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Restricting Temporary Contracts Increases Firm-Provided Training: Evidence from Spain

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Abstract

We examine whether restricting temporary contracts increases firms' investment in worker training, exploiting Spain's 2022 labour market reform. Using 3.1 million online job postings from 2018 to 2024, we implement a difference-in-differences design that leverages pre-reform variation in reliance on temporary contracts across occupations. More exposed occupations shifted toward permanent hiring and increased advertised training relative to less exposed occupations. Training rose by 4.3 percentage points, fully closing the pre-reform gap by 2024. These results provide evidence that longer expected employment duration increases firms' investment in training, identifying a channel through which labour market regulation can shape human capital formation.

JEL classification

J24, J41, J63, J68

Keywords

temporary employment, on-the-job training, human capital investment, employment contracts

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1 Introduction

Training is a key mechanism through which firms invest in human capital, driving productivity and facilitating adaptation to technological change (Acemoglu and Pischke, 1998; Adhvaryu et al., 2023; Becker, 1964). Because training entails upfront costs with returns that accrue over time, firms' incentives to train workers depend critically on the expected duration of the employment relationship. This trade-off is particularly salient in dual labour markets characterised by a high prevalence of temporary contracts. While such institutional frameworks are a hallmark of many European economies, recent evidence suggests that the U.S. labour market also exhibits significant dualism, with a sizeable segment of high-turnover jobs (Ahn et al., 2023). In these contexts, shortened expected job horizons limit firms' ability to recoup training investments, potentially leading to chronic under-provision of skills (Arulampalam et al., 2004; Booth et al., 2002; Garcia-Louzao et al., 2023). A central question for policy is, therefore, whether interventions that lead to a shift from temporary to permanent contracts can strengthen firms' incentives to provide training.

In this paper, we draw on Spain's 2022 labour market reform to provide causal evidence on whether reducing firms' reliance on temporary contracts increases firm-provided training. The reform sharply restricted the use of temporary contracts with the stated aim of increasing employment stability. Using data from over three million online job postings, we implement a difference-in-differences design that exploits pre-reform variation in the share of temporary contracts across occupations. Our main outcome variable is the incidence of advertised training in job ads, which captures firms' intention at the point of hire to provide training, and thus measures intended investment in worker skills. This design tests a central implication of human capital models: that firms have stronger incentives to provide training when employment relationships are expected to last longer.

Spain is a particularly informative setting for this analysis. Prior to 2022, Spain consistently had one of the highest temporary employment rates among advanced economies (Auciello-Estévez et al., 2023; Bentolila and Dolado, 1994; Güell and Petrongolo, 2007, see also Appendix Figure A.1), largely reflecting the widespread use of project-based temporary contracts. The 2022 reform abolished this contract type and sharply restricted other forms of temporary hiring, while keeping broader labour market institutions stable. The reform was implemented nationwide and took effect almost immediately. Because occupations varied substantially in their pre-reform

reliance on temporary contracts, the reform generated plausibly exogenous variation in expected contractual stability across occupations.

Our primary data come from online job postings on Indeed in Spain between 2018 and 2024, which provide high-frequency information on contract types and other job attributes, including firm-provided training. A key strength of this data is that information on the availability of training can be directly linked to firms, unlike most survey data.[1] Recent work has shown that vacancy data systematically captures training offers (Adams et al., 2022). In addition, vacancy data allows us to observe firms' intent to provide training, rather than realised training outcomes in survey data, which conflate firm-sponsored, worker-initiated, formal and non-formal training, and reflect workers' decisions to take up training offered to them. This distinction matters because previous research shows that workers self-select, or are selected, into training at firms where it is available (Albert et al., 2005; Álvarez and Carrasco, 2016).

We have two main results. First, we show—using both job postings and the European Labour Force Survey (EU-LFS)—that the reform had the intended effect of reducing temporary contracts. Occupations in the top tercile of pre-reform reliance on temporary contracts (high-exposure occupations) experienced a 21 percentage-point larger decline in temporary contracts in job postings relative to occupations in the bottom tercile (low-exposure occupations). Roughly two-thirds of this decline was offset by an increase in permanent (open-ended) contracts, with the remainder driven mainly by seasonal contracts (*fijos discontinuos*). These contracts, used largely in sectors with recurring seasonal demand, incorporate predictable non-working spells while preserving open-ended worker-firm relationships.

