with the same employer after the transition. Panels B and D are for all workers, regardless of whether they lose or change jobs in the post period. Columns 2 to 5 include interactions of quarter dummies with controls for the sector, firm's size, company's age, firm's legal status, gender, education, disability status, citizenship status, part-time work, dummies for the worker's age, the number of months worked in ST contracts the 7 years before the reform, the number of months worked in OE contracts the 7 years before the reform, and the unemployment rate at the province level. Each column controls for a different subset of these variables, as specified at the bottom of the table. Robust standard errors clustered at the individual level are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

attribute the observed decline in ST contracts largely to spillover effects.[48] Under this assumption, the resulting change in relative employment is approximately 0.0021 log points.

The denominator captures the percentage change in relative labor costs. As discussed in Section 3, the reform did not directly alter the statutory conditions of either standard OE or ST contracts. Nevertheless, we estimate a modest increase in ST wages for young workers of roughly 1.5 percent (see Appendix Section C.10), consistent with the improvement in their outside options described in Section C.2. We also document a small increase in OE wages of approximately 1.9 percent, which we incorporate into the calculation of OE labor costs. For older workers, changes in ST labor costs are negligible, implying $\frac{W^1_{ST}}{W^0_{ST}} \approx 1$. To compute the percentage change in OE labor costs, we apply the following expression: $\left(1 - \frac{W^1_{OE}}{W^0_{OE}}\right)(1-\omega)$. The first component reflects the reform's impact on the labor costs of each affected OE worker. The parameter ω denotes the wage pass-through, which attenuates the overall reduction in labor costs. To compute $\left(1 - \frac{W^1_{OE}}{W^0_{OE}}\right)$, we use the following expression for the expected labor cost:

$$\frac{W^1_{OE}}{W^0_{OE}} = \frac{w^1_{OE}(1+\tau(1-r)) + \frac{33}{365} * w^1_{OE} * p}{w^0_{OE}(1+\tau) + \frac{45}{365} * w^0_{OE} * p}.$$

The expected annual labor cost of an OE contract depends on the wage (w^t_{OE}), the payroll tax rate (τ), the payroll tax reduction (r), the severance cost per year in the event of wrongful termination (equal to $\frac{45}{365}$ before the reform and $\frac{33}{365}$ after), and the probability of wrongful dismissal (p). We incorporate the estimated 1.9% increase in OE wages for young workers (see Section C.10 in the Appendix), while wages for older workers remain unchanged. The parameters take the following values: $\tau = 37.2\%$, $r = 25.38\%$ for young workers and 38.06% for older workers, $p = 71.17\%$ for young workers, and 77.94% for older workers. Substituting these values into the expression for expected labor costs yields a ratio of $\frac{W^1_{OE}}{W^0_{OE}} = 0.9367$ for young workers and 0.8861 for older workers.[49]

We now allow overall labor costs to adjust through pass-through of the labor cost reduction. Based on our wage incidence estimates, we set $\omega = 0.46$ for young workers and $\omega = 0.467$ for older workers. These values imply an effective labor cost reduction of $\left(1 - \frac{W^1_{OE}}{W^0_{OE}}\right)(1-\omega)$, equal to 3.4% for young workers and 6.1% for middle-aged workers. Combining these reductions with the increase in ST labor costs (1.5% for young workers and no change for older workers) yields changes in relative labor costs, as defined in equation 12, of 0.0496 log points for young workers and 0.0626 log points for older workers.

[48] Section C.6 provides a step-by-step derivation of the elasticity and examines the sensitivity of this and other assumptions.

[49] As a lower bound, we assume that OE wages did not respond to the reform, implying $w^0_{OE} = w^1_{OE}$. Under this assumption, the estimated ratio of labor costs is 0.9192.

Elasticity of substitution for young and adult workers. Using these inputs, we estimate an elasticity of substitution between ST and OE contracts of 7.1 for young workers and 0.03 for adult workers.[50] These numbers suggest that ST and OE contracts are close substitutes for younger workers. In contrast, the low elasticity for adult workers suggests two compatible interpretations: either ST jobs reflect seasonal demand or replacement needs (Garibaldi and Gomes, 2022; Del Bono and Weber, 2008), or the two contract types are used for groups of adult workers with very different skill compositions.[51]

Near-notch elasticity of substitution. We conclude this section by exploiting the estimates presented in Section 5.3.1, which analyze the effects of the reform on OE and ST employment around the age-45 eligibility threshold. The policy altered employers' incentives to offer OE contracts discontinuously at this cutoff, generating both delays in ST-to-OE transitions below the notch and differential hiring of workers just above versus just below age 45. The resulting employment responses allow us to define a near-notch elasticity of substitution between ST and OE contracts.

This near-notch elasticity captures two distinct adjustment margins. First, it reflects an intertemporal elasticity of substitution, as firms shift the timing of contract conversions in response to the temporary gains from waiting until workers become eligible for the subsidy. Second, it embodies an across-notch substitution margin, whereby firms may favor hiring workers just above age 45—who qualify immediately for lower-cost OE contracts—over slightly younger candidates who do not.

Based on the estimates, OE employment decreased by 4.396% while ST employment increased by 8.68% relative to the counterfactual. Using Equation (12), the implied numerator is therefore 0.1282. For the denominator, we use the expected relative cost change at the other side of the notch, taking into account wage incidence: $\ln(1/0.8861)(1-0.467) = 0.0644$. Combining both terms yields an elasticity of substitution of $\sigma = 1.99$ suggesting that firms are willing and can postpone contract conversions in response to the policy-induced change in labor costs.[52]

8 Mechanisms: Adverse Selection and Short-Term Wage Penalty

In this section, we explore why the elasticity of substitution between ST and OE contracts differs sharply for young and adult workers. Two mechanisms appear central. First, policy-eligible older workers employed on ST contracts are substantially more adversely selected than their younger counterparts, making them unlikely candidates for conversion into OE jobs. Second, ST contracts

[50] The 95% confidence interval estimated for young workers is -0.09 to 12.3.

[51] In Section C.7 we include in the calculation of the elasticity that not all new OE jobs occurred through low-cost contracts for young workers, and that for older workers the policy subsidized jobs that would have existed without the policy change. We obtain similar results.

[52] The 95% confidence interval is [1.959,2.015]

allow firms to sustain systematically lower wages, giving them an additional function beyond flexibility alone. This wage penalty makes ST contracts an effective cost-containment device and helps explain why reductions in OE labor costs do not translate into substitution when the relative wage advantage of ST employment remains large—a pattern that is consistent with the evidence on outside options documented in Section 5.2.3.

Adverse selection. A defining feature of the Spanish labor market is that ST-to-OE transitions are common at the beginning of a worker's career. Most young employees start in ST contracts and move into OE positions during their first years of labor-market experience. For older workers, the pattern is markedly different: the modal contract is OE, and relatively few new OE jobs originate from ST positions (Figure 4). This suggests that ST contracts function as stepping stones into permanent employment for young workers, but not for adults.[53]

A natural explanation is adverse selection. Because most workers obtain their first OE contract before age 30, employers can infer that individuals still holding ST contracts later in life are negatively selected. This signal sharpens with age (Greenwald, 1986). As a result, adult ST workers are disproportionately drawn from the lower tail of the productivity distribution and are rarely offered OE jobs. In contrast, for young workers, firms understand that it is difficult to secure a stable position early in their career (Ryan, 2001). Although young workers are considered riskier due to limited work histories, their expected productivity may still exceed that of adversely selected middle-aged ST workers. This difference helps explain why the ST-to-OE margin is active for the young but is effectively absent for adults.

To assess whether adverse selection worsens with age, we examine whether ST adult workers are relatively more negatively selected than ST young workers along observable characteristics. We estimate the following specification on the population of new hires, where the outcome is an indicator for being hired on an ST contract rather than an OE contract:

$$y_{it} = \alpha + \delta_t + \delta_s + \delta_p + \delta_a + \beta X_{it} + \phi 45_{it} + \kappa X_{it} 45_{it} + \varepsilon_{it} \tag{13}$$

where y_{it} equals 1 when the individual is hired in a ST contract, and 0 when hired in an OE contract. δ_t, δ_s, δ_p and δ_a are quarter, sector, province and age fixed effects. X_{it} is a vector of characteristics of the workers and the job: wage, education, experience, firm size, managerial job, gender, citizenship, part-time, and disability status. 45_{it} is dummy indicating that the worker is 45 years or older.

The results are in Table 6. Three findings emerge. First, both young and adult ST workers differ systematically from their OE-hired peers: they earn lower wages, have less experience, are less likely to hold managerial positions, are less educated, and work in smaller firms. Second,

[53] Appendix Section XX presents complementary evidence based on hiring flows.

the interaction terms reveal that adult ST workers are substantially more negatively selected than young ST workers. Conditional on age, they have lower wages, less accumulated experience, and are less likely to occupy higher-rank roles. Third, Columns (4)–(6), which replicate the exercise comparing low-cost and high-cost OE hires, reinforce the same pattern: adult workers hired into low-cost OE jobs are also more negatively selected than their young counterparts.

Taken together, these results indicate that adverse selection intensifies sharply with age. This helps explain why adult ST workers remain far from the productivity threshold needed for OE conversion, yielding the near-zero substitution elasticity we estimate for this group.

Table 6: Sorting into Short-Term and Low-Cost Open-Ended Contracts

	(1) st	(2) st	(3) st	(4) bonified	(5) bonified	(6) bonified
Log Wage	-0.00336***	-0.0577***	-0.00316***	-5.513***	-12.63***	-1.816***
	(0.000766)	(0.00298)	(0.000419)	(0.342)	(0.578)	(0.0307)
Experience in OE	-0.00297***	-0.00616***	-0.00585***	-0.315***	-0.451***	-0.110***
	(0.0000469)	(0.0000615)	(0.0000117)	(0.0119)	(0.0120)	(0.000850)
Experience in ST	-0.00199***	-0.00275***	0.000455***	-0.261***	-0.455***	0.0532***
	(0.0000509)	(0.0000959)	(0.0000196)	(0.0161)	(0.0221)	(0.00142)
High-Rank Occupation	-0.0699***	-0.158***	-0.0598***	-3.144***	-7.478***	1.231***
	(0.00366)	(0.0125)	(0.00132)	(1.065)	(1.576)	(0.0956)
University Degree	-0.0223***	-0.0338***	-0.0114***	-5.032***	0.795	0.0204
	(0.00178)	(0.0113)	(0.000890)	(0.704)	(1.495)	(0.0657)
Firm Size	-0.00386***	-0.0183***	-0.0150***	-0.483***	-1.397***	-0.109***
	(0.000223)	(0.000596)	(0.0000933)	(0.0789)	(0.0757)	(0.00641)
Log Wage x 45			-0.0601***			-11.42***
			(0.00308)			(0.560)
Experience in OE x 45			-0.000989***			-0.334***
			(0.0000610)			(0.0120)
Experience in ST x 45			-0.00423***			-0.463***
			(0.0000998)			(0.0227)
High-Rank Occupation x 45			-0.0659***			-6.114***
			(0.0132)			(1.595)
University Degree x 45			0.0126			0.757
			(0.0116)			(1.513)
Firm Size x 45			0.00898***			-1.554***
			(0.000629)			(0.0718)
Observations	327509	83146	4102890	55892	30628	4050372

Notes: The table displays the characteristics of short-term workers, relative to high-cost open-ended contracts for young workers (Column 1), adult workers (Column 2), and both (Column 3). Columns 4, 5 and 6 show the characteristics of low-cost open-ended workers, relative to high-cost open-ended contracts for young workers, adult workers, and both, respectively. Specification is Equation 13. Additional controls are province, sector, quarter and age fixed effects. We also include variables for citizenship, disability, gender and part-time contracts. Standard errors clustered at the worker's age level are in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Short-Term Wage Penalty. The low ST-to-OE substitution elasticity for adult workers also

points to a second mechanism: ST and OE contracts serve distinct functions within firms. One important role of ST contracts is that they allow employers to pay substantially lower wages. This is consistent with institutional features of the Spanish labor market: ST workers are underrepresented in unions and in firm-level wage agreements (Bentolila et al., 1994; Wilhelmi, 2021), and evidence from Italy shows weaker rent-sharing for temporary employees (Daruich et al., 2023).

We take this implication to the data. If ST jobs systematically pay less than OE jobs—even for observably similar workers—then a reduction in OE hiring costs may not close the wage gap enough to induce substitution, particularly for older, negatively selected workers.

We document a sizable ST wage penalty using two approaches (see Section C.9 in the Appendix for more details). First, in cross-sectional wage regressions that condition on rich worker and firm characteristics, ST workers earn 15.7% less than comparable OE workers. Second, using within-worker changes around ST-to-OE transitions, we estimate a wage gain of 7.5% upon conversion.

Both estimates indicate a substantial wage penalty associated with ST jobs. These results suggest that ST contracts depress workers' outside options and thereby allow firms to sustain lower wages. The persistence of this wage gap helps explain why ST employment continues to play a central role for older workers despite the reform, consistent with the evidence on outside options presented in Section 5.2.3.

9 Robustness

Employment Effects on Young Workers: In this section, we present a set of robustness exercises that support the validity of our identification strategy of the employment effects documented for both young and senior workers. Focusing first on young workers, we begin with a placebo test that shifts the reform date to 2004 and uses 2003 as the baseline year (Table B7). As expected, we find no significant relationship between the baseline share of ST contracts and subsequent employment outcomes, ruling out spurious correlations between pre-reform sectoral differences and later employment trends and thereby supporting our empirical design. We then examine alternative treatment definitions using binary indicators based on the 75th and 90th percentiles of the baseline ST-contract distribution (Table B8). Results using the 75th percentile cutoff remain broadly consistent, though estimated less precisely. At the 90th percentile, the effects become larger and more precisely estimated: open-ended employment increases by 9.5 percentage points, with more than half of this rise stemming from high-cost open-ended contracts.

We further assess robustness through subgroup analyses and sample restrictions. First, redefining exposure using the share of ST contracts among workers aged 25–30—a cohort just below the policy threshold—yields even stronger and more precisely estimated effects (Table B9), consistent with firms' greater willingness to convert older young workers to permanent positions. We also

re-estimate the model using a male-only sample to account for the slightly different policy conditions affecting women, particularly after the 1999 reform aimed at promoting female employment in underrepresented sectors. Finally, restricting the period to the pre-1999 years (Table B10) rules out confounding from later policy extensions; although the coefficients are somewhat attenuated, the effects on both low- and high-cost open-ended employment remain positive and significant, confirming the robustness of our conclusions.

Employment Effects on Adult Workers: To assess the validity of the employment results near the notch, we show they are robust to changes in the upper and lower age bounds used to construct the counterfactuals. We analyze workers aged 37–39.5, 37–40.5, 36.5–40, and 37.5–40, with results presented in Table B11. The corresponding graphical evidence is displayed in Figures B10 to B13.

To further validate the results far from the notch, we restrict the sample to data before January 1999, when a legal change excluded firms that wrongfully dismissed workers from labor cost reductions. The results, presented in Table B12, remain consistent. Similar robustness is observed when analyzing men and women separately (Tables B13 and B14). Additionally, the findings hold across different worker age groups, as shown in Tables B15–B17 and Figures B14–B25. Figure **??** further demonstrates that the reform did not affect transitions from self-employment to OE or ST contracts.

In the Online Appendix (Table **??**), we also test the robustness of our results to alternative assumptions regarding the linearity of pre-treatment trends, following the methodology of **?**. The necessary deviations from linearity to overturn our findings would be implausibly large, reinforcing the credibility of our conclusions.

Wage Incidence: The results on wage incidence remain robust across different time frames. We split the sample into two periods: before and after the government modified ST-to-OE conversion conditions. Table B20 presents results for May 1997–December 1998, while Table B21 covers January 1999–March 2001. The findings are also consistent when analyzing wage effects by gender (Tables B18 and B19) and age (Figure **??**). Additionally, we find no wage effects on workers not directly targeted by the policy. Specifically, Section C.10 of the Online Appendix examines potential impacts on ST wages and finds no significant effects.

10 Conclusions

This paper provides new evidence on how firms adjust contract choices, wages, and task allocation in response to changes in the relative cost of permanent employment. By jointly analyzing two age-based notches arising from the 1997 Spanish reform, we show that lowering the cost of OE contracts generates substantial substitution away from ST jobs for young workers, who are closer

to the margin between temporary and permanent employment. For middle-aged workers, however, contract substitution is nearly absent despite comparable labor-cost reductions. These results challenge the common modeling assumption of homogeneous substitution across worker types and reinforce the importance of life-cycle considerations in dual labor market dynamics.

The reform also raised wages for young workers in both temporary and unsubsidized permanent jobs, reflecting improved outside options rather than statutory pass-through. This mechanism weakens monopsonistic wage-setting and helps explain the reorganization of flexible tasks observed within firms. Temporary employment expanded among older workers, partly filling tasks previously performed by young ST employees who transitioned into permanent roles. Overall, the findings reveal that policies reducing duality are effective primarily for younger workers and may induce broader adjustments in workforce composition, wage-setting, and task assignment even beyond the directly treated groups.

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Online Appendix (Not for Publication)

Contents

A A Comparison of Survey and Administrative Data

The first MCVL dataset was sampled in 2004, and it contains the entire labor history of the individuals included in each edition. Nevertheless, the policy we study was implemented in 1997. Thus, we use the retrospective information of the 2004-2012 samples for the analysis, which may be problematic if it fails to capture the dynamics of the Spanish labor market a few years before.

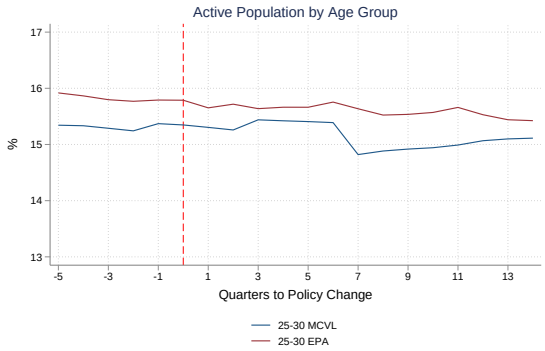
In this section, we compare the MCVL with data from the SLFS and show that both samples capture very similar labor market patterns. In particular, we plot the evolution, before and after the policy, of two population aggregates for workers aged 25-30, 40-45 and 45-50. On the one hand, the percentage of the active population of each age group. This is based on the SLFS. On the other hand, the percentage of each age group that was sampled in the 2004-2012 MCVL editions.

We display the results in Figure A1, panel (a), for employees 25-30, in panel (b) for employees 40-45, and in panel (c) for employees 45-50. As can be seen, the SLFS and the MCVL evolve in parallel throughout the period we study, capturing in a similar way the events in the labor market of the time.

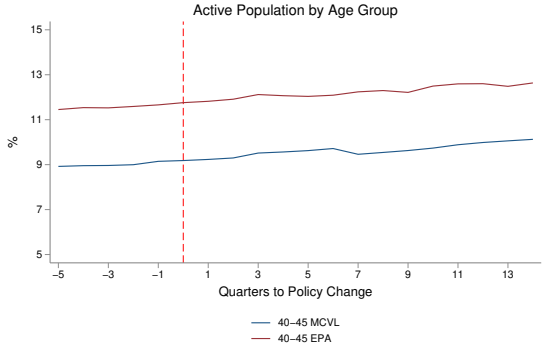
It is also evident that in both cases, the percentage of people is higher for the SLFS data. This is not surprising, given that the two aggregates we are comparing are not exactly the same. For instance, the SLFS contains individuals who are looking for a job, while the MCVL is unlikely to include all these people. In addition, the SLFS includes informal workers, whereas the MCVL does not capture them (Elias et al., 2025). Nonetheless, this is not a problem as long as both datasets reflect similar dynamics, which we confirm with the figures.

Figure A1: Comparing Survey and Administrative Data

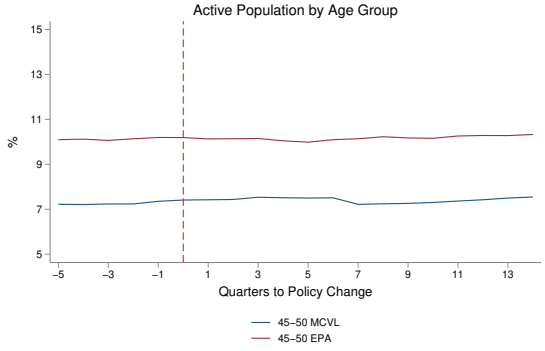
(a) Aged 25-30



(b) Aged 40-45



(c) Aged 45-50



Notes: The figures display the evolution of two population aggregates: the active population from the SLFS (red line) and the workers sampled in the 2004–2012 MCVL editions (blue line). The top panel reports results for employees aged 25–30, the middle panel for 40–45-year-old workers, and the bottomr panel for 45–50-year-old workers. The vertical red-dashed line marks the quarter of the policy change.

B Additional Institutional Details

B.1 Heterogeneity of the severance payment gap

The expected gap in severance payments might change a lot with job tenure if the rate of wrongful dismissals, fair dismissals, and quits is quite different depending on the length of the employment spell. To understand how heterogeneous the gap is, we plot the evolution of each type of separation and the labor cost gap that severance payments imply, with respect to job duration. The evidence is in Figure B1. Panel (a) displays the proportion of separations that are wrongful dismissals, fair dismissals, or quits. As can be seen, each proportion is quite stable over time. On average, the percentage of wrongful dismissals is 77.4%. For fair dismissals and quits, these numbers are 0.47% and 21.63%, respectively. With these values, the expected gap in employment protection is 7.02%, the number in the main text.