Second, we find that the reform led to a 4.3 percentage point increase in firm-provided training in high-exposure occupations relative to low-exposure occupations, averaged over 2023-2024. This effect is economically large, corresponding to roughly a 50 percent increase relative to the pre-reform training incidence of 8.1 percent in low-exposure occupations. Over time, training mentions continued to rise in high-exposure occupations, so that by the end of the sample period, the pre-reform training gap between occupations with high and low temporary

[1] For example, the Spanish Labour Force Survey collects information on respondents' contract type and training experiences but it does not distinguish between training provided by employers and training undertaken independently by workers. This is relevant because data from the most recent (2022) wave of the Spanish Adult Learning Survey shows that, among employed adults, 69% of formal training and 15% of non-formal training undertaken in the preceding 12 months was funded by the workers themselves (Instituto Nacional de Estadística, 2023). In contrast, job postings offer a more direct measure of firm-provided training, as they capture what employers explicitly offer to prospective hires.

employment shares was fully eliminated, falling from 5.1 percentage points in 2018–2021 to zero in 2024. These findings provide evidence that reducing the incidence of temporary contracts strengthens firms' incentives to offer training, shaping recruitment strategies in ways consistent with greater investment in workers' human capital.

Our main specification estimates event-study difference-in-differences models comparing occupations with high and low pre-reform exposure to temporary contracts over time, controlling for occupation and quarter fixed effects. Pre-reform trends in both contract composition and firm-provided training are parallel across exposure groups, supporting the identifying assumptions. The results are robust to alternative treatment definitions, occupational aggregation levels, and the inclusion of additional control variables, as well as to placebo tests across periods and countries. We further show that the increase in advertised training does not appear to be driven by hiring difficulties, as it is not accompanied by changes in posting duration or other advertised amenities. We corroborate the post-reform decline in temporary employment with Labour Force Survey data. The LFS also shows a smaller but statistically significant increase in formal training in high-exposure occupations in the most saturated specification with individual controls, suggesting that the training intentions captured in vacancy data—our preferred measure of firm-provided training—are also translating into realised outcomes.

To shed light on mechanisms, we estimate a specification with firm fixed effects, which restricts the identifying variation to differences between more and less exposed occupations within firms. With firm fixed effects, the estimated increase in training falls from 4.3 to 1.6 percentage points but remains statistically significant and economically meaningful. The attenuation of the effect suggests that the reform operated through two channels: increased training provision within incumbent firms and a compositional shift of postings toward firms more likely to offer training. This pattern is consistent with recent papers emphasising the role of firm selection and reallocation in response to labour market regulation (Cahuc et al., 2022; Dustmann et al., 2022; Pijoan-Mas and Roldan-Blanco, 2025).

This paper contributes to the literature on human capital accumulation and temporary employment by providing causal evidence that restricting temporary contracts increases firms' provision of training. Existing research has documented that temporary workers receive less on-the-job training than workers on open-ended contracts (Albert et al., 2005; Cabrales et al., 2017; Dolado et al., 2016; Ferreira et al., 2018). What remains unclear is whether policy actions that curb

temporary employment in such markets can increase firm-provided training. This paper fills that gap.

Several studies infer the human capital and training impacts of temporary employment from downstream productivity or earnings outcomes rather than from data on firms' training provision. At the macro level, Damiani et al. (2016) show that deregulating temporary contracts is associated with lower productivity growth, arguing that this operates through reduced training. Other work documents long-run wage penalties for temporary workers (Garcia-Louzao et al., 2023; García-Pérez et al., 2019), also pointing to training as a key potential underlying mechanism. We extend this literature by moving beyond indirect measures and studying firms' intended training investments directly. Using job postings, we observe firms' stated provision of training and show that policy-induced changes in contract composition causally affect the incidence of training offers.

Our paper is also related to recent work on labour market reforms in Italy, where temporary contracts are widespread. Bratti et al. (2021) show that easing employment protection for permanent contracts led firms to substitute toward permanent hiring and increased worker training. Grasso and Tatsiramos (2023) find that restricting fixed-term contracts raised education and experience requirements in job postings, consistent with higher screening intensity. We complement these studies by providing direct, hiring-stage evidence that a nationwide restriction on temporary contracts increases firms' provision of training.[2]

2 Spain's Labour Market Reform

On 28 December 2021, the Spanish government enacted Royal Decree-Law 32/2021, which substantially revised Spain's system of employment contracts. The objective of the reform was to drastically limit volatile temporary hiring and promote more stable, open-ended worker-firm relationships. As stated in the preamble, legislators were seeking to *"decisively fix the excessive use of temporary employment to avoid the harmful pattern of systematic job destruction in every economic downturn."*[3]

[2] More generally, we also contribute to a growing literature that uses online job vacancy data to study labour market responses to major economic and policy shocks (Adrjan et al., 2025; Forsythe et al., 2020; Kudlyak et al., 2025; Marinescu, 2017; Marinescu et al., 2021)

[3] Royal Decree-Law 32/2021 of 28 December on urgent measures for labour market reform, the guarantee of employment stability, and the transformation of the labour market. Official State Gazette (BOE), No. 313, 30 December 2021.

Before the reform, temporary contracts accounted for a substantially higher share of employment in Spain than in many other European countries (Appendix Figure A.1). Project-based contracts ("contracts for specific work or service") were particularly prevalent, representing roughly one-third of the stock of temporary contracts and about 40 percent of temporary hires, according to the aggregated data on registered labour contracts.[4] Although formally intended for specific projects or tasks, these contracts were often used as substitutes for permanent employment, partly due to lower dismissal costs (Aguirregabiria and Alonso-Borrego, 2014; Bentolila and Dolado, 1994; Dolado et al., 2002; Güell and Petrongolo, 2007).

Prior to the reform, temporary employment was permitted under three broad modalities: a) contracts for specific project work, b) contracts to cover clearly defined, short-term production needs, and c) contracts to substitute temporarily absent workers. The reform eliminated the first modality and subjected the others to duration limits, preventing their indefinite renewal and thus sharply narrowing the overall scope for temporary hiring.[5]

The text of the law explicitly recognised the link between contract type and firms' incentives to invest in worker training. The preamble noted that *"a labour market model based on temporary employment disincentivises investment in training by firms and workers"*, and that high worker turnover *"prevents continuous skill acquisition and durable professional attachment."* The text further framed *"investment in worker training (upskilling)"* as one of the goals of the legislation.[6] Our analysis of firm-provided training in job postings therefore directly relates to one of the central motivations of the reform.

Although the law was adopted in late 2021, it is commonly referred to as the 2022 labour market reform, as it became fully effective after a short transitional period ending on 30 March

[4] https://www.sepe.es/HomeSepe/es/que-es-el-sepe/estadisticas/contratos/estadisticas-nuevas.html, last accessed April 1, 2026.

[5] To accommodate firms that need to hire workers for seasonal work, the reform expanded the use of seasonal (*fijos discontinuos* or "permanent intermittent") contracts intended for sectors with recurring, intermittent labour demand, such as hospitality and tourism. These contracts establish an open-ended worker-firm relationship while also accommodating predictable periods of inactivity (e.g., during the off-season). Unlike a series of consecutive fixed-term contracts, where each renewal is uncertain, these contracts preserve job continuity across work spells, facilitating the accumulation of experience and strengthening firms' incentives to invest in worker training. Our training results are unchanged if we exclude job postings that offer a seasonal contract.

[6] The reform also simplified the framework governing apprenticeship and internship contracts. This aspect is not particularly relevant to our analysis because we focus on training provision in the broad universe of job postings, not those specifically aimed at people still in education. We show in Table 1 that the reform had no effect on apprenticeship or internship job postings.

2022. Its rapid and nationwide implementation provides a clean policy shock to the framework governing employment contracts, which we exploit in our empirical analysis.[7]

3 Data and Empirical Strategy

Data Our primary data source consists of online job postings from Indeed, which provide high-frequency information on firms' hiring intentions in Spain. The data is particularly well-suited to studying the consequences of the 2022 labour market reform, as job postings frequently specify the type of contract offered and include information on non-wage amenities, such as firm-provided training. Because workers value training as a job attribute (Maestas et al., 2023), firms have an incentive to advertise it when they intend to provide it. Appendix Figure A.2 provides illustrative examples of job postings in Spain that explicitly mention both the contract type and training.