Panel (b) shows the counts of each type of separation. Most of them occur during the first 3 years of tenure. In fact, 77.8% of all separations happen during this period of time. Furthermore, 86.5% of OE contracts last at most 5 years. If we calculate each separation rate for the contracts that last at most 3 years, we obtain numbers that are very similar to the average. The wrongful dismissal rate is 81.43%, the fair dismissal rate is 0, and the share of quits is 18.56%. This implies an expected labor cost gap of 7.3%, not very different from the average value.

Panel (c) depicts the labor cost gap between ST and OE contracts due to severance payments as a percentage of the wage. It is quite stable and oscillates between 6 and 8% for most of the period. It might be surprising that the gap does not increase for workers with longer tenure. The reason is that it is calculated relative to the overall level of earnings attached to a contract (see Equation 3.1).

B.2 Calculation of the Reduction in Labor Costs

The overall payroll tax rate is 37.2%, and the reduction is applied to a fraction of it -a tax rate of 23.6%- known as *"contingencias comunes"*, which is statutorily paid by the employer and funds health insurance and pension benefits.[54][55] The base of the tax is the wage, subject to a maximum and a minimum basis according to the occupational category of the worker, as shown in Table B1.

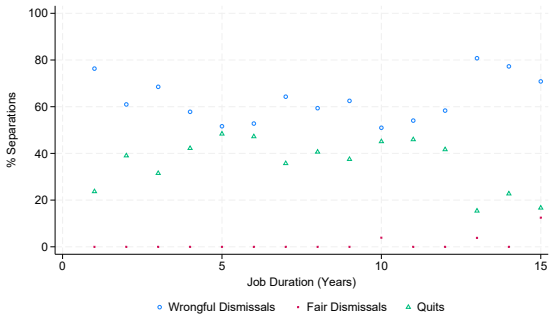
The tax rate discounts are summarized in Table B2. This table is different than Table B3 in the main text because it only shows the reductions in the payroll tax rate, as stated in the law, and not the overall statutory labor cost reduction. In its initial form, the reduction in the payroll tax rate was of 60% for workers hired after their 45th birthday, whereas it was 40% for workers who had been unemployed, or 50% for ST contract conversions. The fact that the payroll tax cuts were

[54] The statutory tax rate paid by the employer was 30.8% and 6.4% by the worker.

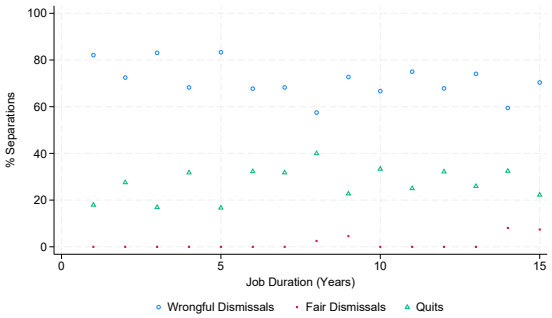
[55] The reduction in payroll tax collection was funded by a chapter in the budget of the Spanish employment agency.

Figure B1: Separations and Expected Gap in Severance Payments

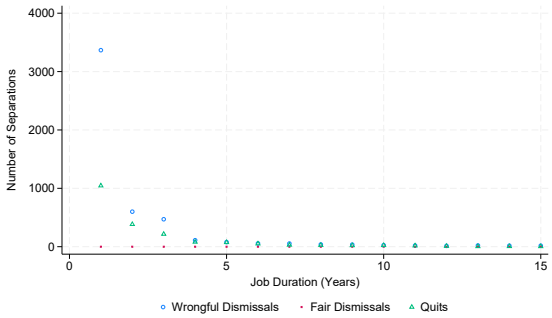
(a) Separations (%) 30



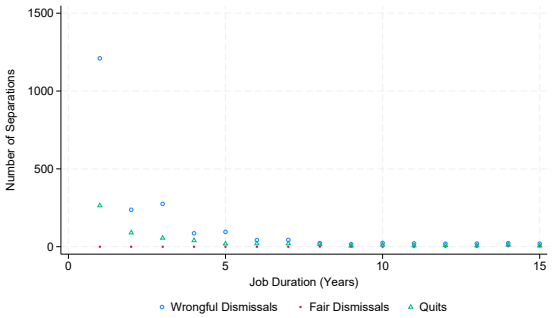
(b) Separations (%) 45



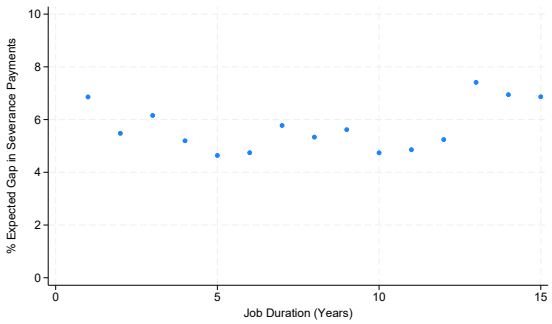
(c) Number of separations 30



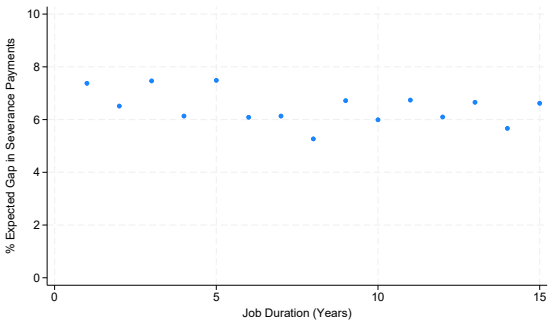
(d) Number of separations 45



(e) Expected gap in severance payments 30



(f) Expected gap in severance payments 45



Notes: Notes: Panels (a) and (b) show the heterogeneity of job separations by job tenure. The sample is composed of all workers who start an OE job during the year before the policy. Panel (a) displays the percentage of wrongful dismissals, fair dismissals, and quits, with respect to job tenure. Panel (b) shows the absolute number of each type of separation. In Panel (c,) we display the expected gap in severance payments by tenure.

more generous for workers hired when they were already 45 remained a stable feature of the policy in the period we analyze.

To obtain the actual reduction in labor costs summarized in Table B3, we can apply the following formula:

$$\frac{\text{Expected reduction in statutory labor costs}}{\text{Labor costs in ST contract}} = \frac{w\tau \times \frac{23.6\% \times discount}{\tau} \times 365 + w(1+\tau)(45-33) \times d}{w(1+\tau) \times 365}$$

where d is the wrongful dismissal rate (77.9% for workers older than 45 and 88.04% for young workers).

For instance, for male workers unemployed for more than a year, the discount is of 40%. Then, the overall reduction in labor costs is 9.44%. Following Table B2 and the formula above, we obtain the labor cost reductions in Table B3.

Table B1: Payroll Tax Bases for 1998

Worker Group	Minimum Base (monthly)	Maximum Base (monthly)
Engineers and university graduates	697.23	2311.67
Technical engineers	578.23	2311.67
Chief administrative	502.69	2311.67
Non-graduated assistants	467.17	2311.67
Administrative officials, subordinate employees and administrative assistants	467.17	1722.8
First-, second- and third-order officials. Employer under 18 years (1)	15.57	57.43

Notes: The source is **?**. (1): daily tax base. Worker group refers to the different contribution groups as established by Social Security law in Spain.

Table B2: Payroll Tax Cuts Programs

Group of workers	**8/5/1992-5/16/1997**	**05/17/1997-12/31/1998**	**01/01/1999-04/10/1999**	**04/11/1999-12/31/1999**	**1/1/2000-03/02/2001**
45 years or older	Only workers registered as unemployed for at least one year. Subsidy of 3000 euros. 50% all contract.	60%, first 2 years, 50% after.	45% first year, 40% after (+5% women).	45% first year, 40% after (+5% women).	50% first year, 45% after.
More than a year unemployed		40%, first two years (60% for women).	40% first year, 30% second year (+5% women).	40% first year, 30% second year (+5% women).	50%, first year, 45% second year.
Conversion of short-term contracts into open-ended		50%, first two years (60% if the worker is 45 or older, first two years. 50% after). The short-term contract had to be valid on May 17th, 1997.	25%, first two years. Only for workers hired on a short-term contract when they were younger than 30, older than 45, or had spent at least one year unemployed. The short-term contract had to be valid on January 1st, 1999.	25%, first two years (25% for the whole duration of the contract if the worker is older than 45). The short-term contract had to be valid on January 1st, 1999.	20%, first two years. Only for apprenticeship and replacement short-term contracts.
Younger than 30 years old	<25 y, and 1 year registered as unemployed; or 25-29 years old if they had not worked for more than 3 months. 2400 euros in subsidy.	40%, 24 months.	35% first year, 25% second year (+5% women).	35% first year, 25% second year (+5% women).	20%, 24 months.

Notes: The table is a summary of the main payroll tax credits available in each year. The sources are the laws enumerated in section B.4.

Table B3: Reductions in Statutory Labor Costs

Group of workers	8/5/1992-5/16/1997	05/17/1997-12/31/1998	01/01/1999-04/10/1999	04/11/1999-12/31/1999	1/1/2000-03/02/2001
45 years or older	Only workers registered as unemployed for at least one year. Subsidy of 3000 euros. 10.5% all contract.	12.2%, first 2 years, 10.5% after.	9.6% first year, 8.8% after (+0.87% women).	9.6% first year, 8.8% after (+0.87% women).	10.5% first year, 9.6% after.
More than a year unemployed		8.8%, first two years (12.2% for women).	8.8% first year, 7% second year (+0.87% women).	8.8% first year, 7% second year (+0.87% women).	10.5%, first year, 9.6% second year.
Conversion of short-term contracts into open-ended		10.5%, first two years (12.2% if the worker is 45 or older, first two years. 10.5% after). The short-term contract had to be valid on May 17th, 1997.	6.2%, first two years. Only for workers hired on a short-term contract when they were younger than 30, older than 45, or had spent at least one year unemployed. The short-term contract had to be valid on January 1st, 1999.	6.2%, first two years (6.2% for the whole duration of the contract if the worker is older than 45). The short-term contract had to be valid on January 1st, 1999.	5.3%, first two years. Only for apprenticeship and replacement short-term contracts.
Younger than 30 years	<25 y, and 1 year registered as unemployed; or 25-29 years old if they had not worked for more than 3 months. 2400 euros in subsidy.	9%, 24 months.	8.13% first year, 6.4% second year (+0.86% women).	8.13% first year, 6.4% second year (+0.86% women).	5.55%, 24 months.

Notes: The table is a summary of the statutory reductions in labor costs available in each year. The sources are the laws enumerated in section B.4. For the calculation of the labor cost reductions for workers older than 45, more than a year unemployed, and conversions I used the dismissal rates of the workers 45 or older (as in Section 3). For workers younger than 30, the calculation is based on the dismissal rates of 18-30-year-old workers, as in **?**.

B.3 Changes in the Payroll Tax Cut Program

Perhaps the most important modifications affected conversions from ST to OE contracts, though they were erratic. From January 1st, 1999, ST contracts in force that day could be converted to OE contracts with lower labor costs, as long as the worker was younger than 30 or older than 45. This stands in contrast with the law passed in May 1997, under which any conversion of a ST contract would benefit from a payroll tax break.[56] Moreover, for workers older than 45, the discounts in payroll taxes after a contract conversion lasted for two years, rather than the contract's duration. However, in April 1999, the law was changed again to include all ST contracts in force on January 1st 1999, regardless of the age of the worker. Furthermore, the tax break for workers older than 45 was extended to cover the duration of the contract. Finally, in January 2000, the types of ST contracts that could benefit from a reduction in payroll taxes if converted to OE contracts were restricted to two very specific cases: apprenticeship and worker replacement. Nonetheless, it should be noted that this restriction could be easily circumvented for ST workers older than 45: they only needed to wait until their temporary contract expired to be eligible for the tax break for workers over 45. In the empirical section, we report results using data both before and after January 1999 to show that the findings are robust to the legislative changes that modified the discounts after a contract conversion.

B.4 Payroll Tax Legislation

The following is a list of Spain's legislation concerning payroll taxes and summarized in Table B2:

[56] As long as the ST contract had been in force when the 1997 reform was passed.

- Ley 22/1992 de 30 de julio.
- Real-Decreto Ley 9/1997 de 16 de mayo.
- Ley 64/1997 de 26 de diciembre.
- Ley 50/1998
- Ley 55/1999 de 29 de diciembre.
- Ley 14/2000.

B.5 Unemployment Assistance for Workers Older than 52

The UA program for workers older than 52 is described in the Social Security law 1/1994 and entitles individuals to unlimited benefit duration until they reach the age of retirement.[57] Workers are eligible if:

- Have contributed to the UI fund for at least six years during their labor life.
- At the moment they request UA they fulfill all requisites for a contributory retirement pension, except the age.
- They do not have non-work rents higher than 75% of the minimum wage.

This UA program provides workers with a monthly stipend equivalent to:

- 75% of the minimum wage when the individual takes care of one or no relatives.
- 100% of the minimum wage when the individual takes care of at least two relatives.
- 125% of the minimum wage when the individual takes care of three or more relatives.

Moreover, it provides workers with state-sponsored contributions.

[57] The age requirement was moved to 55 years with a policy change in 2012, and it was lowered to 52 again in 2019, among other modifications.

C Additional Results

C.1 ST employment by age

Figure B1 provides additional descriptive evidence on the evolution of short-term (ST) employment by age group around the 1997 reform. Panel (a) shows that ST employment among workers aged 18–30 was on an upward trend prior to the reform. After implementation, this trend breaks: ST employment for young workers stops increasing and subsequently declines. In contrast, ST employment for workers aged 30–40 and 40–50 rises after the reform.

To shed further light on these patterns, Panel (b) removes age-group–specific pre-treatment trends and plots deviations from the projected counterfactual paths. The detrended series suggests that some of the ST jobs no longer held by workers aged 18–30 were absorbed by workers aged 30–40 and 40–50, with effects that appear persistent over time.

Interpretation of Panel (b) should remain cautious, especially at longer horizons, as extrapolating pre-trends may overstate the post-reform decline in ST employment for young workers. Nevertheless, up to roughly ten quarters after the reform, the evidence is consistent with a reallocation of ST jobs from younger to older workers rather than a one-for-one contraction in overall ST employment.

Figure B1: Short-term employment by age

Notes: Panel (a) shows the time-series for ST employment for all workers 18-50, 18-30, 30-40, and 40-50 years old. Panel (b) plots the deviations from pre-treatment trends for each age group.

C.2 Outside Options

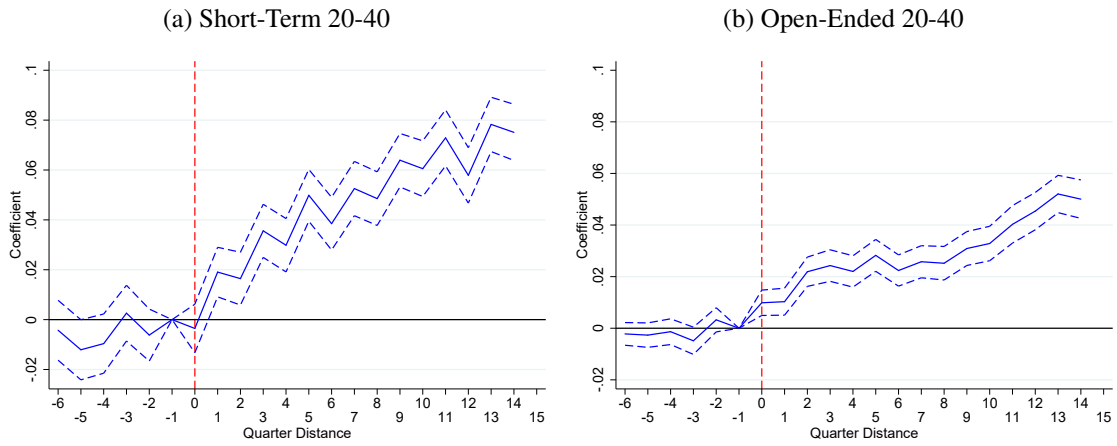
We perform a robustness exercise for the results on outside options in Section 5.2.3. We extend the comparison to workers 20 to 40 years old, and not only 25 to 35. The results are in Table B1 and Figure B2 and are consistent with those in the main text.

Table B1: Evolution of ST and OE Wages, Young Workers, 20-40

	(1)	(2)
	Log Daily Wage	
Treatment x Post	0.050***	0.031***
	(0.003)	(0.002)
Observations	1,340,281	1,855,160

Notes: The table reports wage differences in ST and OE jobs before and after the reform. Treatment equals one for workers younger than 30. Column (1) compares ST wages for ages 20–40. Column (2) examines OE wages for non-subsidized OE workers using the 20–40 comparisons. All regressions control for gender, education, citizenship, disability status, months spent in ST and OE jobs between 1990 and 1997, and include age-by-gender, occupation, sector, and province-by-year fixed effects. Standard errors are clustered at the individual level. * significant at 10%; ** significant at 5%; *** significant at 1%.

Figure B2: Evolution of ST and OE Wages Before and After the Reform (Notch at 30)

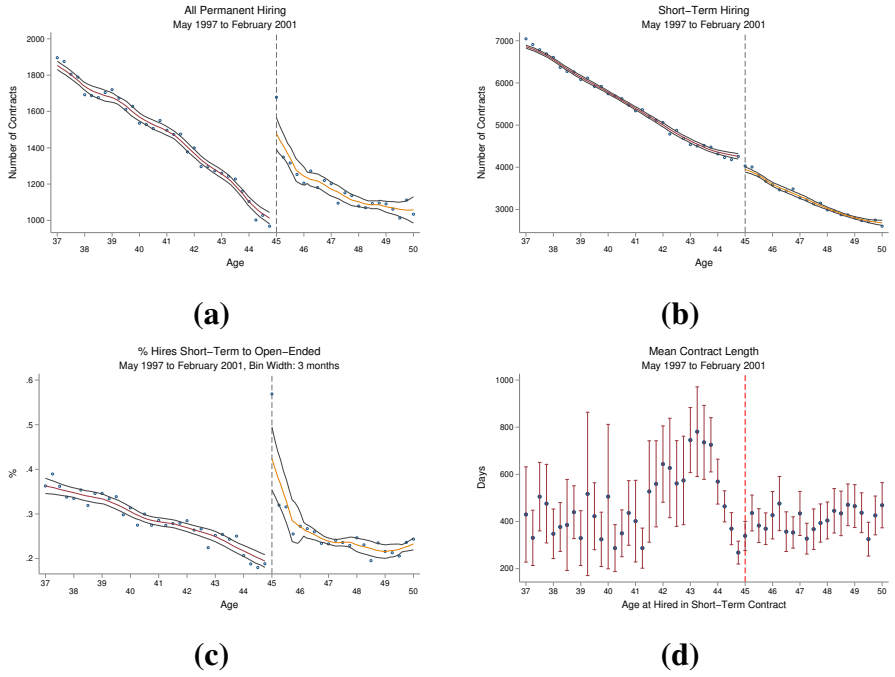


Notes: The figure presents event-study estimates of wage dynamics in ST and OE jobs. Panel (a) compares ST wages on either side of the age-30 notch. Panel (b) compares high-cost OE wages on either side of the age-30 notch. The treatment group are workers 20 to 30 years old. The control group are workers 30 to 40 years old. Control variables include gender, education, citizenship status, disability status, months spent in ST employment between January 1990 and April 1997, and months spent in OE employment over the same period. The specification also includes age-by-gender fixed effects, as well as occupation, sector, and province-by-year fixed effects.

C.3 Transitions and Contract Length Around Notch at 45

In Figure B3 we display a few graphics to reinforce the interpretation that the main effect of the policy near the notch is to postpone the time when some ST workers transition to OE contracts. Specifically, we see that the entries into OE contracts spike just after the threshold (Panel (a)). If substitution played a role, we would not expect such a sharp jump just above 45. Similarly, transitions from ST to OE contracts jump upwards right after the notch (Panel (c)), and the duration of ST contracts that were later transformed into OE contracts is anomalously large in the ages before the threshold (Panel (d)).