Indeed is the world's largest online hiring platform by traffic and has operated in Spain since 2008. Our dataset includes 3.1 million job postings that appeared between January 2018 and December 2024, corresponding to roughly 36,000 new postings per month. Of these postings, 1.1 million (37 percent) contain explicit information on the type of contract. The dataset covers all major occupational categories (Appendix Figure A.3) and closely tracks survey-based measures of vacancies over time (Appendix Figure A.4). Consistent with the literature, training is significantly less common in temporary than in permanent jobs: 5 percent of temporary postings in our sample advertise training, compared with 14 percent of permanent postings.

In addition to the contract type, firm-provided training and the job title—our main variables of interest—the dataset also includes the location, posting date and a firm identifier for each posting. These features allow us to control for heterogeneity across occupations, regions and firms, and thus to isolate variation in training provision plausibly attributable to the reform. For selected analyses, we use information on other advertised job amenities and on posting duration to assess robustness and explore potential alternative mechanisms.

[7] Conde-Ruiz et al. (2025) show that, although the reform reduced the incidence of temporary contracts, aggregate measures of employment stability have not yet improved significantly. This is not inconsistent with our hypothesised mechanism, which operates through the expected duration of the employment relationship as determined by contract type at the point of hire, rather than through realised tenure. A firm offering a permanent rather than a temporary contract faces higher expected separation costs and a longer expected employment horizon, strengthening its incentive to invest in training regardless of whether economy-wide turnover has adjusted.

One limitation of online vacancy data is that postings are not fully representative of the labour market. As in other countries (Cammeraat and Squicciarini, 2021), job postings in Spain are more concentrated in professional and high-skill occupations than employment. To account for this, we show that our results are robust to alternative weighting schemes, including weighting observations by ISCO two-digit employment shares.

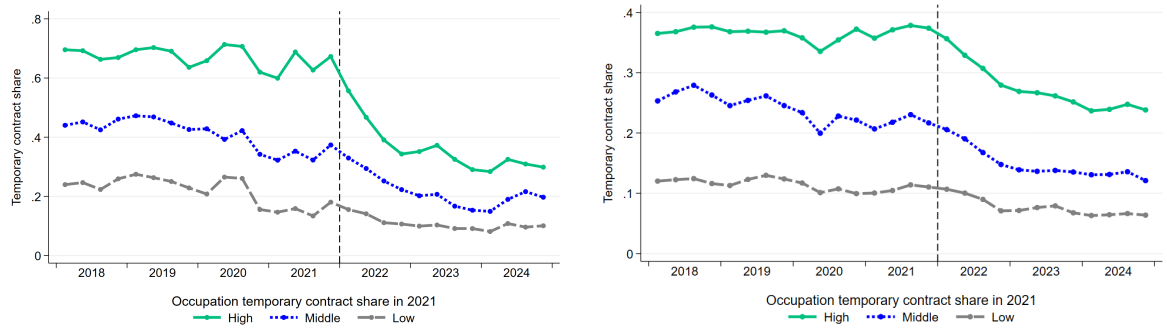
Another potential concern is that postings with and without explicit contract information may differ systematically. Because the occupation-level treatment intensity variable is constructed using postings that report contract type, this raises the question of whether including postings without contract information at the outcome stage could influence the estimated training effects. While our main training results are based on the full sample of postings, Appendix Figures A.5 and A.6 show that postings with and without contract information are similarly distributed across occupations and regions, suggesting that the subsample of postings reporting contract type is broadly representative of all postings. In addition, restricting the training regressions to postings with explicit contract information yields similar and statistically significant estimates as for the full sample.

As a secondary data source, we use the European Union Labour Force Survey (EU-LFS). The EU-LFS is a harmonised quarterly household survey conducted by national statistical institutes and coordinated by Eurostat. The survey collects information on demographics, employment status, occupation, industry, hours worked and training.[8] The Spanish segment of the EU-LFS (EPA) covers approximately 120,000 individuals per quarter.

We use the EU-LFS for robustness and to complement the vacancy-based analysis with a representative sample of workers. In the EU-LFS, we restrict attention to dependent employees who were employed in the reference week. We classify a job as temporary if the contract is reported as fixed-term. This survey-based dataset allows us to validate the magnitude and timing of the reform-induced changes in temporary contracts observed in the Indeed data and to examine whether the training effects documented in job postings are also reflected in training participation.

[8]The LFS distinguishes between "formal" and "non-formal" training. Formal training includes both formal education across all levels of the International Standard Classification of Education (ISCED), i.e., from early childhood education to doctoral level, and, in the case of Spain, also professional certificates (*certificados de profesionalidad*), which are widely used for training in work-related skills. Non-formal training captures vocational training for employment that does not lead to a professional certificate and any other programmes aimed at improving personal or professional skills.

Figure 1: Share of Temporary Contracts by 2021 Temporary Contract Share



(a) Temporary contracts
Job postings (Indeed)

(b) Temporary contracts
All employees (EU-LFS)

Notes: The figure shows (a) the share of temporary contracts in job postings, (b) the share of temporary contracts in employee jobs. Occupations are grouped into terciles according to the share of temporary contracts in 2021. Vertical dashed lines denote the 2022 labour market reform. *Sources:* Indeed and EU-LFS.

Empirical Strategy We exploit the sharp, nationwide restriction on temporary contracts induced by the 2022 labour market reform. Because occupations differed substantially in their pre-reform reliance on temporary hiring, the reform generated heterogeneous exposure across occupations. Our empirical strategy is to compare changes in outcomes over time across occupations with high versus low pre-reform temporary contract shares.

We measure an occupation's exposure to the reform using its share of temporary contracts in 2021, the last full year before implementation. In the Indeed data, we classify postings into 56 occupations based on Indeed's internal taxonomy and group these into terciles based on this share. For the EU-LFS analysis, we use 3-digit ISCO occupations for this assignment.[9] Figure 1 illustrates the identifying variation in both datasets. Following the reform, occupations in the top tercile, i.e., those with the highest initial temporary contract share, experienced a large and persistent decline in temporary contracts, while occupations in the bottom tercile largely continued their modest pre-reform downward trend.

We estimate the following dynamic difference-in-differences equation:

$$Y_{o,t} = \sum_{\tau \neq 2021q4} \sum_{k \in \{2,3\}} \beta_\tau^k \mathbb{1}\{t = \tau\} \times \mathbb{1}\{\text{TempTerc}_{o,2021} = k\} + \gamma_o + \delta_t + \varepsilon_{o,t} \tag{1}$$

[9] We show in the Appendix that our results are very similar if we use the 2019 share as a measure of exposure to the reform (in case the results are contaminated by fluctuations in temporary hiring during the COVID-19 pandemic) or if we assign the treatment status at different aggregation levels.

where $Y_{o,t}$ represents the outcome variable of interest (the temporary contract share or the share of postings that mention training) for occupation o in year-quarter t. $Temp_{terc(o),2021}$ denotes the occupation's tercile of temporary contract intensity in 2021, which measures exposure to the treatment induced by the reform. The first tercile (lowest temporary contract intensity) is the omitted group. We include occupation fixed effects, γ_o, and year-quarter fixed effects, δ_t. The coefficients β measure the dynamic impact of the reform relative to the last quarter of 2021, conditional on the fixed effects.

To summarise post-reform effects, we also estimate a static difference-in-differences specification, where the event-time coefficients are replaced by binary indicators for 2022 (the transition year) and the post-2022 period:

$$Y_{o,t} = \sum_{k\in\{2,3\}} \left(\lambda_1^k \mathbb{1}\{t = 2022\} + \lambda_2^k \mathbb{1}\{t \geq 2023\}\right) \times \mathbb{1}\{\text{TempTerc}_{o,2021} = k\} + \gamma_o + \delta_t + u_{o,t} \quad (2)$$

where the λ_2 coefficients capture the average effect for the first two full post-reform years, 2023 and 2024, relative to the pre-reform period. We report λ_2 as the main summary estimate in all event-study graphs and the accompanying tables. Standard errors in both equations are clustered at the occupation level.