Figure B3: **Transitions and Contract Length**



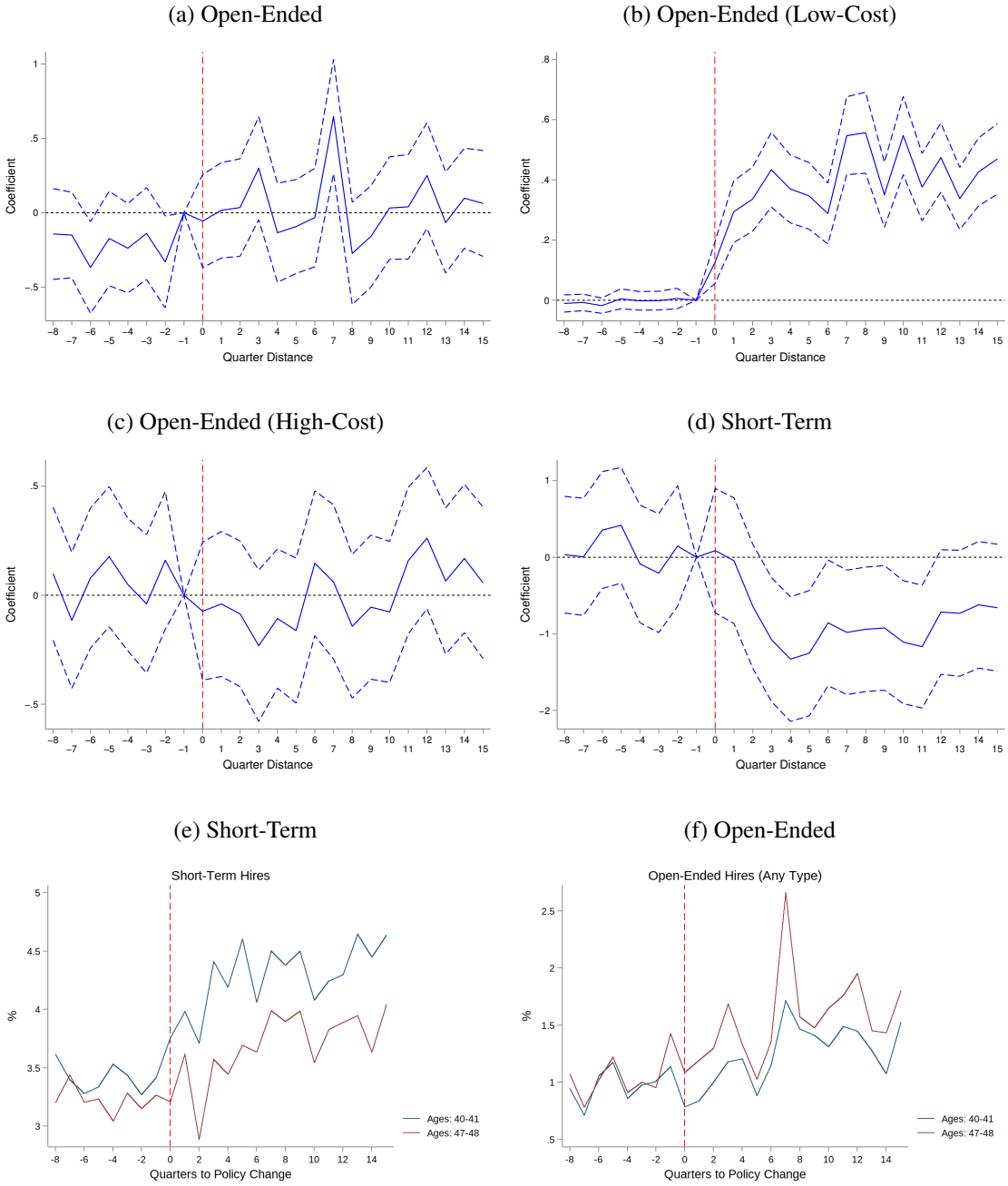
Notes: Figures (a) and (b) show the entries into open-ended and short-term contracts around the notch at the age of 45. Figure (c) displays transitions from short-term contracts into open-ended contracts. Figure (d) shows the mean contract length and the 95% confidence interval (red-capped lines) for short-term contracts that transition to an open-ended contract with low labor costs with the same employer. The blue dots in each figure depict the raw data. The vertical red-dashed line represents the labor cost notch. In Panels (a), (b), and (c), the red solid line is a local polynomial based on pre-notch data; the yellow solid line is a local polynomial based on post-notch data. The black solid lines are the confidence intervals of the local polynomials.

C.4 Additional Employment Results: Hires and Separations

C.5 Wage Incidence: Transitions from Non-Employment to OE Jobs

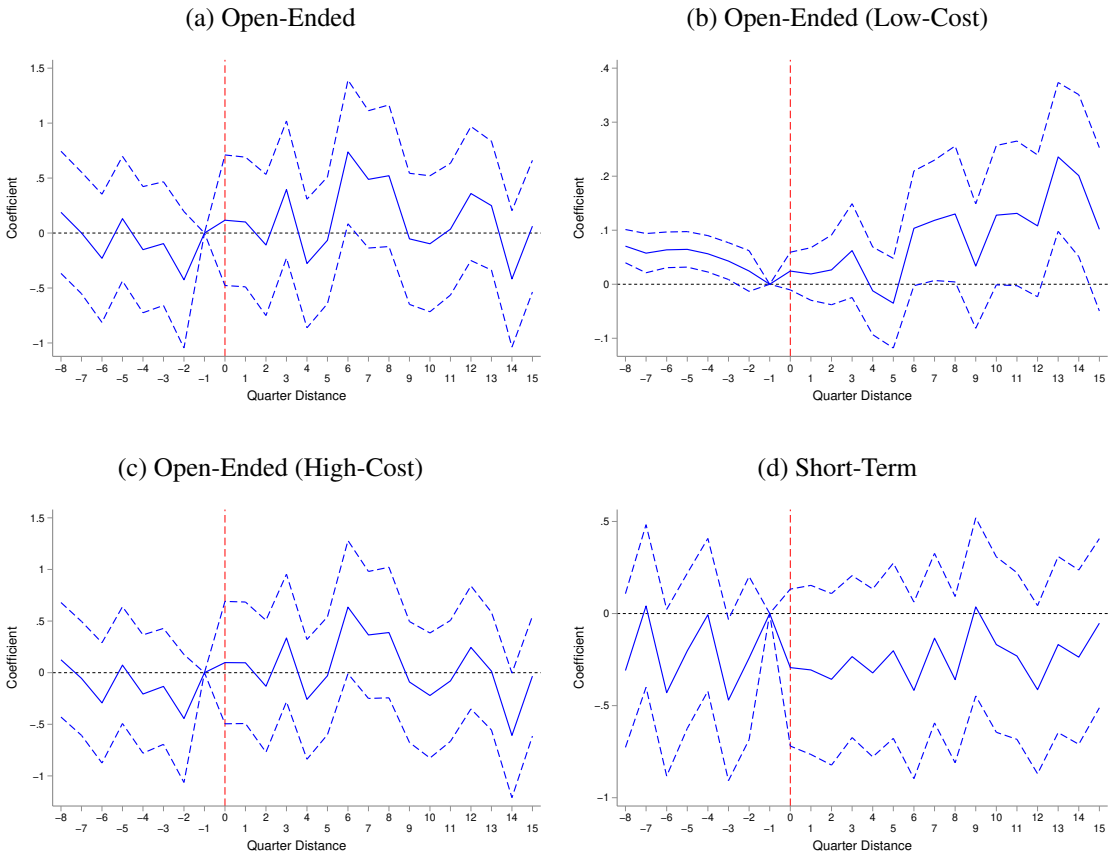
Transitions from non-employment into OE contracts represent an important entry route into permanent employment. Studying wage incidence in this context, however, is less straightforward than in the ST-to-OE setting. For workers moving from short-term to open-ended contracts, wages are

Figure B4: Effects of the Reform on Hiring



Notes: The figure shows the event-studies that analyze the effects on hires. The specification is Equation 9. In Panels (a)-(d), the blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel (a) depicts the results for entries into open-ended contracts, Panel (b) for entries into open-ended low-cost contracts, Panel (c) for entries into open-ended high-cost contracts, and Panel (d) for entries into short-term contracts. Panel (e) shows the raw time-series for short-term hires. In this case, the red solid line represents workers aged 47-48 and the blue line workers aged 40-41, and the dashed lines display the pre-treatment trends for both groups. The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45. Panel (f) shows the raw time-series for open-ended hires.

Figure B5: Effects of the Reform on Separations



Notes: The figure shows the event-studies that analyze the effects on separations. The specification is Equation 9. The blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel (a) depicts the results for exits from open-ended contracts, Panel (b) for exits from open-ended low-cost contracts, Panel (c) for exits from open-ended high-cost contracts, and Panel (d) for exits from short-term contracts. The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

observed both before and after conversion, allowing a clean comparison of wage dynamics around the transition. In contrast, individuals entering OE employment from non-employment have no earnings in the pre-transition period, preventing the use of standard event-time measures based on continuous wage histories.

To address this challenge, we restrict attention to quarters in which workers have positive earnings, following the approach described in Section 6. Event time therefore reflects periods with observed earnings, rather than calendar quarters. This allows us to compare wage trajectories immediately before and after the start of the OE job without relying on wage information that is mechanically zero during non-employment. We conduct the analysis separately for workers aged 18–30 and 45–55, distinguishing between transitions into low-cost and high-cost OE contracts.

The resulting sample sizes are substantially smaller than in the ST-to-OE analysis. Among younger workers, the administrative records contain 14,172 transitions from non-employment into an OE job. However, many of these transitions cannot be used because we require a sufficient number of quarters with positive earnings both before and after the transition. After imposing this requirement, the final samples consist of 528 transitions into low-cost OE contracts and 381 transitions into high-cost OE contracts. For older workers, the administrative data include 7,832 transitions from non-employment into an OE contract. Applying the same requirement of sufficient pre- and post-transition earnings yields 594 transitions into low-cost OE contracts and 703 transitions into high-cost OE contracts, which form the analytic samples.

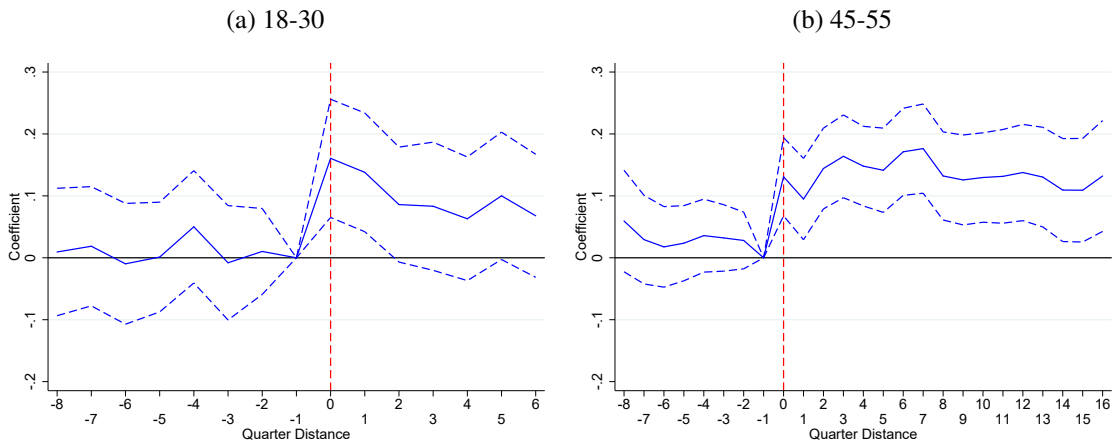
The empirical strategy mirrors the one used in the main wage-incidence analysis. We estimate a difference-in-differences specification with individual, time, and age fixed effects, alongside an event-study version of the model that traces the dynamic wage response relative to the quarter in which the OE job begins (Equations 10 and 11). The treatment indicator distinguishes transitions into low-cost versus high-cost OE contracts, and the specification includes the same set of worker and firm covariates interacted with quarter dummies to flexibly account for heterogeneous wage trends. The dynamic coefficients are presented in Figure B6, and the corresponding static estimates—analogous to Table 5 in the main text—are reported in Table B2.

The results broadly align with the patterns documented for ST-to-OE transitions. For both age groups, wages rise sharply at the start of the new OE job for workers entering low-cost contracts relative to those entering high-cost ones, consistent with the pass-through of the cost reduction.

Based on our preferred specification (Table B2, Column 5), the implied pass-through rates are 108% for young workers and 79.5% for adult workers. These magnitudes should be interpreted with caution, as the sample of non-employed workers who can be followed over sufficient quarters with positive earnings is considerably smaller than in the main analysis. In addition, the sample is positively selected: by construction, it includes individuals with longer and more stable post-transition employment spells. Even so, the qualitative conclusion remains the same. Reductions

in employer labor costs were clearly transmitted to wages, reinforcing the main finding that the reform generated substantial wage pass-through.

Figure B6: Wage Dynamics Non-Employment to Open-Ended Transition: Low-Cost vs. High-Cost OE Employees



Notes: Figure 13 presents event-study estimates of the wage incidence of the reform. The specification follows a difference-in-differences with individual and time fixed effects, as described in Equation 10. The blue solid lines represent the estimated coefficients, and the dashed lines indicate the 95% confidence intervals based on robust standard errors clustered at the individual level. Panel (a) reports estimates for workers aged 18–30, and Panel (b) for those aged 45–55. The model includes interactions between quarter dummies and controls for sector, gender, education, disability status, citizenship, part-time status, firm size (number of employees), the number of months worked under ST and OE contracts in the seven years prior to the reform, as well as firm age and legal status. We also control for age dummies and the provincial unemployment rate.

C.6 Elasticity Estimation

To examine the sensitivity of the elasticity estimate to different assumptions, we begin by defining its key components. By definition, the elasticity of substitution is given by

$$\sigma = -\frac{\Delta \ln\left(\frac{L_{OE}}{L_{ST}}\right)}{\Delta \ln\left(\frac{W_{OE}}{W_{ST}}\right)},$$

where L_{OE} and L_{ST} denote employment in OE and ST contracts, respectively, and W_{OE} and W_{ST} represent the corresponding labor costs. This expression captures how relative employment responds to relative changes in labor costs across contract types.

Numerator: We first estimate the numerator, separately for young and older workers. The numerator can be expressed as

$$\begin{aligned}\Delta \ln\left(\frac{L_{OE}}{L_{ST}}\right) &= \ln\left(\frac{L^1_{OE}}{L^1_{ST}}\right) - \ln\left(\frac{L^0_{OE}}{L^0_{ST}}\right) \\ &= \ln\left(\frac{L^1_{OE}}{L^0_{OE}}\right) - \ln\left(\frac{L^1_{ST}}{L^0_{ST}}\right),\end{aligned}$$

Table B2: Wage Incidence

	(1)	(2)	(3)	(4)	(5)
	Log Daily Wage				
Panel A: Transition from NE to OE (30 years old)					
Treatment x Post	0.140***	0.104***	0.106***	0.104***	0.093***
	(0.034)	(0.034)	(0.035)	(0.035)	(0.035)
Observations	13495	13353	12841	12841	12342
Panel B: Transition from NE to OE (45 years old)					
Treatment x Post	0.102***	0.088***	0.094***	0.091***	0.097***
	(0.022)	(0.024)	(0.026)	(0.026)	(0.030)
Observations	30188	29201	28156	28156	27888
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	Yes	Yes
Province Unemployment	No	Yes	Yes	Yes	Yes
Sector Controls	No	No	Yes	Yes	Yes
Firm Size	No	No	No	Yes	Yes
Other Firm Controls	No	No	No	No	Yes

Notes: The table shows the wage effects of the reform. The specification is a difference-in-differences, as in Equation 11. Panels A and D is for a sample of people continuously employed with the same employer after the transition. Panels B and E is for all workers regardless of whether they lose their jobs or change jobs in the post period. Panels C and F present evidence on transitions from non-employment to open-ended. Columns 2 to 5 include interactions of quarter dummies with controls for the sector, firm's size, company's age, firm's legal status, gender, education, disability status, citizenship status, part-time work, dummies for the worker's age, the number of months worked in ST contracts the 7 years before the reform, the number of months worked in OE contracts the 7 years before the reform, and the unemployment rate at the province level. Each column controls for a different subset of these variables, as specified at the bottom of the table. Robust standard errors clustered at the individual level are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

which corresponds to the relative change in employment for OE contracts minus the relative change for ST contracts. In the following, we detail the procedure used to calculate these terms.

Young workers: For young workers, we rely on the estimates reported in Table 1. In this specification, the dependent variable is the employment outcome normalized by the baseline total number of OE and ST workers. Using these estimates, we recover how changes in OE and ST employment relate to initial employment levels and the baseline sectoral share of ST employment. Specifically:

$$\frac{L^1_{OE}}{L^0_{OE}+L^0_{ST}} = \frac{L^0_{OE}}{L^0_{OE}+L^0_{ST}} + S_{ST} \times \beta_{OE}, \qquad \frac{L^1_{ST}}{L^0_{OE}+L^0_{ST}} = \frac{L^0_{ST}}{L^0_{OE}+L^0_{ST}} + S_{ST} \times \beta_{ST}.$$

In order to obtain average employment changes, we use the average baseline share of short-term employment, $S_{ST} = 0.15$, and the baseline share of OE employment, $\frac{L^0_{OE}}{L^0_{OE}+L^0_{ST}} = 0.4823$. Combining these values with the estimated effects of the reform on OE and ST employment (0.703 for OE and -0.344 for ST), we obtain average employment ratios of $\frac{L^1_{OE}}{L^0_{OE}} \approx 1.2186$ for OE workers and $\frac{L^1_{ST}}{L^0_{ST}} \approx 0.9003$ for ST workers. Consequently, the numerator of the elasticity expression, $\Delta \ln\left(\frac{L_{OE}}{L_{ST}}\right)$, is estimated to be 0.3027 log points.

Senior workers: For older workers, we use the estimated effect on OE employment reported in Table 4. Consistent with the discussion in Section 5.2.2 and the evidence presented in Appendix Section C.1, we assume that the estimated decline in ST contracts is primarily driven by spillover effects. At the end of this section, however, we examine the sensitivity of this assumption by considering alternative scenarios in which 25% or 50% of the observed decline in ST employment is not attributable to spillovers.

The estimated coefficients are 0.213 for OE employment and -0.746 for ST employment. Under the baseline assumption that the decline in ST employment fully reflects spillovers, we set $L^1_{OE} = L^0_{OE}(1+0.0023)$ and $L^1_{ST} = L^0_{ST}$. This yields a change in the employment ratio for senior workers of $\Delta \ln\left(\frac{L_{OE}}{L_{ST}}\right) \approx 0.0020$ log points.

Denominator: For the denominator we expand the expression, such that it represents the change in labor costs as a function of past and future OE and ST labor costs, specifically:

$$\begin{aligned}\Delta \ln\left(\frac{W_{OE}}{W_{ST}}\right) &= \ln\left(\frac{W^1_{OE}}{W^1_{ST}}\right) - \ln\left(\frac{W^0_{OE}}{W^0_{ST}}\right) \\ &= \ln\left(\frac{W^1_{OE}}{W^0_{OE}}\right) - \ln\left(\frac{W^1_{ST}}{W^0_{ST}}\right),\end{aligned}$$

Thus, we only need to compute the ratios of labor costs for OE and ST employment. For ST workers, we rely on the estimated wage change reported in Section C.10, which indicates a 1.5

percent increase around the policy reform. Hence,

$$\frac{W_{ST}^1}{W_{ST}^0} = 1.015.$$

For OE workers, we first compute the percentage change in labor costs, denoted by Δ:

$$\Delta = (1 - W_{OE}^1/W_{OE}^0)(1-\omega),$$

where $\omega \in [0,1]$ captures the share of the statutory tax change passed through to workers. A value of $\omega = 0$ implies that firms bear the full burden of the reform, whereas $\omega = 1$ corresponds to complete pass-through to workers. By varying ω, we can evaluate how different assumptions about tax incidence affect the implied change in labor costs, $\Delta \ln(W_{OE}/W_{ST})$, and therefore the elasticity parameter σ. In our preferred specification, the estimated pass-through corresponds to $\omega_{\text{young}} = 0.44$ for young workers and $\omega_{\text{old}} = 0.467$ for older workers.

We now use the following expression on the expected OE labor costs:

$$\begin{aligned}\frac{W_{OE}^1}{W_{OE}^0} &= \frac{w_{OE}^1[1+\tau(1-r)] + \frac{33}{365} * w_{OE}^1 * p}{w_{OE}^0(1+\tau) + \frac{45}{365} * w_{OE}^0 * p} \\ &= \frac{w_{OE}^1}{w_{OE}^0} \frac{[1+\tau(1-r)] + \frac{33}{365} * p}{(1+\tau) + \frac{45}{365} * p}.\end{aligned}$$

The expected annual labor cost of an OE contract depends on the wage (w_{OE}^t), the payroll tax rate (τ), the payroll tax reduction (r), the severance cost per year in the event of wrongful termination (equal to $\frac{45}{365}$ before the reform and $\frac{33}{365}$ after), and the probability of wrongful dismissal (p). We incorporate the estimated 1.9% increase in OE wages for young workers (see Section C.10 in the Appendix), while wages for older workers remain unchanged. The parameters take the following values: $\tau = 37.2\%$, $r = 25.38\%$ for young workers and 38.06% for older workers, $p = 71.17\%$ for young workers, and 77.94% for older workers. Substituting these values into the previous expression we get that the percentage change in labor costs Δ is equal to 6.32% for young workers and 11.38% for older workers.

We now allow overall labor costs to adjust through the pass-through of the statutory labor cost reduction. Based on our wage-incidence estimates, we set $\omega = 0.44$ for young workers and $\omega = 0.467$ for older workers. These values imply an effective reduction in OE labor costs of

$$\left(1 - \frac{W_{OE}^1}{W_{OE}^0}\right)(1-\omega),$$

which corresponds to a 3.54% decline for young workers and a 6.07% decline for older workers.

Sensitivity	Elasticity σ
Young workers:	
Baseline sector share of ST 10% ($S_{ST} = 0.1$)	4.8168
Baseline sector share of ST 20% ($S_{ST} = 0.2$)	9.3694
No change in ST labor costs ($W^1_{ST} = W^0_{ST}$)	8.3959
No change in standard OE wages ($w^1_{OE} = w^0_{OE}$)	5.7428
No wage incidence ($\omega = 0$)	4.2166
Older workers:	
Percent of ST due to spillover 75%	0.0638
Percent of ST due to spillover 50%	0.0485
No wage incidence ($\omega = 0$)	0.0176

Combining these reductions with the change in ST labor costs—an increase of 1.5% for young workers and no change for older workers—yields changes in relative labor costs (as defined in equation 12) of 0.0496 log points for young workers and 0.0626 log points for older workers.

Elasticity of substitution: Using the numerator values of 0.3027 log points for young workers and 0.0020 log points for older workers, together with the corresponding denominators of 0.0496 and 0.0626 log points, we estimate elasticities of substitution of approximately 7.12 for young workers and 0.032 for older workers.

Sensitivity analysis

C.7 Elasticity of Substitution Using the Relative Increase in Low-Cost OE Contracts

Based on the employment results, we know that the increases in OE employment for young workers occurred partially through high-cost contracts, especially when the subsidies expired (see Figure 5, Panels (b), (d), and (f)). Alternatively, for older workers the policy subsidized OE jobs that would have existed without the reform or, in other words, inframarginal OE workers (see Figure 12, Panels (b) and (c)). To take this into account, we expand Equation **??** in the following form: $\left(1 - \frac{W^1_{OE}}{W^0_{OE}}\right)(1-\omega)\frac{\Delta\text{Low-Cost OE}}{\Delta\text{OE}}$, where the last element weights the effective cost change by the relative increase in low-cost OE contracts.

Specifically, this proportion is $0.292/0.703 = 0.415$ for young workers (see Table 1, Panel B, Columns 1–2). This number implies that only part of the increase in OE employment happens through low-cost OE contracts, which minimizes the impact of monetary incentives. For adult workers, the proportion is $2.038/0.213 = 9.57$ (see Table 4, Panel D, Columns 1–2), which indicates that for every marginal OE adult worker, there were 9.57 infra-marginal OE adult workers. Hence, the reduction in labor costs implied by low-cost OE contracts was much larger.

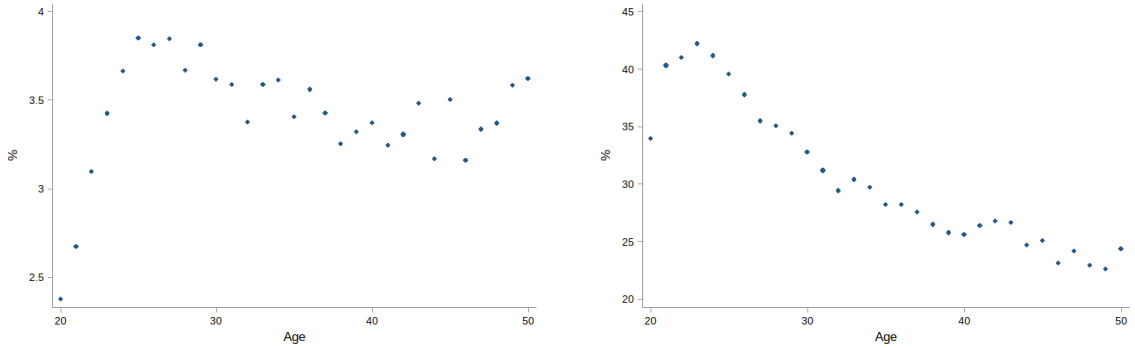
When we include the factor $\frac{\Delta\text{Low-Cost OE}}{\Delta\text{OE}}$ in the calculation, we obtain a reduction in labor costs

of 1.81% for young workers and 58.1% for adult workers. The elasticity of substitution is 16.7 for young workers and 0.004 for adult workers, emphasizing that ST-to-OE substitution is much more important in the market for young workers.

C.8 Entries into OE Contracts

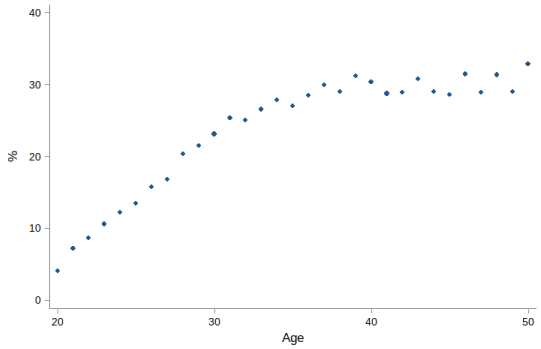
??

Figure B7: **Entries into Open-Ended Contracts**

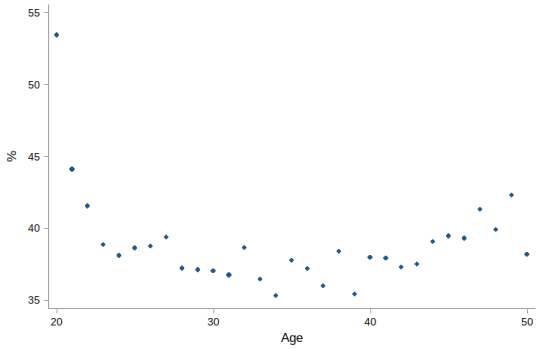


(a) From ST relative to ST contracts

(b) From ST relative to OE Entries



(c) From OE relative to OE Entries



(d) From Non-Employment relative to OE Entries

Notes: The Figure shows a breakdown of the entries into OE contracts taking into account the situation of the worker the month before he is hired into an OE contract. Panel (a) shows the percentage of entries from a ST contract, relative to the number of ST workers of that age. The other graphs display the percentage of OE hires that happen from a ST contract (Panel (b)), from another OE contract (Panel (c)), and from out of employment (Panel (d)). To construct the figures we used data from the pre-policy period between January 1995 to April 1997.

C.9 Wage penalty

Two key questions emerge from the reform's employment effects. Why is there no increase in marginal OE positions among older workers, and why does the policy that targets young workers generate spillovers on older workers through ST contracts?

One reason might be that ST and OE contract for older workers play different roles within firms. A plausible explanation is that ST contracts enable firms to avoid paying higher wages. This hypothesis rests on an important institutional characteristic: ST workers are largely underrepresented in both unions and firm-level wage agreements (Bentolila et al., 1994; Wilhelmi, 2021). Furthermore, Daruich et al. (2023) document differential rent-sharing between ST and OE contracts in Italy.

We take this idea to the data. We expect ST workers to earn significantly lower wages than comparable OE employees. We test this prediction in two complementary ways. First, conditional on observable characteristics, we assess whether ST workers face a wage penalty relative to OE workers. Second, we examine whether workers transitioning from ST to OE contracts experience a significant wage premium.

ST Wage Penalty in a Mincerian Regression. To measure the wage penalty, we focus on individuals aged 18–55 during the 1996–1998 period. Our preferred specification is:

$$y_{it} = \alpha + \beta ST_{it} + \gamma X_{it} + \rho_p + \theta_t + \varepsilon_{it} \tag{14}$$

where y_{it} denotes the logarithm of the wage of worker i in period t. ST_{it} is a dummy equal to one if the worker holds an ST contract and zero otherwise. The coefficient β is the parameter of interest. X_{it} includes individual controls such as education, experience, age, sector, gender, disability status, firm size, the provincial unemployment rate, and several social security variables capturing the worker's rank and firm activity. ρ_p, θ_t, δ_m, and κ_a denote province, and time fixed effects, respectively.

Table B3 reports five specifications. Column (1) excludes controls, Column (2) adds province and time fixed effects, Column (3) corresponds to our preferred specification. Columns (4) and (5) restrict to workers aged 18-30 and 45-55, respectively. In all cases, we find a significant and negative wage penalty. When including all controls, the estimated penalty equals –12.2%. This estimate is comparable to the temporary wage gap of 12–13% found using Italian data (Picchio, 2006). Hence, monetary incentives to increase OE employment may be ineffective if they do not compensate for the large wage gap across contracts.

Wage Premium after Transition to an OE Contract. To quantify the wage premium associated with becoming an OE worker, we focus on employees who transition from an ST to an OE contract with the same firm between January 1996 and April 1997, prior to the policy implementation. We compare their daily wages in the months immediately before and after the transition. For each individual, we retain observations corresponding to the month preceding the transition and

Table B3: Wage Penalty for Short-Term Contracts

	(1)	(2)	(3)	(4)	(5)
	log wage				
ST	-0.196***	-0.191***	-0.122***	-0.100***	-0.157***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.007)
Observations	533,422	533,422	533,422	306,237	47,685

Notes: The table reports the estimated wage penalty faced by short-term (ST) workers relative to open-ended (OE) workers. The sample includes individuals aged 18–55 observed from four quarters before to six quarters after the policy change. Column (1) excludes controls; Column (2) adds province and time fixed effects; and Column (3) presents the preferred specification with the full set of controls. Columns (4) and (5) restrict the sample to workers aged 18–30 and 45–55, respectively. Robust standard errors are reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table B4: Wage after Transition to Open-Ended

	(1)	(2)	(3)	(4)	(5)
	log wage				
transitionSTtoOE	0.125***	0.117***	0.111***	0.135***	0.075**
	(0.008)	(0.007)	(0.009)	(0.012)	(0.035)
Observations	24,056	24,056	13,576	7,531	1,221

Notes: The table shows the wage increase after a short-term worker transitions to an open-ended contract. The sample is composed of individuals aged 18-30 and 45-55. The time period is from the first quarter of 1995 to the first quarter of 1997, both included. Robust standard errors are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

the month immediately after. We follow the next equation:

$$Y_{it} = \alpha + \beta Transition_{it} + \eta_i + \zeta_t + \gamma Unemp_{pt} + \varepsilon_{it}, \tag{15}$$

where $Transition_{it}$ is a dummy equal to one if worker i transitions to an OE contract in period t. The regression includes individual fixed effects η_i and quarter fixed effects ζ_t. Because the transition occurs within the same firm, constant firm characteristics are absorbed by η_i. We also control for the provincial unemployment rate $Unemp_{pt}$. Identification relies on within-individual variation before and after the transition.

Table B4 presents the results. We find a wage premium of approximately 11% following a transition to an OE contract, a result consistent across specifications and in line with Italian evidence showing a 6–8% premium (Daruich et al., 2023).

C.10 The Evolution of Short-term Wages for Adult Workers

We begin by examining whether the reform affected wage-setting in ST contracts, focusing on the two age thresholds embedded in the policy: 30 and 45. For younger workers, we compare wage patterns on either side of the 30-year threshold. We apply the same approach to OE workers

who were never employed under subsidized contracts, thereby isolating wage responses in non-subsidized jobs. To assess robustness, we estimate effects using two age windows—25–35 (our preferred specification) and 20–40.

For older workers, constructing a valid counterfactual requires avoiding observations close to the 45-year notch, where the reform's incentives are strongest and could contaminate wage comparisons. We therefore adopt a donut design that excludes individuals immediately around age 45. The intuition is that workers just below and just above this threshold may respond mechanically to the labor-cost reductions introduced at age 45. Our main comparison contrasts ST workers aged 40–42 with those aged 46–47 (and older) and is supplemented by evidence that wages for workers aged 40–41 remain stable, which supports the credibility of this counterfactual. Together, these strategies allow us to study whether wage-setting evolved differently for groups directly and indirectly exposed to the reform.

We estimate the wage effects using the following event-study specification:

$$Y_{it} = \alpha + \delta_s + \delta_p + \delta_t + \sum_{j=-T,\, j\neq -1}^{T} \beta_j \mathbf{1}[j = t]\text{Treatment}_i + \gamma X_{it} + \varepsilon_{it},$$

where the dependent variable is the log daily wage. Treatment is defined as being younger than 30 (for the youth analysis) or older than 45 (for the senior analysis). The coefficients β_j trace the differential evolution of the ST–OE wage gap relative to the quarter before the reform. The model includes sector, province, and quarter fixed effects; age-by-gender fixed effects; and controls for education, citizenship, disability status, months of prior ST and OE experience (1990–1997), firm size, and province-by-year fixed effects. We also estimate a complementary static specification with treatment, post-reform, and interaction terms.

The event-study results appear in Figures 8 and B8. For younger workers, pre-trends in both ST and OE wages are flat, validating the identification strategy. After the reform, wages begin to diverge: ST wages rise by nearly 4% fifteen quarters later, and OE wages by about 2%. In contrast, Figure B8 shows no meaningful wage differences across the 45-year notch, consistent with limited wage adjustment for older workers. Table B5 presents the two-way fixed-effects estimates: in our preferred specification, workers younger than 30 earn 1.5% higher wages in ST positions and 1.9% higher wages in standard OE positions, whereas workers aged 45 or older experience no significant wage changes relative to slightly younger workers.

Table B5: Evolution of ST and OE Wages Before and After the Reform

	(1)	(2)	(3)	(4)
	Log Daily Wage			
	Panel A: 30-age-notch			
Treatment x Post	0.015***	0.050***	0.019***	0.031***
	(0.004)	(0.003)	(0.003)	(0.002)
Observations	780,795	1,340,281	1,184,879	1,855,160
	Panel B: 45-age-notch			
Treatment x Post	-0.007	-0.003	0.000	0.007
	(0.013)	(0.010)	(0.006)	(0.005)
Observations	59,063	126,888	204,890	438,484

Notes: The table reports wage differences in ST and OE jobs before and after the reform. In Panel A, treatment equals one for workers younger than 30; in Panel B, for workers aged 45 or older. Column (1) compares ST wages for ages 25–35 (Panel A) and 41 vs. 46 (Panel B). Column (2) uses wider age windows: 20–40 (Panel A) and 40–42 vs. 46–48 (Panel B). Column (3) examines OE wages for non-subsidized OE workers using the 25–35 (Panel A) and 41 vs. 46 (Panel B) comparisons. Column (4) presents the corresponding results for 20–40 (Panel A) and 40–42 vs. 46–48 (Panel B). All regressions control for gender, education, citizenship, disability status, months spent in ST and OE jobs between 1990 and 1997, and include age-by-gender, occupation, sector, and province-by-year fixed effects. Standard errors are clustered at the individual level. * significant at 10%; ** significant at 5%; *** significant at 1%.

C.11 Effect on Part-Time Contracts

The policy on young workers might affect the equilibrium of part-time employment by age-groups. This is because as the policy increases the bargaining power of young workers, this makes that employers reallocate position, creating a substitution of part-time jobs from young workers into older workers.

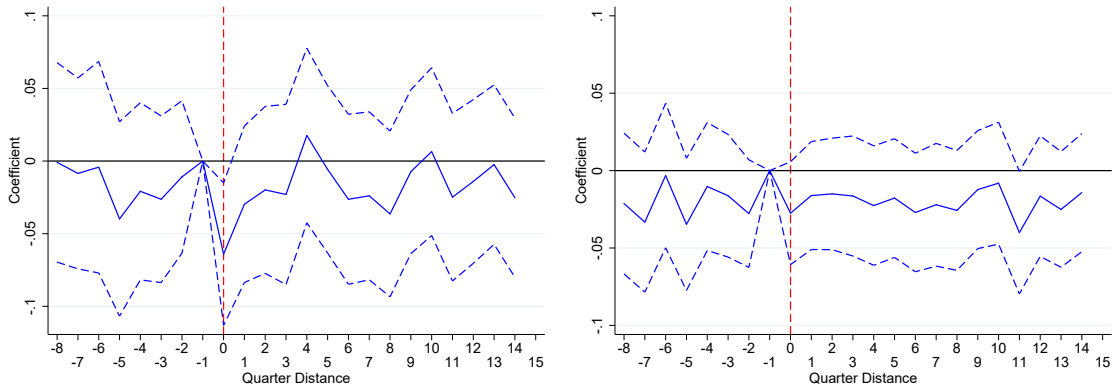
In order to know this, we compare the probability of being employed in a part-time job. We follow the same approach as Section C.10 in the appendix, and use as a treatment variable whether the worker is 30 years of younger. comparing 30-35 workers to 25-30 in the young population. and comparing 40-42 vs 46-48 for older workers. The model includes sector, province, and quarter fixed effects; age-by-gender fixed effects; and controls for education, citizenship, disability status, months of prior ST and OE experience (1990–1997), firm size, and province-by-year fixed effects. We also estimate a complementary static specification with treatment, post-reform, and interaction terms.

The event-study results are presented in Figure B9. Panel (a) shows that workers younger than 30 are less likely to hold part-time positions than comparable workers just above the 30-year threshold. Fourteen quarters after the reform, workers below age 30 are about 3 percentage points less likely to be in part-time employment relative to their slightly older counterparts. In contrast,

Figure B8: Evolution of ST and OE Wages Before and After the Reform (45 notch)

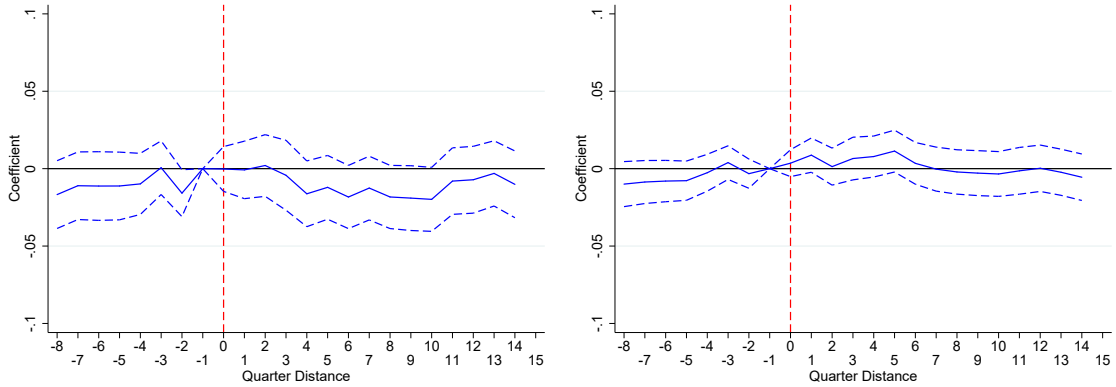
(a) Short-Term 40/46

(b) Short-Term 40/47



(c) Open-Ended 40/46

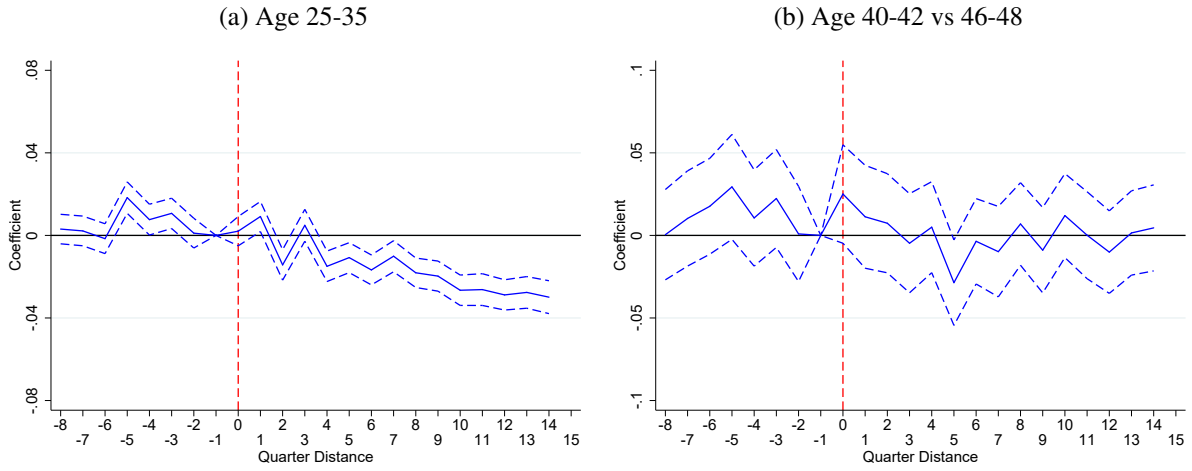
(d) Open-Ended 40/47



Notes: The figure presents event-study estimates of wage dynamics in ST and OE jobs. Panels (a) and (b) compare ST wages on either side of the age-45 notch. Panels (c) and (d) examine OE wages for workers in standard (non-subsidized) OE positions. Control variables include gender, education, citizenship status, disability status, months spent in ST employment between January 1990 and April 1997, and months spent in OE employment over the same period. The specification also includes age-by-gender fixed effects, as well as occupation, sector, and province-by-year fixed effects.

Panel (b) shows no comparable discontinuity around the age-45 notch, indicating no differential change in part-time employment for workers on either side of that threshold.

Figure B9: Impact of the Reform on Part-Time Employment



Notes: The figure presents event-study estimates of the probability of part-time employment. Panel (a) compares workers just below and above the age-30 threshold, while Panel (b) compares those on either side of the age-45 notch. The specification controls for gender, education, citizenship, disability status, months spent in ST employment between January 1990 and April 1997, and months spent in OE employment over the same period. It also includes age-by-gender fixed effects, as well as occupation, sector, and province-by-year fixed effects. Standard errors are clustered at the individual level.

C.12 Assessing the Parallel Trends Assumptions

We assess the sensitivity of our difference-in-differences estimates to potential violations of the parallel trends assumption using the "credible" approach proposed by Rambachan and Roth (2023). Rather than assuming exact parallel trends, this framework allows for smooth deviations in untreated potential outcomes and quantifies how large such deviations would need to be to overturn our conclusions. In particular, we focus on the magnitude of changes in the slope of the differential trend between treated and control groups across consecutive periods that would render the estimated effect statistically indistinguishable from zero.

Table **??** presents the results from the Honest DiD analysis. Because individual event-time coefficients are estimated with limited precision, we focus on the average treatment effect evaluated 16 periods after the policy change. Following Rambachan and Roth (2023), we report the minimum violation of parallel trends required to invalidate the estimate, normalized by the slope of the pre-treatment trend measured eight periods before the policy change.

The estimates for low-cost OE employment and transitions into OE are imprecise, consistent with the lack of statistical significance in the baseline event-study specifications. In contrast, for the other results, the estimated effects remain robust to sizable deviations from parallel trends, indicating that only large changes in the slope of pre-treatment trends would be sufficient to overturn

Table B6: Assessing Parallel Trends

	Slope of linear	M	%
Employment			
OE low-cost	0.00047	0.0000	0.0
OE high-cost	0.00599	0.0010	16.7
OE all	0.00646	0.0025	38.7
Ever OE low-cost	0.00026	0.0005	195.0
Transitions			
ST to Low-Cost OE	0.00123	0.0200	1631.7
ST to OE	0.00450	0.0000	0
Wage Incidence			
Wage	0.00051	0.0010	195.4

our conclusions. Specially, for the Employment results of ever in a low-cost, the transitions into Low-Cost and wage incidence results.