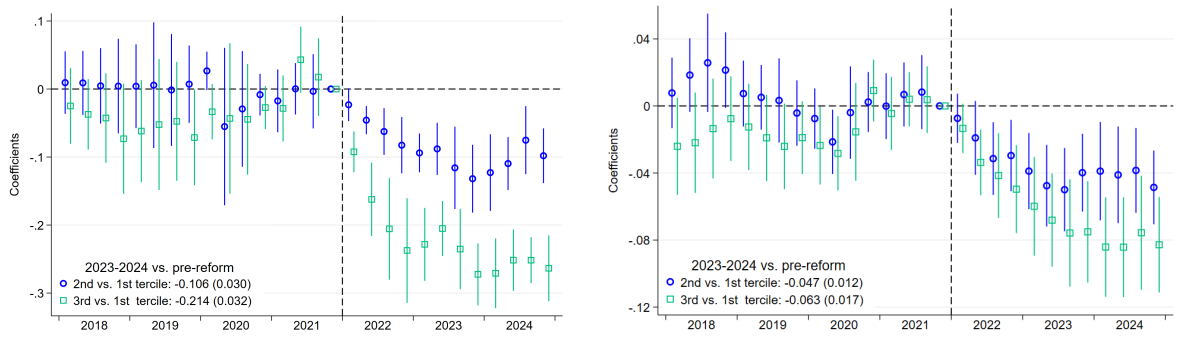
4 Results

We present the results in two steps. We first document the effect of the reform on the share of temporary employment. Then, we estimate the impact of the reform on firm-provided training. Throughout, we refer to occupations in the top tercile of pre-reform temporary contract intensity as high-exposure occupations and those in the bottom tercile as low-exposure occupations.

Temporary Employment Figure 2 shows event-study estimates for the share of temporary contracts, i.e., the β coefficients from equation (1). Panel (a), based on Indeed job postings, shows parallel pre-reform trends in the temporary contract share across exposure groups. Following the reform implementation in early 2022, high-exposure occupations experienced a substantial and persistent decline in temporary hiring. The temporary share declined gradually in the year of the reform before stabilising at a substantially lower rate from 2023 onwards. Averaged over 2023-2024, the first two full post-reform years, high-exposure occupations saw a 21.4 percentage

point reduction in temporary contracts relative to low-exposure occupations, while the middle tercile experienced a 10.6 percentage point decline.

Figure 2: Reform Effect on the Temporary Contract Share



(a) Job postings (Indeed)

(b) All employees (EU-LFS)

Notes: The figure plots the β coefficients from estimating equation (1). Panel (a) shows the effect of the reform on the share of job postings with a temporary contract. Panel (b) shows the effect on the share of temporary employee jobs. Occupations are grouped into terciles according to the share of temporary contracts in 2021. Reported summary effects of the reform are the λ_2 coefficients from estimating equation (2), with standard errors in parentheses. Both specifications include occupation and quarter fixed effects. Vertical bars indicate 95% confidence intervals around each point estimate. Standard errors are clustered by occupation. Vertical dashed lines denote the 2022 labour market reform. *Sources:* Indeed and EU-LFS

Panel (b) replicates the analysis using EU-LFS data. The qualitative pattern is similar, though the magnitude is smaller: high-exposure occupations experienced a 5-6 percentage point relative decline in temporary employment. This attenuation of the effect is consistent with a slower adjustment in the stock of employed workers relative to newly posted vacancies.

Table 1 shows how the decline in temporary job postings was absorbed across other contract types. As intended by policymakers, more than two-thirds of the 21.4 percentage-point relative reduction in temporary contracts in high-exposure occupations was offset by an increase in permanent (open-ended) contracts (a relative increase of 15.7 percentage points). Most of the remainder was absorbed by seasonal contracts (*fijos discontinuos*, 5.6 percentage points), with a small increase in freelance contracts (1.7 percentage points). Other contract forms, including apprenticeships and internships, were unaffected.