D Robustness for Young Workers

Placebo

Table B7: Effects of Reform on Employment Outcomes (Placebo)

	(1) Open-Ended Low-Cost	(2) Open-Ended (All)	(3) Open-Ended High-Cost	(4) Ever Low-Cost Open-Ended	(5) Short-Term	(6) Open-Ended and Short-Term
				Panel A: 2003 Shock		
$Post \times \%ST_{s,03}$	0.008	0.098	0.090	0.510	-0.246	-0.023
	(0.057)	(0.157)	(0.151)	(0.412)	(0.265)	(0.333)
Observations	46,420	46,420	46,420	46,420	46,420	46,420
				Panel B: 1996 Shock		
$Post \times \%ST_{s,96}$	0.019	0.086	0.068	0.621	0.201	0.208
	(0.059)	(0.169)	(0.147)	(0.542)	(0.251)	(0.330)
Observations	46,420	46,420	46,420	46,420	46,420	46,420
	Short-Term to Open-Ended	Short-Term to Low-Cost OE	Short-Term to High-Cost OE	Low- to High-Cost Open-Ended	Low- to High-Cost Open-Ended (Different Firm)	Low- to High-Cost Open-Ended (Same Firm)
				Panel C: 2003 Shock		
$Post \times \%ST_{s,03}$	0.090	0.015	0.069	-0.144	0.007	-0.151
	(0.602)	(0.303)	(0.434)	(0.240)	(0.021)	(0.227)
Observations	42,723	42,723	42,723	42,723	42,723	42,723
				Panel D: 1996 Shock		
$Post \times \%ST_{s,96}$	0.212	-0.011	0.221	-0.076	0.008	-0.085
	(0.590)	(0.302)	(0.418)	(0.238)	(0.025)	(0.222)
Observations	42,723	42,723	42,723	42,723	42,723	42,723

Notes: This table reports placebo estimates of the policy's impact on sector-level labor market outcomes, assuming the reform was instead implemented in the first quarter of 2004. The analysis follows the difference-in-differences specification in Equation 1, including the controls, sector and time fixed effects. Panel A constructs the exposure measure using the 2003 sectoral ST share, while Panel B uses the 1996 baseline ST share—similar to our main specification—and examines employment outcomes for the 2001–2007 period as a placebo. * significant at the 10% level; ** at the 5% level; *** at the 1% level.

Binary treatment

Table B8: Effects of Reform on Employment Outcomes (Robustness Percentiles dummy)

	(1) Open-Ended Low-Cost	(2) Open-Ended (All)	(3) Open-Ended High-Cost	(4) Ever Low-Cost Open-Ended	(5) Short-Term	(6) Open-Ended and Short-Term
				Panel A: Percentile 75		
$Post \times \%ST^{75}_{s,96}$	0.035*	0.046**	0.080**	0.038*	0.026	0.133*
	(0.020)	(0.020)	(0.032)	(0.022)	(0.041)	(0.071)
Observations	34,091	34,091	34,091	34,091	34,091	34,091
				Panel B: Percentile 90		
$Post \times \%ST^{90}_{s,96}$	0.038	0.067***	0.105***	0.048	-0.027	0.050
	(0.026)	(0.025)	(0.040)	(0.030)	(0.062)	(0.091)
Observations	34,091	34,091	34,091	34,091	34,091	34,091
	Short-Term to Open-Ended	Short-Term to Low-Cost OE	Short-Term to High-Cost OE	Low- to High-Cost Open-Ended	Low- to High-Cost Open-Ended (Different Firm)	Low- to High-Cost Open-Ended (Same Firm)
				Panel C: Percentile 75		
$Post \times \%ST^{75}_{s,96}$	0.581***	0.329***	0.252***	0.037*	0.025	0.012
	(0.132)	(0.107)	(0.095)	(0.019)	(0.017)	(0.008)
Observations	32116	32,116	32,116	32116	32,116	32,116
				Panel D: Percentile 90		
$Post \times \%ST^{90}_{s,96}$	0.330*	0.151	0.180*	0.019	0.014	0.005
	(0.187)	(0.141)	(0.102)	(0.018)	(0.014)	(0.009)
Observations	32,116	32,116	32,116	32116	32,116	32,116

Notes: This table reports the estimated effects of reduced non-wage labor costs on various labor market outcomes. The analysis uses a difference-in-differences specification with sector and time fixed effects, as outlined in Equation 1. Panel A uses an indicator for whether a sector falls above the 75th percentile of our instrument. Panel C apply the same approach using the 90th percentile. * significant at 10%; ** significant at 5%; *** significant at 1%.

Subgroups

Table B9: Effects of Reform on Employment Outcomes (Robustness)

	(1) Open-Ended Low-Cost	(2) Open-Ended High-Cost	(3) Open-Ended (All))	(4) Ever Low-Cost Open-Ended	(5) Short-Term	(6) Open-Ended and Short-Term
			Panel A: Shock Variable 25-30			
$Post \times \%ST_{s,96}$	0.799*	1.259**	2.058***	0.829*	-2.079**	-1.084
	(0.421)	(0.548)	(0.785)	(0.475)	(0.851)	(1.609)
Observations	30,646	30,646	30,646	30,646	30,646	30,646
			Panel B: Shock Variable Male			
$Post \times \%ST_{s,96}$	0.339	0.498**	0.849**	0.398*	-0.793*	-0.478
	(0.216)	(0.215)	(0.369)	(0.240)	(0.419)	(0.739)
Observations	31,112	31,112	31,112	31,112	31,112	31,112
	Short-Term to Open-Ended	Short-Term to Low-Cost OE	Short-Term to High-Cost OE	Low- to High-Cost Open-Ended	Low- to High-Cost Open-Ended (Different Firm)	Low- to High-Cost Open-Ended (Same Firm)
			Panel C: Shock Variable 25-30			
$Post \times \%ST_{s,96}$	1.851	3.515*	-1.650	0.171	0.046	0.126
	(1.937)	(1.833)	(1.119)	(0.295)	(0.070)	(0.256)
Observations	27,215	27,215	27,215	27,215	27,215	27,215
			Panel D: Shock Variable Male			
$Post \times \%ST_{s,96}$	2.225	3.692**	-1.467	3.696**	2.097***	1.599
	(2.869)	(1.626)	(2.562)	(1.528)	(0.746)	(0.988)
Observations	32,280	32,280	32,280	32,280	32,280	32,280

Notes: This table reports the estimated effects of reduced non-wage labor costs on sector-level employment outcomes. The analysis relies on the difference-in-differences specification in Equation 1, including sector and time fixed effects. Panel A presents the baseline estimates. Panel B introduces an alternative exposure measure based on the share of fixed-term contracts among workers aged 25–30 and restricts the outcomes accordingly to this subpopulation. Panel C limits the sample to male workers and the shock variable for that population. * significant at 10%; ** significant at 5%; *** significant at 1%.

Pre-1999 period

Table B10: Effects of Reform on Employment Outcomes (Robustness pre 1999)

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Employment Outcomes					
	Open-Ended Low-Cost	Open-Ended High-Cost	Open-Ended (All))	Ever Low-Cost Open-Ended	Short-Term	Open-Ended and Short-Term
$Post \times \%ST_{s,96}$	0.117*	0.301*	0.418**	0.123*	-0.064	0.129
	(0.069)	(0.166)	(0.198)	(0.068)	(0.320)	(0.424)
Observations	24,355	24,355	24,355	24,355	24,355	24,355
	Panel B: Employment Transitions					
	Short-Term to Open-Ended	Short-Term to Low-Cost OE	Short-Term to High-Cost OE	Low- to High-Cost Open-Ended	Low- to High-Cost Open-Ended (Different Firm)	Low- to High-Cost Open-Ended (Same Firm)
$Post \times \%ST_{s,96}$	1.750***	1.473***	0.273	-0.003	0.064	-0.067
	(0.576)	(0.490)	(0.438)	(0.089)	(0.056)	(0.071)
Observations	22,940	22,940	22,940	22,940	22,940	22,940

Notes: This table presents the estimated effects of reduced non-wage labor costs on sector-level labor market outcomes. Estimates are obtained using the difference-in-differences specification in Equation 1, which includes sector and time fixed effects. The sample is limited to the pre-1999 period to exclude later policy extensions. * significant at 10%; ** significant at 5%; *** significant at 1%.

E Robustness for Adult Workers

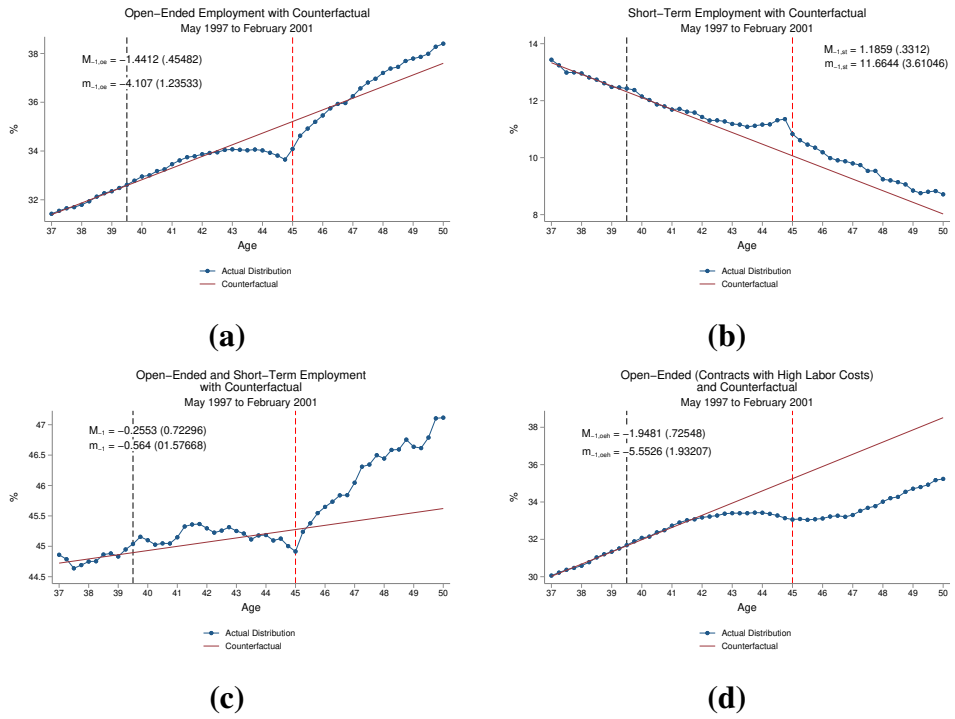
Changing counterfactual bounds

Table B11: Employment Effects for Workers just Before the Labor Costs Notch for Period 1997-2001. Robustness Evidence.

	(1) Open-Ended (OE)	(2) Short-Term (ST)	(3) OE + ST	(4) OE High-Costs
Panel A: Counterfactual based on ages 37-39.5				
Percentage points	-1.441**	1.186***	-0.255	-1.948**
	(0.455)	(0.331)	(0.723)	(0.725)
Percentage	-4.107***	11.66**	-0.564	-5.553**
	(1.235)	(3.610)	(1.577)	(1.932)
Panel B: Counterfactual based on ages 37-40.5				
Percentage points	-1.630***	1.002***	-0.628	-2.071***
	(0.258)	(0.199)	(0.428)	(0.373)
Percentage	-4.620***	9.676***	-1.377	-5.882***
	(0.691)	(2.081)	(0.915)	(0.984)
Panel C: Counterfactual based on ages 36.5-40				
Percentage points	-1.440***	1.209***	-0.231	-1.894***
	(0.230)	(0.167)	(0.352)	(0.359)
Percentage	-4.105***	11.92***	-0.512	-5.406***
	(0.623)	(1.834)	(0.769)	(0.958)
Panel D: Counterfactual based on ages 37.5-40				
Percentage points	-1.698**	0.607	-1.091	-2.216**
	(0.577)	(0.630)	(1.169)	(0.843)
Percentage	-4.803**	5.652	-2.366	-6.269**
	(1.541)	(6.045)	(2.444)	(2.208)

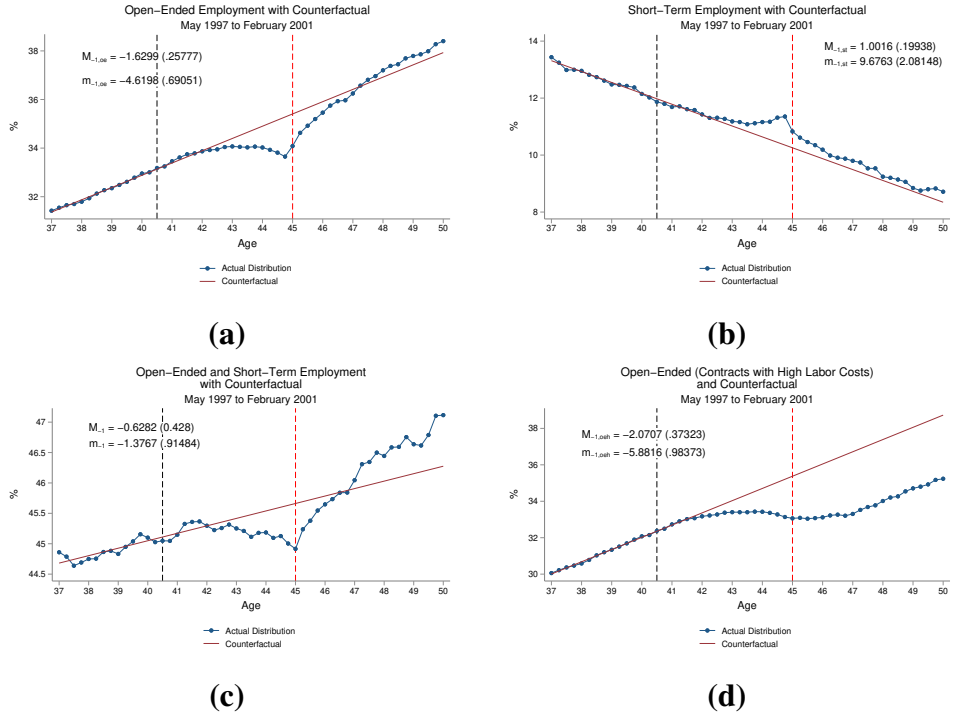
Notes: The table reports employment effects for workers one quarter-bin before the 45th birthday notch for the period between May 1997 and February 2001. Each panel shows robustness results for counterfactuals based on different age groups: 37-39.5 (A), 37-40.5 (B), 36.5-40 (C) and 37.5-40 (D). The first column shows the effect in open-ended employment; the second column displays the impact on short-term employment; the third column reports the effect when combining both open-ended and short-term employment; the fourth column shows the impact on open-ended employment in high-costs contracts. We report results both in percentage points ($\hat{M}_{jk}$) and as a percentage ($\hat{m}_{jk}$). Bootstrapped standard errors are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Figure B10: **Empirical and Counterfactual Distributions (Based on Ages 37-39.5)**



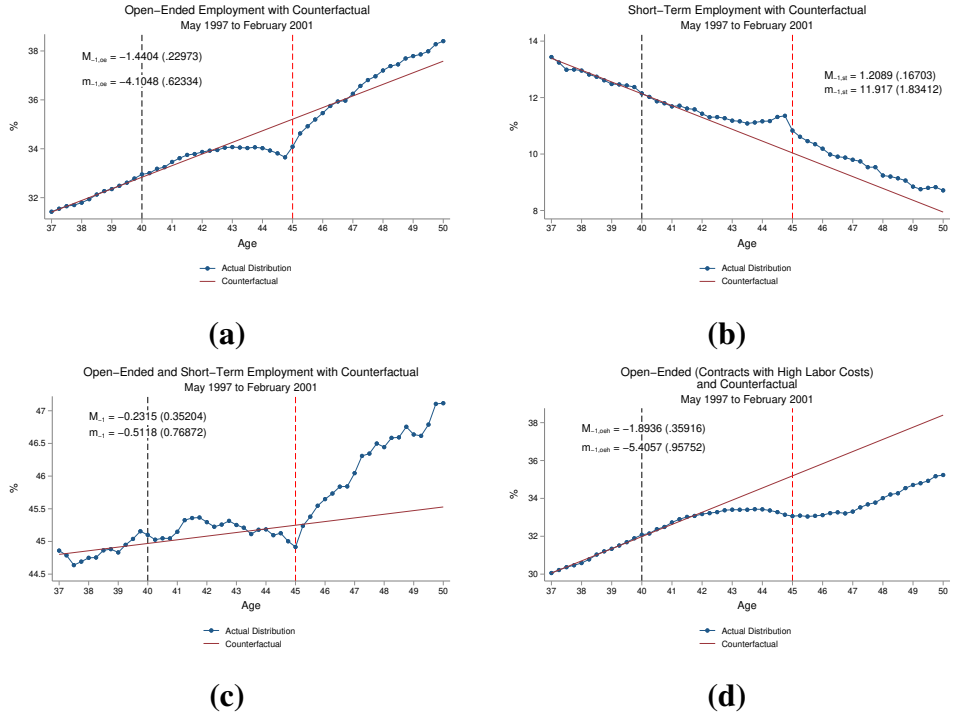
Notes: The figures show the empirical distribution of employment (blue dots) and the respective counterfactual distribution (red solid line). The counterfactual is estimated by fitting a linear polynomial to the empirical distribution in the ages between 37 and 39.5. Panel (a) depicts open-ended employment, panel (b) short-term employment, panel (c) joint open-ended and short-term employment, and panel (d) high-cost open-ended employment. The figures also display the employment measures $M_{j,k}$ and $m_{j,k}$, where $j = -1$ is for workers at most one quarter away from the threshold at 45 and k is each contract type, as explained in section 5.3.1. The black-dashed line shows the last age bin used to build the counterfactual. The red-dashed line represents the labor cost notch.

Figure B11: **Empirical and Counterfactual Distributions (Based on Ages 37-40.5)**



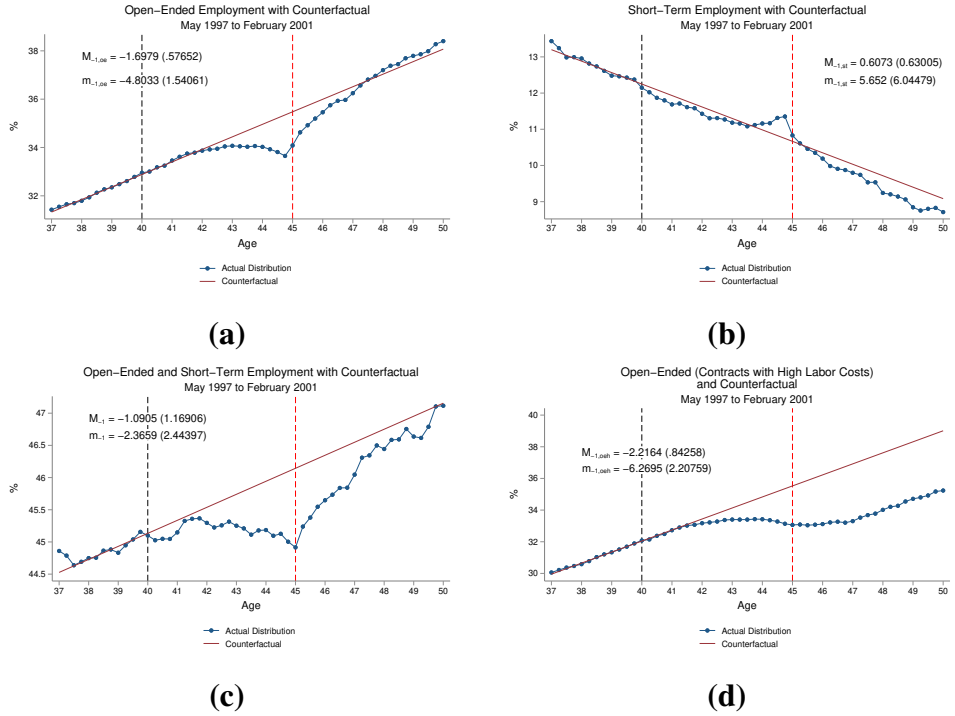
Notes: The figures show the empirical distribution of employment (blue dots) and the respective counterfactual distribution (red solid line). The counterfactual is estimated by fitting a linear polynomial to the empirical distribution in the ages between 37 and 40.5. Panel (a) depicts open-ended employment, panel (b) short-term employment, panel (c) joint open-ended and short-term employment, and panel (d) high-cost open-ended employment. The figures also display the employment measures $M_{j,k}$ and $m_{j,k}$, where $j = -1$ is for workers at most one quarter away from the threshold at 45 and k is each contract type, as explained in section 5.3.1. The black-dashed line shows the last age bin used to build the counterfactual. The red-dashed line represents the labor cost notch.

Figure B12: **Empirical and Counterfactual Distributions (Based on Ages 36.5-40)**



Notes: The figures show the empirical distribution of employment (blue dots) and the respective counterfactual distribution (red solid line). The counterfactual is estimated by fitting a linear polynomial to the empirical distribution in the ages between 36.5 and 40. Panel (a) depicts open-ended employment, panel (b) short-term employment, panel (c) joint open-ended and short-term employment, and panel (d) high-cost open-ended employment. The figures also display the employment measures $M_{j,k}$ and $m_{j,k}$, where $j = -1$ is for workers at most one quarter away from the threshold at 45 and k is each contract type, as explained in section 5.3.1. The black-dashed line shows the last age bin used to build the counterfactual. The red-dashed line represents the labor cost notch.

Figure B13: **Empirical and Counterfactual Distributions (Based on Ages 37.5-40)**



Notes: The figures show the empirical distribution of employment (blue dots) and the respective counterfactual distribution (red solid line). The counterfactual is estimated by fitting a linear polynomial to the empirical distribution in the ages between 37.5 and 40. Panel (a) depicts open-ended employment, panel (b) short-term employment, panel (c) joint open-ended and short-term employment, and panel (d) high-cost open-ended employment. The figures also display the employment measures $M_{j,k}$ and $m_{j,k}$, where $j = -1$ is for workers at most one quarter away from the threshold at 45 and k is each contract type, as explained in section 5.3.1. The black-dashed line shows the last age bin used to build the counterfactual. The red-dashed line represents the labor cost notch.

Different Age Groups, Men and Women, and Before 1999

Table B12: Effects on Transitions and Employment, Short Post Period. Workers 47-48 and 40-41 years old.

	(1)		(2)		(3)		(4)	
Panel A: Transitions to Open-Ended.								
From Short-Term. Same Employer								
	All		Low-Cost		High-Cost			
Above45 x Post	-0.0156	(0.0298)	0.0964***	(0.00971)	-0.112***	(0.0260)		
Observations	463544		463544		463544			
Panel B: Transitions to Open-Ended								
From Short-Term. Any Employer.								
	All		Low-Cost		High-Cost			
Above45 x Post	0.00893	(0.0384)	0.128***	(0.00632)	-0.119***	(0.0347)		
Observations	463544		463544		463544			
Panel C: Transitions from Non-Employment to Open-Ended								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)			
Above45 x Post	0.137**	(0.0455)	0.127***	(0.0190)	0.00951	(0.0369)		
Observations	463544		463544		463544			
Panel D: Employment Variables								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.257	(0.237)	1.149***	(0.0191)	-0.859***	(0.236)	-0.771***	(0.226)
Observations	463544		463544		463544		463544	
Panel E: Hires								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.185*	(0.0854)	0.312***	(0.0232)	-0.128	(0.0724)	-0.139	(0.0769)
Observations	463544		463544		463544		463544	
Panel F: Separations								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.306***	(0.0810)	0.0898***	(0.00481)	0.221**	(0.0756)	-0.100	(0.0887)
Observations	463544		463544		463544		463544	

Notes: The table shows the effects of the lower non-wage labor costs on several labor market variables. *Above*45 is equal to 1 for workers aged 47-48, and 0 for workers aged 40-41. The estimation period includes data from 4 quarters before treatment and 6 after it. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel A focuses on transitions from a short-term contract to an open-ended with the same employer, whereas panel B shows it for any employer. Panel C shows the effects on transitions from non-employment. Panel D reports the results for employment on open-ended and short-term contracts. Panels E and F display the results for transitions in and out of open-ended and short-term contracts, respectively. Standard errors clustered at the worker's age level are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table B13: Effects on Transitions and Employment. Workers 47-48 and 40-41 years old. Men.

	(1)		(2)		(3)		(4)	
Panel A: Transitions to Open-Ended.								
From Short-Term. Same Employer								
	All		Low-Cost		High-Cost			
Above45 x Post	-0.0600	(0.0391)	0.133***	(0.0196)	-0.193***	(0.0344)		
Observations	423225		423225		423225			
Panel B: Transitions to Open-Ended								
From Short-Term. Any Employer.								
	All		Low-Cost		High-Cost			
Above45 x Post	-0.0564	(0.0544)	0.197***	(0.0183)	-0.253***	(0.0477)		
Observations	423225		423225		423225			
Panel C: Transitions from Non-Employment to Open-Ended								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)			
Above45 x Post	0.121**	(0.0471)	0.172***	(0.0151)	-0.0503	(0.0407)		
Observations	423225		423225		423225			
Panel D: Employment Variables								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.471	(0.256)	2.483***	(0.0381)	-1.968***	(0.250)	-1.192***	(0.176)
Observations	423225		423225		423225		423225	
Panel E: Hires								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.210	(0.127)	0.464***	(0.0190)	-0.255*	(0.116)	-0.118	(0.0793)
Observations	423225		423225		423225		423225	
Panel F: Separations								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.282*	(0.140)	0.247***	(0.0102)	0.0436	(0.132)	-0.129	(0.0967)
Observations	423225		423225		423225		423225	

Notes: The table shows the effects of the lower non-wage labor costs on several labor market variables for men. *Above*45 is equal to 1 for workers aged 47-48, and 0 for workers aged 40-41. The estimation period includes data from 4 quarters before treatment and 12 after it. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel A focuses on transitions from a short-term contract to an open-ended with the same employer, whereas panel B shows it for any employer. Panel C shows the effects on transitions from non-employment. Panel D reports the results for employment on open-ended and short-term contracts. Panels E and F display the results for transitions in and out of open-ended and short-term contracts, respectively. Standard errors clustered at the worker's age level are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table B14: Effects on Transitions and Employment. Workers 47-48 and 40-41 years old. Women.

	(1)		(2)		(3)		(4)	
Panel A: Transitions to Open-Ended.								
	From Short-Term. Same Employer							
	All		Low-Cost		High-Cost			
Above45 x Post	0.0204	(0.0235)	0.0946***	(0.0201)	-0.0741**	(0.0275)		
Observations	327794		327794		327794			
Panel B: Transitions to Open-Ended								
	From Short-Term. Any Employer.							
	All		Low-Cost		High-Cost			
Above45 x Post	0.0457	(0.0449)	0.122***	(0.0143)	-0.0752	(0.0440)		
Observations	327794		327794		327794			
Panel C: Transitions from Non-Employment to Open-Ended								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)			
Above45 x Post	0.105	(0.0793)	0.132***	(0.0103)	-0.0268	(0.0721)		
Observations	327794		327794		327794			
Panel D: Employment Variables								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.301	(0.198)	1.382***	(0.0597)	-1.066***	(0.218)	-0.524*	(0.230)
Observations	327794		327794		327794		327794	
Panel E: Hires								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.223**	(0.0816)	0.284***	(0.0157)	-0.0607	(0.0716)	-0.0444	(0.0735)
Observations	327794		327794		327794		327794	
Panel F: Separations								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.516***	(0.108)	0.0949***	(0.00901)	0.424***	(0.110)	-0.0597	(0.0668)
Observations	327794		327794		327794		327794	

Notes: The table shows the effects of the lower non-wage labor costs on several labor market variables for women. *Above*45 is equal to 1 for workers aged 47-48, and 0 for workers aged 40-41. The estimation period includes data from 4 quarters before treatment and 12 after it. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel A focuses on transitions from a short-term contract to an open-ended with the same employer, whereas panel B shows it for any employer. Panel C shows the effects on transitions from non-employment. Panel D reports the results for employment on open-ended and short-term contracts. Panels E and F display the results for transitions in and out of open-ended and short-term contracts, respectively. Standard errors clustered at the worker's age level are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table B15: Effects on Transitions and Employment. Workers 48-49 and 40-41 years old.

	(1)		(2)		(3)		(4)	
Panel A: Transitions to Open-Ended.								
	From Short-Term. Same Employer							
	All		Low-Cost		High-Cost			
Above45 x Post	-0.0143	(0.0213)	0.110***	(0.00706)	-0.125***	(0.0177)		
Observations	747288		747288		747288			
Panel B: Transitions to Open-Ended								
	From Short-Term. Any Employer.						From Non-Employment	
	All		Low-Cost		High-Cost			
Above45 x Post	0.0146	(0.0256)	0.157***	(0.00523)	-0.142***	(0.0241)		
Observations	747288		747288		747288			
Panel C: Transitions from Non-Employment to Open-Ended								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)			
Above45 x Post	0.0819	(0.0526)	0.144***	(0.00706)	-0.0618	(0.0469)		
Observations	747288		747288		747288			
Panel D: Employment Variables								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.392	(0.217)	2.006***	(0.0231)	-1.578***	(0.222)	-1.451***	(0.101)
Observations	747288		747288		747288		747288	
Panel E: Hires								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.171**	(0.0733)	0.366***	(0.0127)	-0.195**	(0.0651)	-0.115***	(0.0169)
Observations	747288		747288		747288		747288	
Panel F: Separations								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.294***	(0.0751)	0.192***	(0.0136)	0.106	(0.0690)	-0.269***	(0.0633)
Observations	747288		747288		747288		747288	

Notes: The table shows the effects of the lower non-wage labor costs on several labor market variables. *Above*45 is equal to 1 for workers aged 48-49, and 0 for workers aged 40-41. The estimation period includes data from 4 quarters before treatment and 12 after it. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel A focuses on transitions from a short-term contract to an open-ended with the same employer, whereas panel B shows it for any employer. Panel C shows the effects on transitions from non-employment. Panel D reports the results for employment on open-ended and short-term contracts. Panels E and F display the results for transitions in and out of open-ended and short-term contracts, respectively. Standard errors clustered at the worker's age level are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table B16: Effects on Transitions and Employment. Workers 48-49 and 41-42 years old.

	(1)		(2)		(3)		(4)	
Panel A: Transitions to Open-Ended.								
	From Short-Term. Same Employer							
	All		Low-Cost		High-Cost			
Above45 x Post	-0.0599**	(0.0204)	0.101***	(0.00762)	-0.161***	(0.0197)		
Observations	584581		584581		584581			
Panel B: Transitions to Open-Ended								
	From Short-Term. Any Employer.						From Non-	
	All		Low-Cost		High-Cost		Employment	
Above45 x Post	-0.0478*	(0.0228)	0.149***	(0.00571)	-0.196***	(0.0221)		
Observations	584581		584581		584581			
Panel C: Transitions from Non-Employment to Open-Ended								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)			
Above45 x Post	0.0591	(0.0500)	0.138***	(0.00692)	-0.0794	(0.0447)		
Observations	584581		584581		584581			
Panel D: Employment Variables								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	-0.0329	(0.153)	2.058***	(0.0217)	-2.060***	(0.140)	-1.267***	(0.0595)
Observations	584581		584581		584581		584581	
Panel E: Hires								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.0880	(0.0589)	0.350***	(0.0128)	-0.262***	(0.0510)	-0.0146	(0.0410)
Observations	584581		584581		584581		584581	
Panel F: Separations								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.223	(0.122)	0.179***	(0.0105)	0.0479	(0.119)	-0.0644	(0.0490)
Observations	584581		584581		584581		584581	

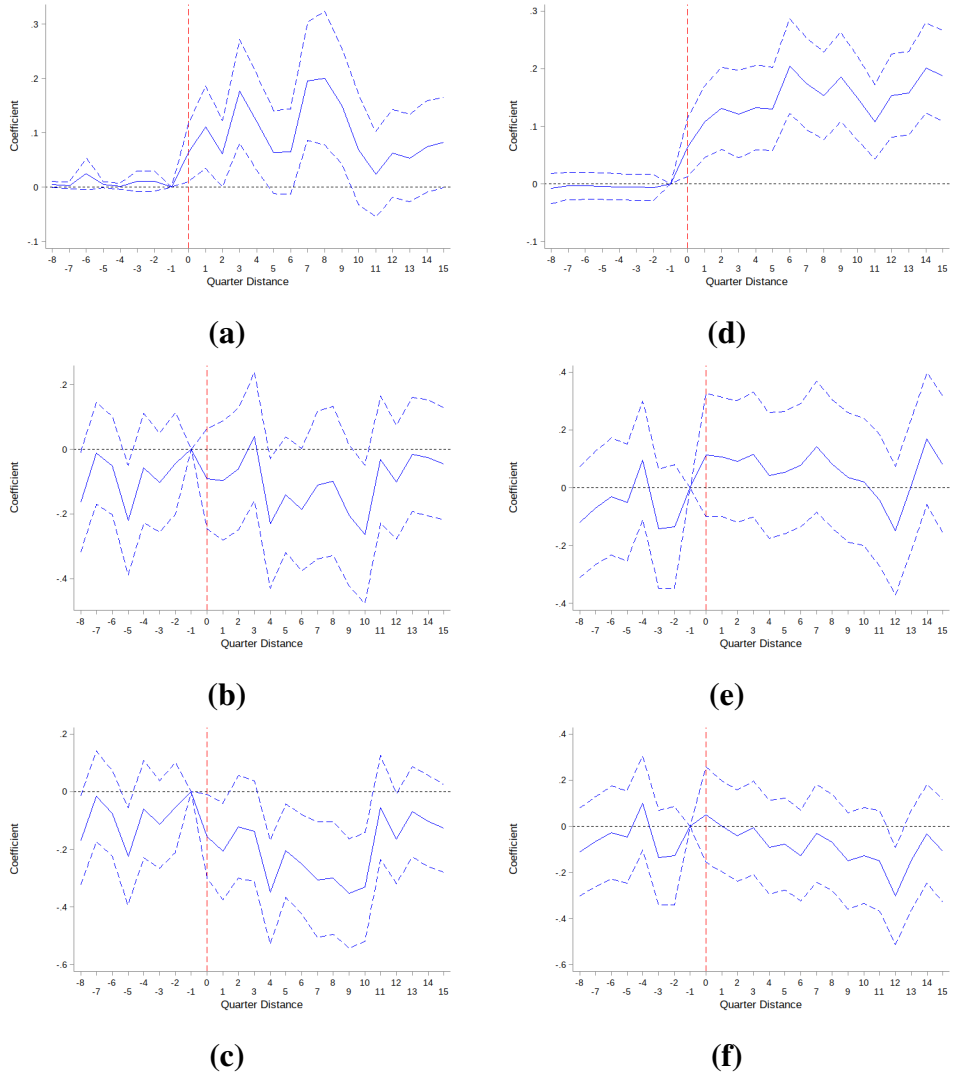
Notes: The table shows the effects of the lower non-wage labor costs on several labor market variables. *Above*45 is equal to 1 for workers aged 48-49, and 0 for workers aged 41-42. The estimation period includes data from 4 quarters before treatment and 12 after it. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel A focuses on transitions from a short-term contract to an open-ended with the same employer, whereas panel B shows it for any employer. Panel C shows the effects on transitions from non-employment. Panel D reports the results for employment on open-ended and short-term contracts. Panels E and F display the results for transitions in and out of open-ended and short-term contracts, respectively. Standard errors clustered at the worker's age level are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table B17: Effects on Transitions and Employment. Workers 47-48 and 41-42 years old.

	(1)		(2)		(3)		(4)	
Panel A: Transitions to Open-Ended.								
	From Short-Term. Same Employer							
	All		Low-Cost		High-Cost			
Above45 x Post	-0.0673**	(0.0240)	0.109***	(0.0101)	-0.176***	(0.0239)		
Observations	588228		588228		588228			
Panel B: Transitions to Open-Ended								
	From Short-Term. Any Employer.						From Non-	
	All		Low-Cost		High-Cost		Employment	
Above45 x Post	-0.0698*	(0.0302)	0.158***	(0.00727)	-0.228***	(0.0277)		
Observations	588228		588228		588228			
Panel C: Transitions from Non-Employment to Open-Ended								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)			
Above45 x Post	0.0914*	(0.0412)	0.150***	(0.0126)	-0.0591	(0.0318)		
Observations	588228		588228		588228			
Panel D: Employment Variables								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	-0.193	(0.157)	2.076***	(0.0435)	-2.242***	(0.144)	-0.582**	(0.172)
Observations	588228		588228		588228		588228	
Panel E: Hires								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.142*	(0.0723)	0.376***	(0.0138)	-0.234***	(0.0632)	0.0140	(0.0647)
Observations	588228		588228		588228		588228	
Panel F: Separations								
	Open-Ended		Open-Ended (Low-Costs)		Open-Ended (High-Costs)		Short-Term	
Above45 x Post	0.302**	(0.121)	0.169***	(0.00360)	0.138	(0.118)	0.115	(0.0630)
Observations	588228		588228		588228		588228	

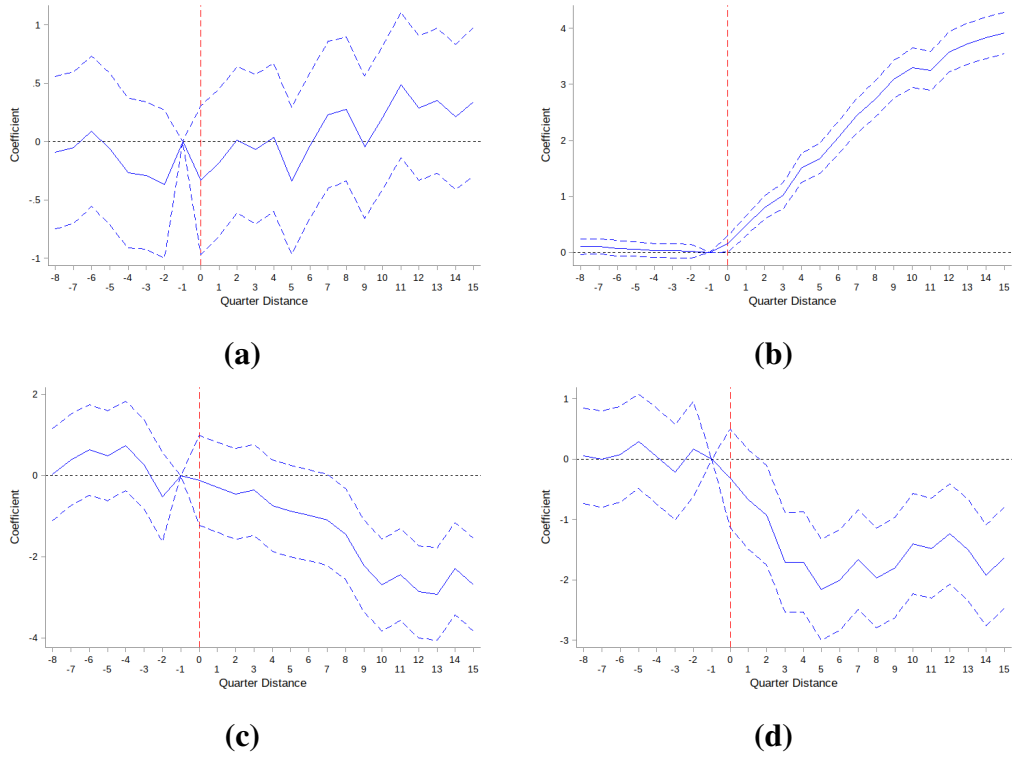
Notes: The table shows the effects of the lower non-wage labor costs on several labor market variables. *Above*45 is equal to 1 for workers aged 47-48, and 0 for workers aged 41-42. The estimation period includes data from 4 quarters before treatment and 12 after it. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel A focuses on transitions from a short-term contract to an open-ended with the same employer, whereas panel B shows it for any employer. Panel C shows the effects on transitions from non-employment. Panel D reports the results for employment on open-ended and short-term contracts. Panels E and F display the results for transitions in and out of open-ended and short-term contracts, respectively. Standard errors clustered at the worker's age level are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Figure B14: **Marginal Open-Ended Jobs, Event Studies, 40-41 and 48-49**



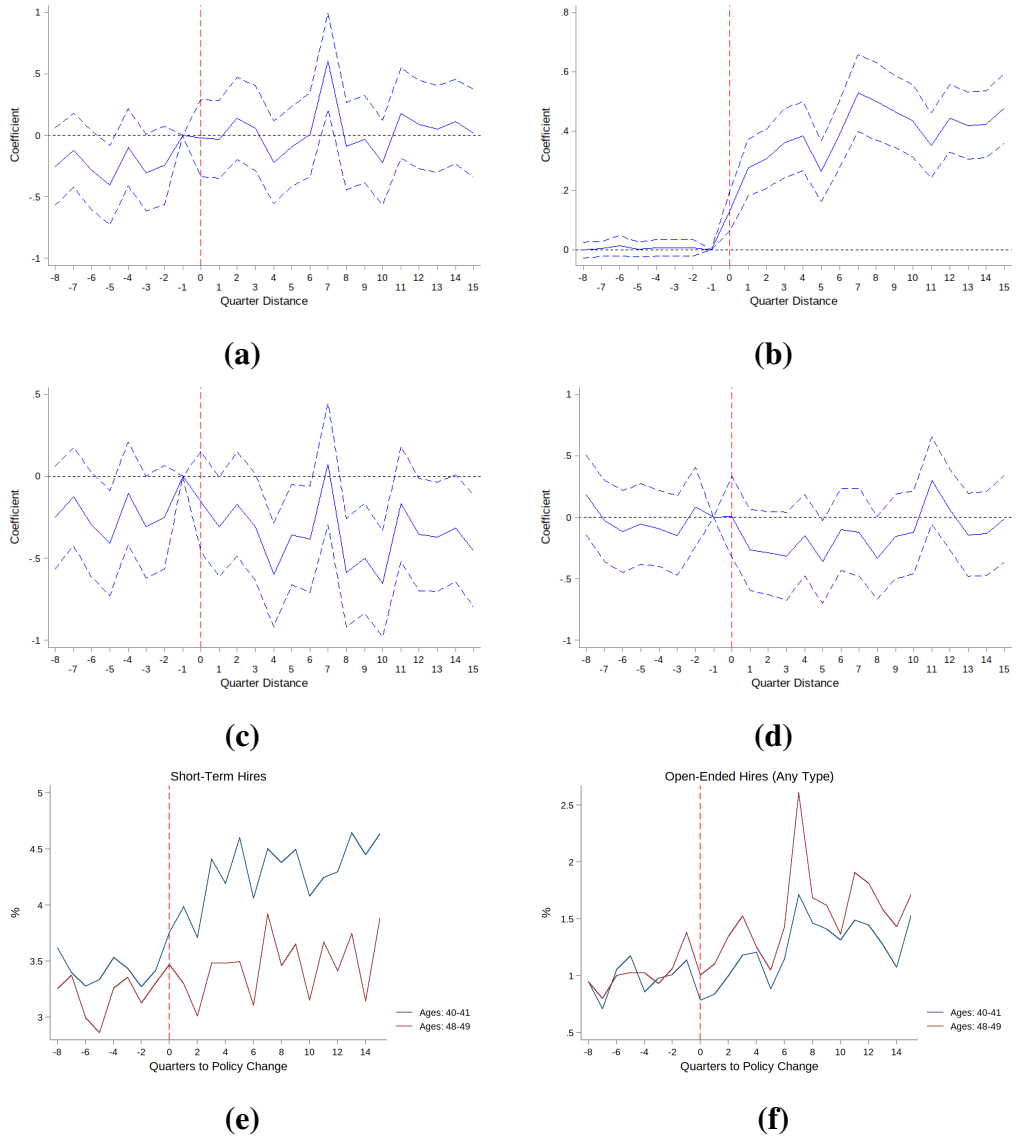
Notes: The figure shows the event-studies that analyze the effect on marginal open-ended jobs. The specification is Equation 9. The blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panels (a), (b) and (c) display short-term conversions with the same employer: towards a low-cost open-ended contract (a), towards any type of open-ended contract (b), and towards high-cost open-ended contracts (c). Panels (d), (e) and (f) depict transitions from non-employment to low-cost open-ended contracts (d), towards any type of open-ended contract (e), and towards high-cost open-ended contracts (f). The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

Figure B15: **Employment Event Studies, 40-41 and 48-49**



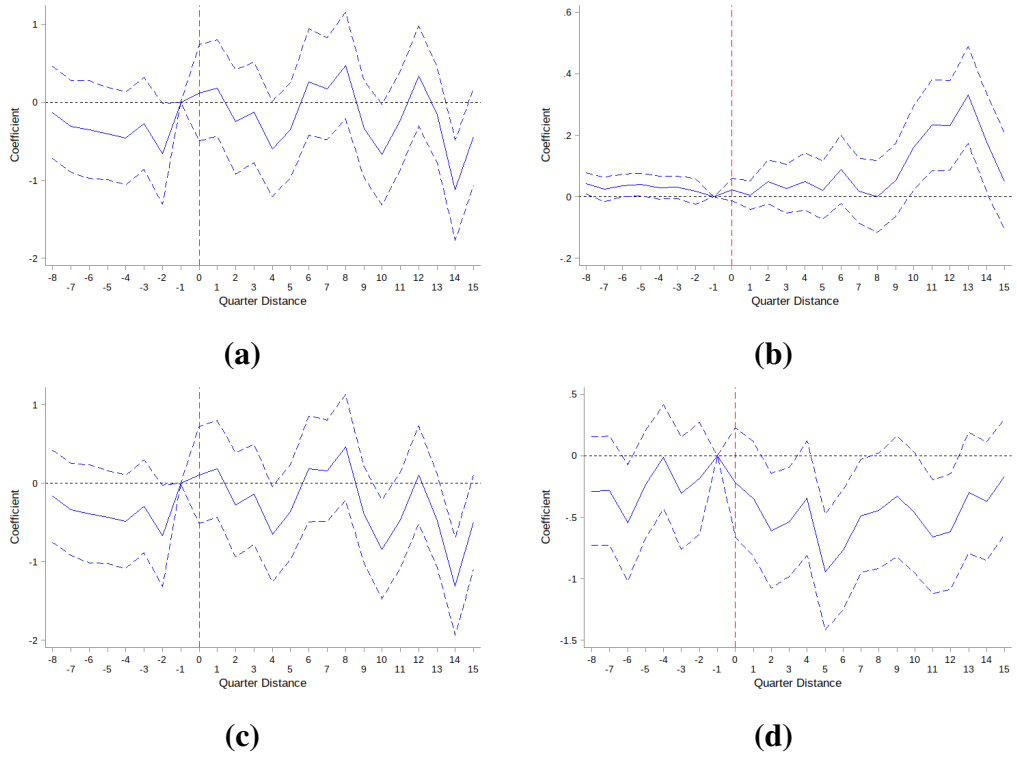
Notes: The figure shows the event-studies that analyze the employment effects. The specification is Equation 9. In panels (a)-(d), the blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel (a) depicts the results for open-ended employment, panel (b) for open-ended employment in low-cost contracts, panel (c) for open-ended employment in high-cost contracts, and panel (d) for short-term employment. The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

Figure B16: **Hiring Event Studies, 40-41 and 48-49**



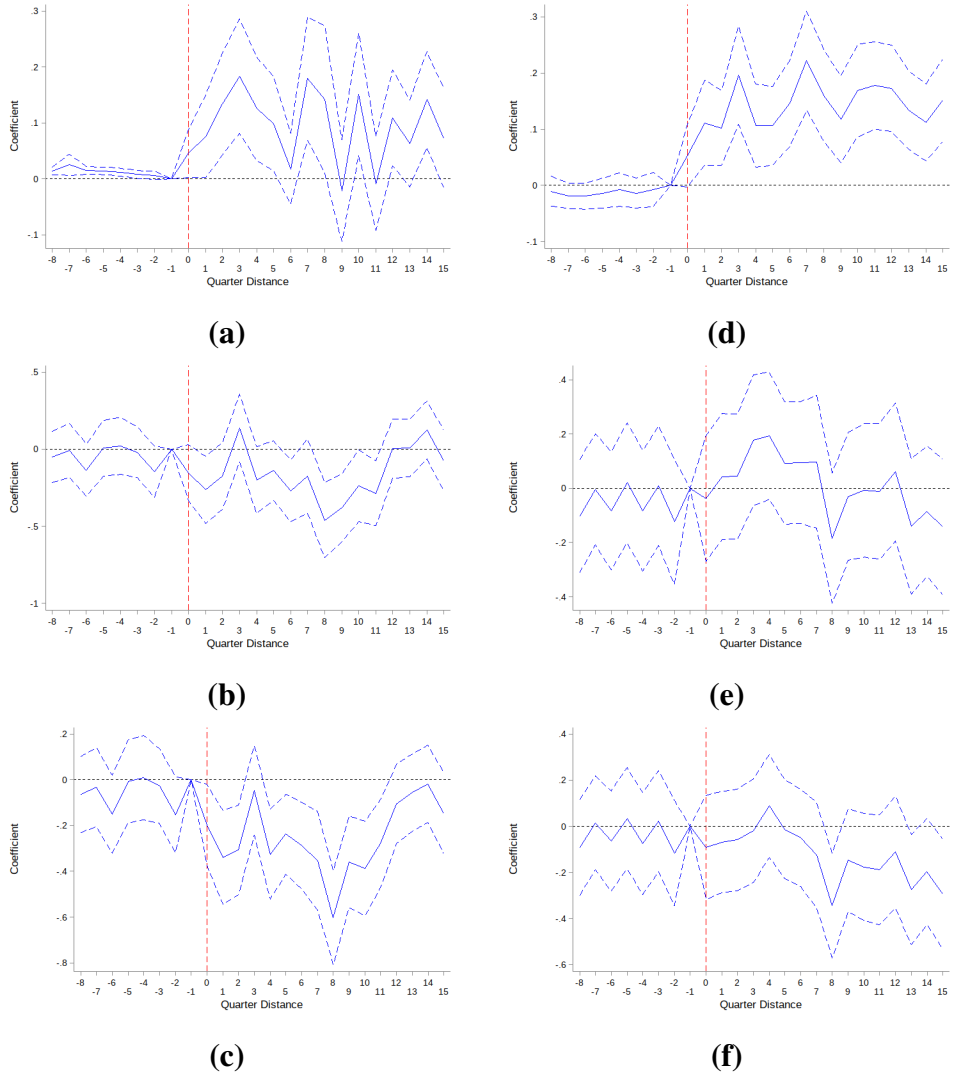
Notes: The figure shows the event-studies that analyze the effects on hires. The specification is Equation 9. In panels (a)-(d), the blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel (a) depicts the results for entries into open-ended contracts, panel (b) for entries into open-ended low-cost contracts, panel (c) for entries into open-ended high-cost contracts, and panel (d) for entries into short-term contracts. Panel (e) shows the raw time-series for short-term hires. In this case, the red solid line represents workers aged 48-49 and the blue line workers aged 40-41, and the dashed lines display the pre-treatment trends for both groups. Panel (f) shows the raw time-series for open-ended hires. The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

Figure B17: **Separation Event Studies, 40-41 and 48-49**



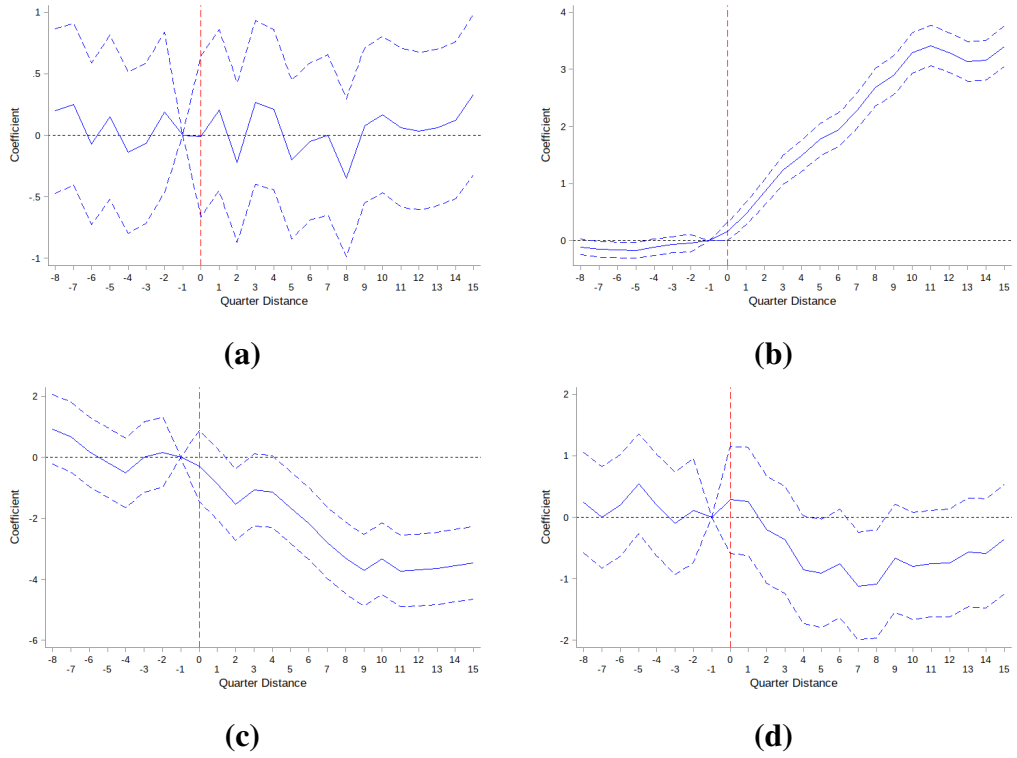
Notes: The figure shows the event-studies that analyze the effects on separations. The specification is Equation 9. The blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel (a) depicts the results for exits from open-ended contracts, panel (b) for exits from open-ended low-cost contracts, panel (c) for exits from open-ended high-cost contracts, and panel (d) for exits from short-term contracts. The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

Figure B18: **Marginal Open-Ended Jobs, Event Studies, 41-42 and 47-48**



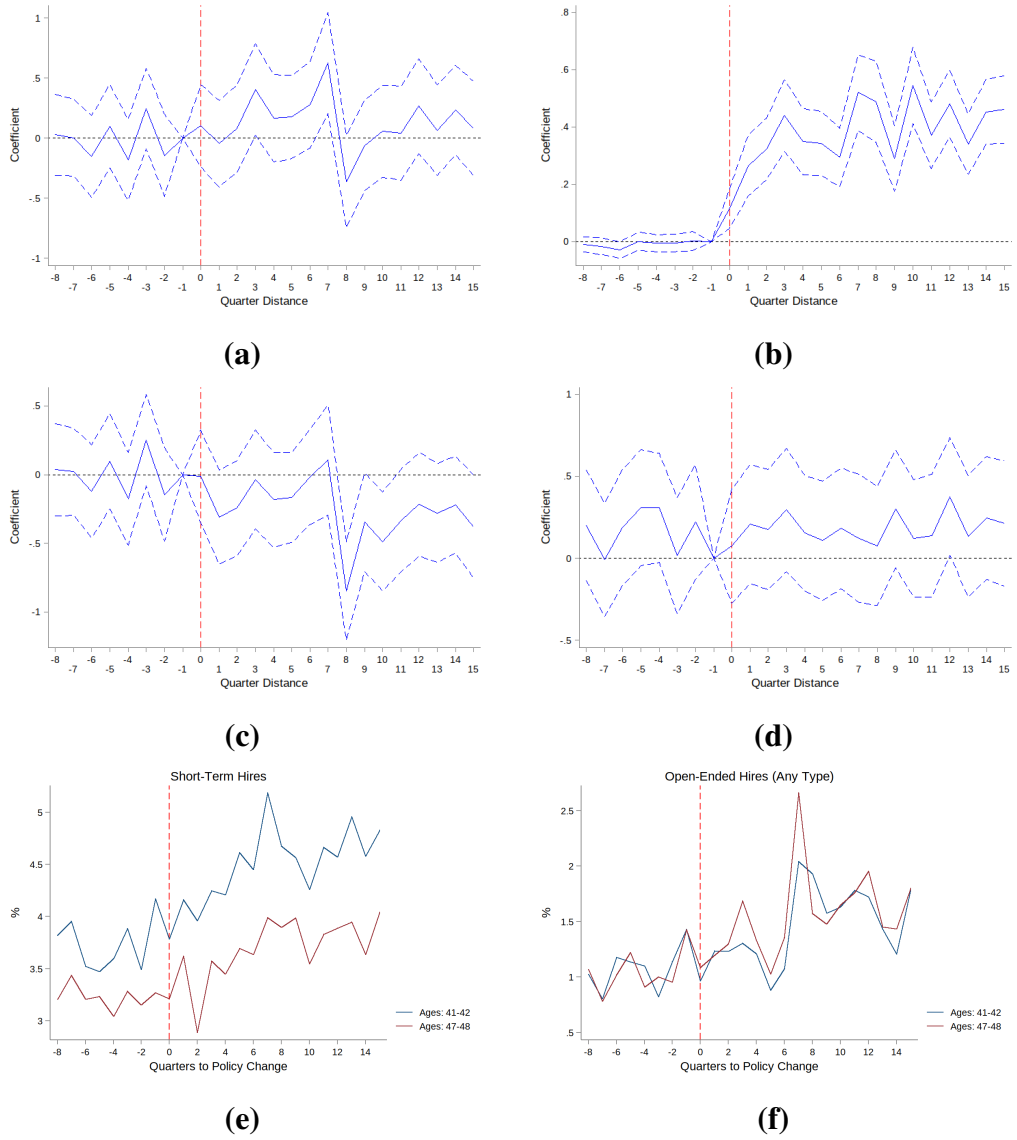
Notes: The figure shows the event-studies that analyze the effect on marginal open-ended jobs. The specification is Equation 9. The blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panels (a), (b) and (c) display short-term conversions with the same employer: towards a low-cost open-ended contract (a), towards any type of open-ended contract (b), and towards high-cost open-ended contracts (c). Panels (d), (e) and (f) depict transitions from non-employment to low-cost open-ended contracts (d), towards any type of open-ended contract (e), and towards high-cost open-ended contracts (f). The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

Figure B19: **Employment Event Studies, 41-42 and 47-48**



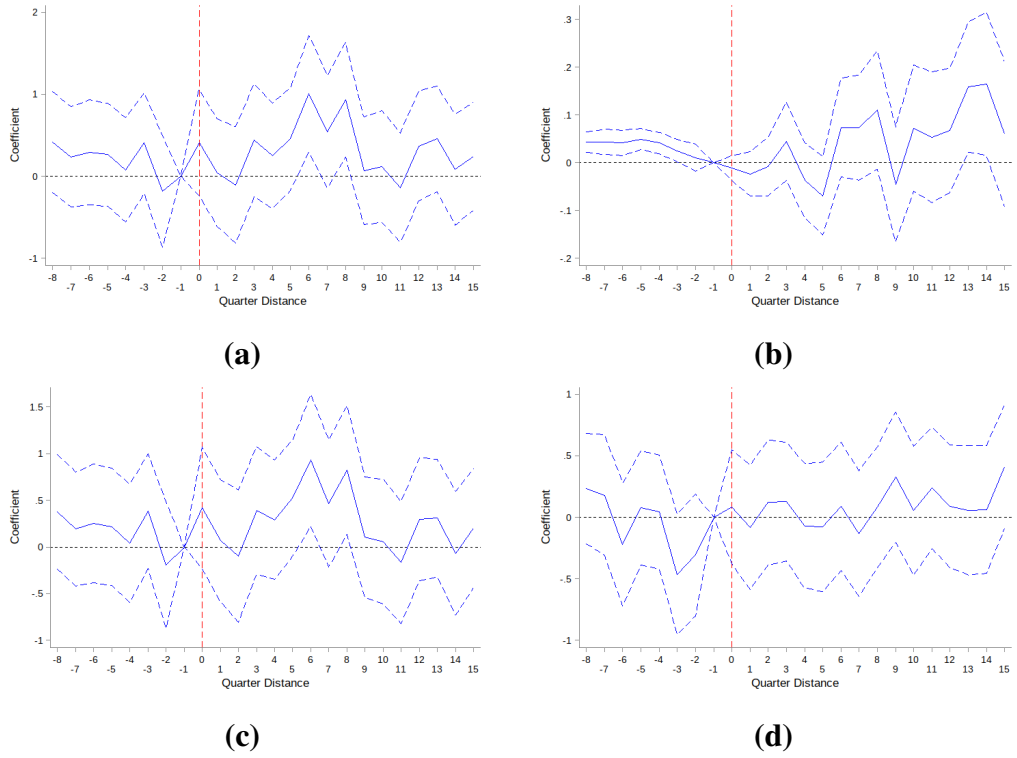
Notes: The figure shows the event-studies that analyze the employment effects. The specification is Equation 9. In panels (a)-(d), the blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel (a) depicts the results for open-ended employment, panel (b) for open-ended employment in low-cost contracts, panel (c) for open-ended employment in high-cost contracts, and panel (d) for short-term employment. The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

Figure B20: **Hiring Event Studies, 41-42 and 47-48**



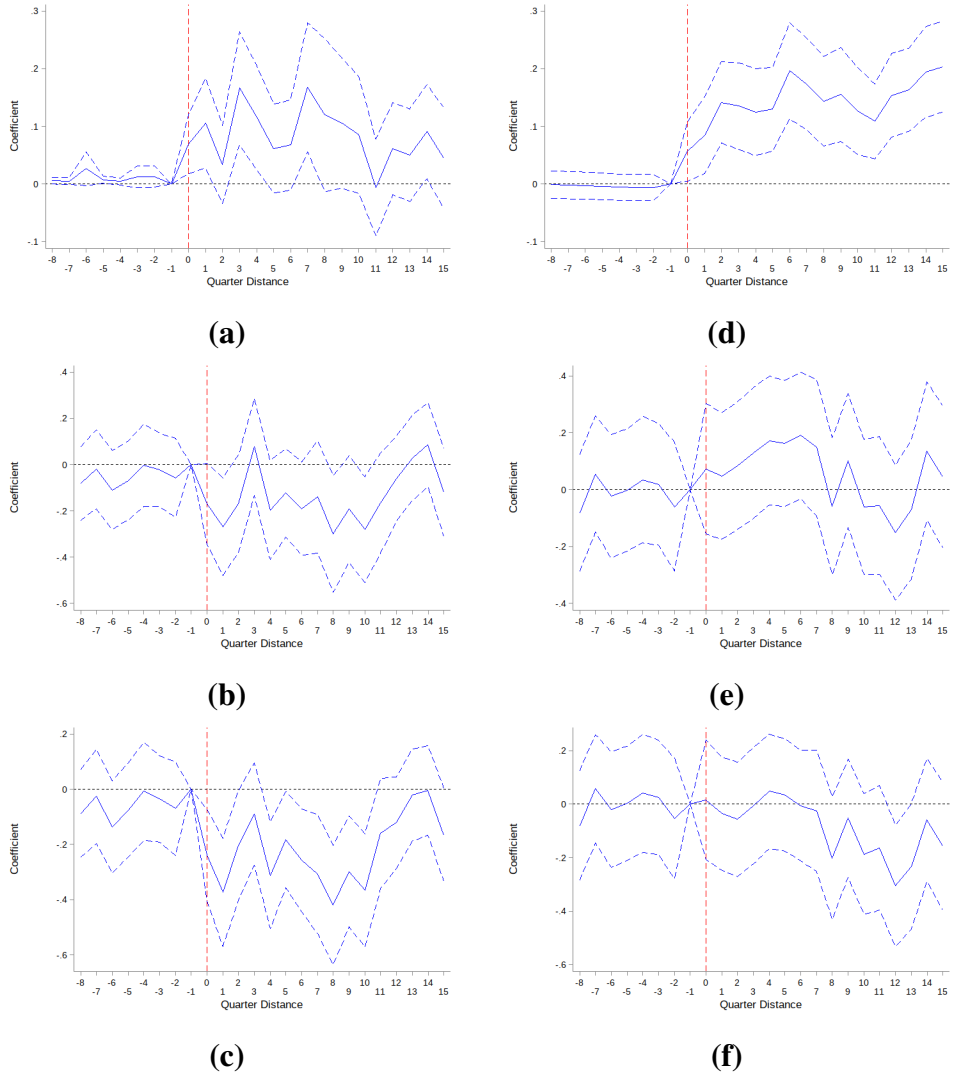
Notes: The figure shows the event-studies that analyze the effects on hires. The specification is Equation 9. In panels (a)-(d), the blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel (a) depicts the results for entries into open-ended contracts, panel (b) for entries into open-ended low-cost contracts, panel (c) for entries into open-ended high-cost contracts, and panel (d) for entries into short-term contracts. Panel (e) shows the raw time-series for short-term hires. In this case, the red solid line represents workers aged 47-48 and the blue line workers aged 41-42, and the dashed lines display the pre-treatment trends for both groups. Panel (f) shows the raw time-series for open-ended hires. The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

Figure B21: **Separation Event Studies, 41-42 and 47-48**



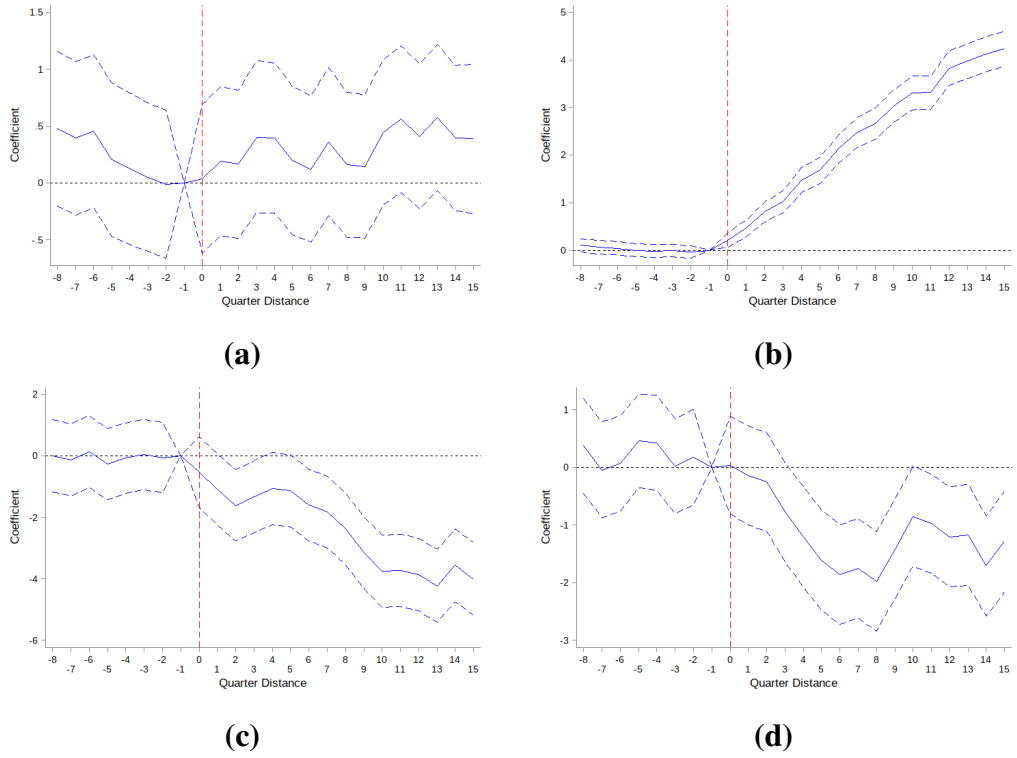
Notes: The figure shows the event-studies that analyze the effects on separations. The specification is Equation 9. The blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel (a) depicts the results for exits from open-ended contracts, panel (b) for exits from open-ended low-cost contracts, panel (c) for exits from open-ended high-cost contracts, and panel (d) for exits from short-term contracts. The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

Figure B22: **Marginal Open-Ended Jobs, Event Studies, 41-42 and 48-49**



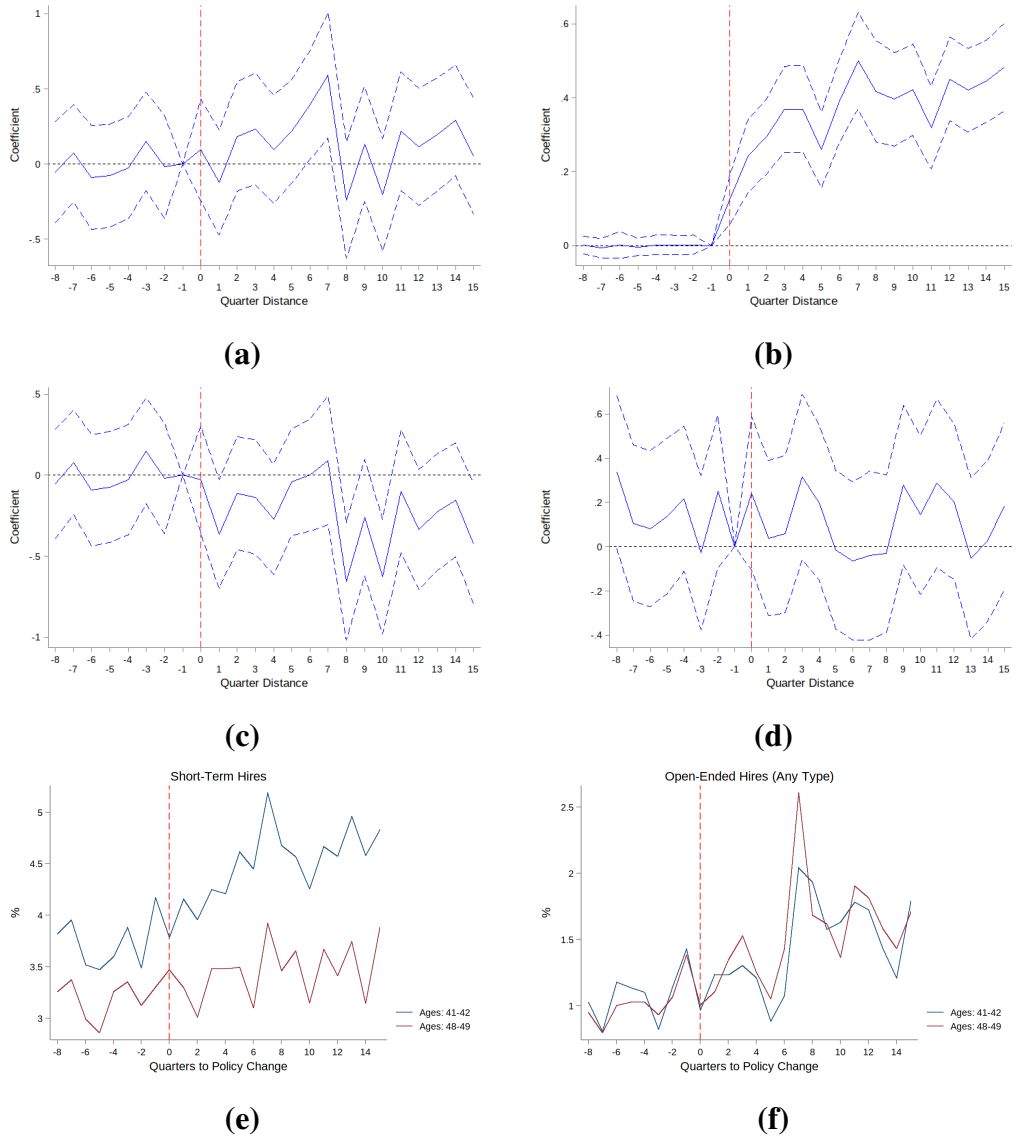
Notes: The figure shows the event-studies that analyze the effect on marginal open-ended jobs. The specification is Equation 9. The blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panels (a), (b) and (c) display short-term conversions with the same employer: towards a low-cost open-ended contract (a), towards any type of open-ended contract (b), and towards high-cost open-ended contracts (c). Panels (d), (e) and (f) depict transitions from non-employment to low-cost open-ended contracts (d), towards any type of open-ended contract (e), and towards high-cost open-ended contracts (f). The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

Figure B23: **Employment Event Studies, 41-42 and 48-49**



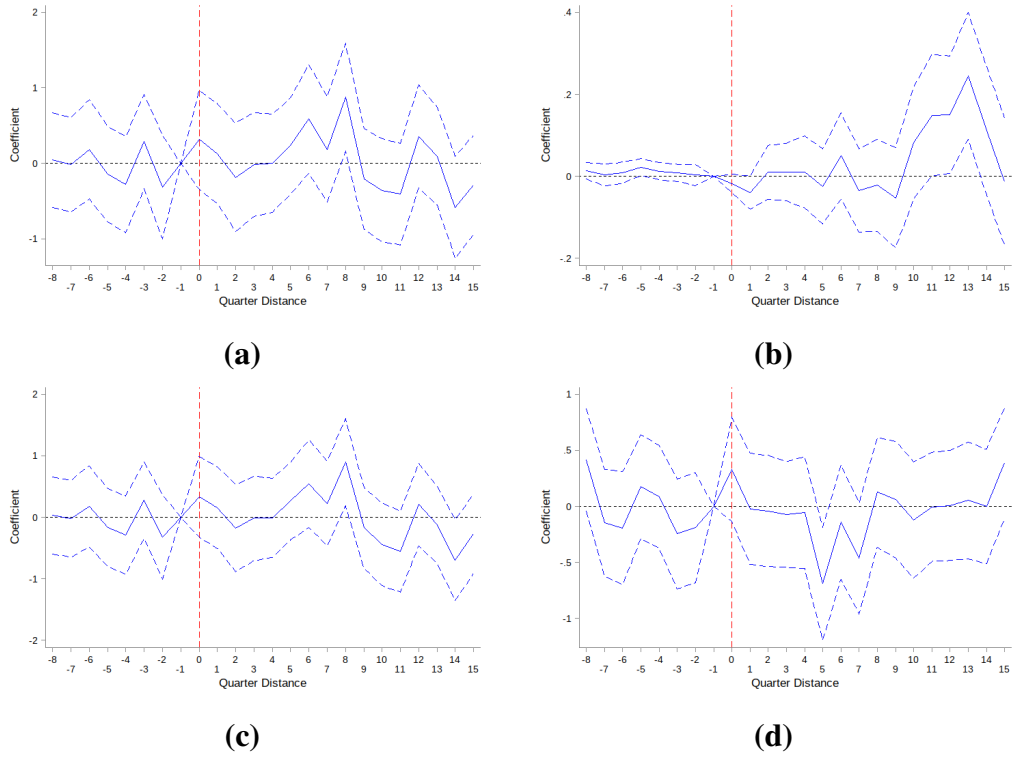
Notes: The figure shows the event-studies that analyze the employment effects. The specification is Equation 9. In panels (a)-(d), the blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel (a) depicts the results for open-ended employment, panel (b) for open-ended employment in low-cost contracts, panel (c) for open-ended employment in high-cost contracts, and panel (d) for short-term employment. The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

Figure B24: **Hiring Event Studies, 41-42 and 48-49**



Notes: The figure shows the event-studies that analyze the effects on hires. The specification is Equation 9. In panels (a)-(d), the blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel (a) depicts the results for entries into open-ended contracts, panel (b) for entries into open-ended low-cost contracts, panel (c) for entries into open-ended high-cost contracts, and panel (d) for entries into short-term contracts. Panel (e) shows the raw time-series for short-term hires. In this case, the red solid line represents workers aged 48-49 and the blue line workers aged 41-42, and the dashed lines display the pre-treatment trends for both groups. Panel (f) shows the raw time-series for open-ended hires. The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

Figure B25: **Separation Event Studies, 41-42 and 48-49**



Notes: The figure shows the event-studies that analyze the effects on separations. The specification is Equation 9. The blue solid lines are the coefficient estimates and the blue-dashed lines 95% confidence intervals. The estimates have been multiplied by 100 so that they can be interpreted as percentage points. Panel (a) depicts the results for exits from open-ended contracts, panel (b) for exits from open-ended low-cost contracts, panel (c) for exits from open-ended high-cost contracts, and panel (d) for exits from short-term contracts. The vertical red-dashed line depicts the quarter when eligibility for payroll tax cuts was expanded and severance payments lowered, in particular for workers older than 45.

F Robustness for Wage Incidence

Table B18: Wage Incidence (Male)

	(1)	(2)	(3)	(4)	(5)
	Log Daily Wage				
Panel A: Transition from ST to OE and Stay at Same Firm (30 years old)					
Treatment x Post	-0.005	0.040***	0.040***	0.034***	0.033***
	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)
Observations	46,771	46,771	46,771	46,771	46,771
Panel B: All Transitions from ST to OE (30 years old)					
Treatment x Post	-0.002	0.040***	0.038***	0.035***	0.034***
	(0.010)	(0.009)	(0.008)	(0.008)	(0.008)
Observations	79,985	79,985	79,985	79,985	79,985
Panel C: Transition from ST to OE and Stay at Same Firm (45 years old)					
Treatment x Post	0.045**	0.067***	0.067***	0.069***	0.056***
	(0.022)	(0.020)	(0.020)	(0.021)	(0.017)
Observations	31,611	31,611	31,611	31,611	31,611
Panel D: All Transitions from ST to OE (45 years old)					
Treatment x Post	0.022	0.050***	0.049***	0.050***	0.045***
	(0.016)	(0.014)	(0.014)	(0.014)	(0.013)
Observations	50,348	50,348	50,348	50,348	50,348
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	Yes	Yes
Province Unemployment	No	Yes	Yes	Yes	Yes
Sector Controls	No	No	Yes	Yes	Yes
Firm Size	No	No	No	Yes	Yes
Other Firm Controls	No	No	No	No	Yes

Notes: The table shows the wage effects of the reform. The specification is a difference-in-differences, as in Equation 11. We focus on workers who transition from an ST contract to an OE contract, either low- or high-cost. We analyze 18-to 30-year-old workers (Panels A and B) and 45-to 55-year-old workers (Panels C and D). Panels A and C are for a sample of people continuously employed with the same employer after the transition. Panels B and D are for all workers, regardless of whether they lose or change jobs in the post period. Columns 2 to 5 include interactions of quarter dummies with controls for the sector, firm's size, company's age, firm's legal status, gender, education, disability status, citizenship status, part-time work, dummies for the worker's age, the number of months worked in ST contracts the 7 years before the reform, the number of months worked in OE contracts the 7 years before the reform, and the unemployment rate at the province level. Each column controls for a different subset of these variables, as specified at the bottom of the table. Robust standard errors clustered at the individual level are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table B19: Wage Incidence (Female)

	(1)	(2)	(3)	(4)	(5)
	Log Daily Wage				
Panel A: Transition from ST to OE and Stay at Same Firm (30 years old)					
Treatment x Post	0.029*	0.057***	0.057***	0.049***	0.046***
	(0.016)	(0.016)	(0.015)	(0.015)	(0.015)
Observations	30,597	30,597	30,597	30,597	30,597
Panel B: All Transitions from ST to OE (30 years old)					
Treatment x Post	0.007	0.035***	0.034***	0.027**	0.024**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Observations	51,775	51,775	51,775	51,775	51,775
Panel C: Transition from ST to OE and Stay at Same Firm (45 years old)					
Treatment x Post	0.004	0.061***	0.060**	0.058**	0.054**
	(0.025)	(0.023)	(0.023)	(0.023)	(0.024)
Observations	15,509	15,509	15,509	15,509	15,509
Panel D: All Transitions from ST to OE (45 years old)					
Treatment x Post	-0.001	0.036*	0.035*	0.036*	0.032*
	(0.020)	(0.019)	(0.019)	(0.020)	(0.020)
Observations	25,424	25,424	25,424	25,424	25,424
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	Yes	Yes
Province Unemployment	No	Yes	Yes	Yes	Yes
Sector Controls	No	No	Yes	Yes	Yes
Firm Size	No	No	No	Yes	Yes
Other Firm Controls	No	No	No	No	Yes

Notes: The table shows the wage effects of the reform. The specification is a difference-in-differences, as in Equation 11. We focus on workers who transition from an ST contract to an OE contract, either low- or high-cost. We analyze 18-to 30-year-old workers (Panels A and B) and 45-to 55-year-old workers (Panels C and D). Panels A and C are for a sample of people continuously employed with the same employer after the transition. Panels B and D are for all workers, regardless of whether they lose or change jobs in the post period. Columns 2 to 5 include interactions of quarter dummies with controls for the sector, firm's size, company's age, firm's legal status, gender, education, disability status, citizenship status, part-time work, dummies for the worker's age, the number of months worked in ST contracts the 7 years before the reform, the number of months worked in OE contracts the 7 years before the reform, and the unemployment rate at the province level. Each column controls for a different subset of these variables, as specified at the bottom of the table. Robust standard errors clustered at the individual level are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table B20: Wage Incidence (Before)

	(1)	(2)	(3)	(4)	(5)
	Log Daily Wage				
Panel A: Transition from ST to OE and Stay at Same Firm (30 years old)					
Treatment x Post	-0.001	0.057***	0.057***	0.051***	0.049***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Observations	38,015	38,015	38,015	38,015	38,015
Panel B: All Transitions from ST to OE (30 years old)					
Treatment x Post	-0.009	0.035***	0.035***	0.032***	0.030***
	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)
Observations	61,096	61,096	61,096	61,096	61,096
Panel C: Transition from ST to OE and Stay at Same Firm (45 years old)					
Treatment x Post	0.016	0.050***	0.050***	0.049***	0.039**
	(0.021)	(0.018)	(0.018)	(0.018)	(0.018)
Observations	21,771	21,771	21,771	21,771	21,771
Panel D: All Transitions from ST to OE (45 years old)					
Treatment x Post	0.018	0.055***	0.055***	0.054***	0.050***
	(0.017)	(0.015)	(0.015)	(0.015)	(0.015)
Observations	34,544	34,544	34,544	34,544	34,544
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	Yes	Yes
Province Unemployment	No	Yes	Yes	Yes	Yes
Sector Controls	No	No	Yes	Yes	Yes
Firm Size	No	No	No	Yes	Yes
Other Firm Controls	No	No	No	No	Yes

Notes: The table shows the wage effects of the reform. The specification is a difference-in-differences, as in Equation 11. We focus on workers who transition from an ST contract to an OE contract, either low- or high-cost. We analyze 18-to 30-year-old workers (Panels A and B) and 45-to 55-year-old workers (Panels C and D). Panels A and C are for a sample of people continuously employed with the same employer after the transition. Panels B and D are for all workers, regardless of whether they lose or change jobs in the post period. Columns 2 to 5 include interactions of quarter dummies with controls for the sector, firm's size, company's age, firm's legal status, gender, education, disability status, citizenship status, part-time work, dummies for the worker's age, the number of months worked in ST contracts the 7 years before the reform, the number of months worked in OE contracts the 7 years before the reform, and the unemployment rate at the province level. Each column controls for a different subset of these variables, as specified at the bottom of the table. Robust standard errors clustered at the individual level are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table B21: Wage Incidence (Before)

	(1)	(2)	(3)	(4)	(5)
	Log Daily Wage				
Panel A: Transition from ST to OE and Stay at Same Firm (30 years old)					
Treatment x Post	0.025*	0.039***	0.038***	0.029**	0.027**
	(0.014)	(0.013)	(0.013)	(0.012)	(0.013)
Observations	39,353	39,353	39,353	39,353	39,353
Panel B: All Transitions from ST to OE (30 years old)					
Treatment x Post	0.012	0.030***	0.029***	0.021**	0.020**
	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)
Observations	70,664	70,664	70,664	70,664	70,664
Panel C: Transition from ST to OE and Stay at Same Firm (45 years old)					
Treatment x Post	0.014	0.074***	0.074***	0.075***	0.066***
	(0.023)	(0.026)	(0.026)	(0.028)	(0.024)
Observations	25,349	25,349	25,349	25,349	25,349
Panel D: All Transitions from ST to OE (45 years old)					
Treatment x Post	-0.014	0.034**	0.034*	0.036**	0.029*
	(0.017)	(0.017)	(0.017)	(0.018)	(0.016)
Observations	41,228	41,228	41,228	41,228	41,228
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	Yes	Yes
Province Unemployment	No	Yes	Yes	Yes	Yes
Sector Controls	No	No	Yes	Yes	Yes
Firm Size	No	No	No	Yes	Yes
Other Firm Controls	No	No	No	No	Yes

Notes: The table shows the wage effects of the reform. The specification is a difference-in-differences, as in Equation 11. We focus on workers who transition from an ST contract to an OE contract, either low- or high-cost. We analyze 18-to 30-year-old workers (Panels A and B) and 45-to 55-year-old workers (Panels C and D). Panels A and C are for a sample of people continuously employed with the same employer after the transition. Panels B and D are for all workers, regardless of whether they lose or change jobs in the post period. Columns 2 to 5 include interactions of quarter dummies with controls for the sector, firm's size, company's age, firm's legal status, gender, education, disability status, citizenship status, part-time work, dummies for the worker's age, the number of months worked in ST contracts the 7 years before the reform, the number of months worked in OE contracts the 7 years before the reform, and the unemployment rate at the province level. Each column controls for a different subset of these variables, as specified at the bottom of the table. Robust standard errors clustered at the individual level are shown in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.