Several robustness checks confirm these findings. Results are similar when treatment is defined using 2019 temporary shares (Appendix Figure A.8) or alternative occupational aggregation levels, such as detailed job titles for the Indeed data and 2-digit ISCO occupations for EU-LFS data (Appendix Figure A.9) or 1-digit ISCO occupations using the share of *obra y ser-*

Table 1: Reform Effect on Contract Types in Job Postings

Contract type:	Temporary (1)	Permanent (2)	Seasonal (3)	Freelance (4)	Apprentice (5)	Volunteer (6)	Internship (7)	Replacement (8)
Post 2022 x 2nd tercile	-0.106***	0.099***	0.017**	0.005	-0.001	-0.000	-0.008	-0.006
	(0.030)	(0.031)	(0.006)	(0.008)	(0.001)	(0.000)	(0.011)	(0.005)
Post 2022 x 3rd tercile	-0.214***	0.157***	0.056***	0.017**	-0.010	-0.000	-0.005	-0.002
	(0.031)	(0.033)	(0.016)	(0.007)	(0.006)	(0.000)	(0.009)	(0.005)
Pre-reform mean DV (1st tercile)	0.215	0.591	0.001	0.084	0.003	0.000	0.102	0.005
Pre-reform mean DV (2nd tercile)	0.411	0.395	0.001	0.052	0.005	0.001	0.117	0.018
Pre-reform mean DV (3rd tercile)	0.673	0.232	0.005	0.035	0.012	0.000	0.023	0.020
Observations	1,139,407	1,139,407	1,139,407	1,139,407	1,139,407	1,139,407	1,139,407	1,139,407

Notes: The table shows the effect of the reform on various contract types in job postings after 2022. Column (1) is the temporary contract share. Column (2) is the permanent contract share. Column (3) is the seasonal (*fijos discontinuos* or "permanent intermittent") contract share. Column (4) is the freelance contract share. Column (5) is the apprenticeship contract share. Column (6) is the volunteer contract share. Column (7) is the internship (prácticas) contract share. Column (8) is the replacement contract share. All columns include quarter and occupation fixed effects, as well as the interactions of a 2022 dummy with the terciles of the 2021 temporary contract share. Treatment assignment is based on occupations' 2021 temporary contract shares. The reported pre-reform means of the dependent variable are shown separately for terciles of the 2021 occupation-level temporary contract share. Standard errors are clustered at the occupation level. Significance levels: * 10%, ** 5%, *** 1%. *Source*: Indeed

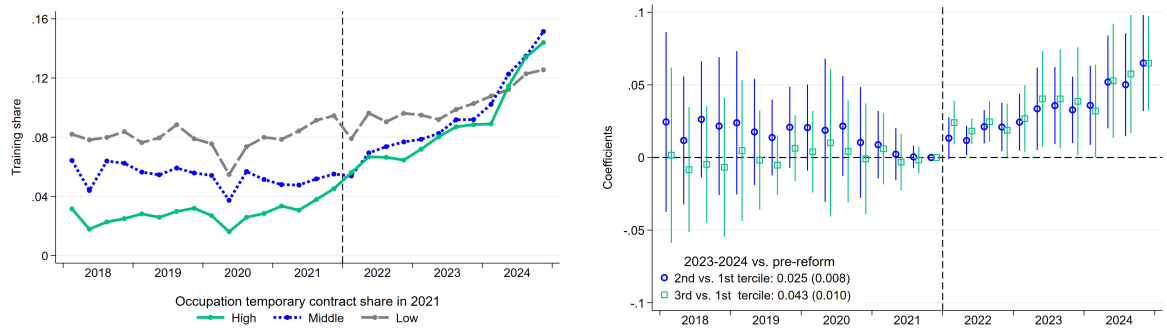
vicio contracts[10] (Appendix Figure A.10). Estimates are also robust to weighing all occupations in the Indeed data equally (Appendix Figure A.11) and to the inclusion of varying sets of controls and fixed effects (Appendix Tables B.1 and B.2).

Adding firm fixed effects roughly halves the estimates but they remain statistically significant (Appendix Table B.1). This pattern is consistent with recent models that emphasise firm heterogeneity and reallocation in dual labour markets (Cahuc et al., 2022; Pijoan-Mas and Roldan-Blanco, 2025). In these frameworks, more productive firms place greater value on employment stability and firm-specific human capital, while tighter restrictions on temporary contracts disproportionately affect lower-productivity firms, inducing a reallocation of jobs toward higher-quality employers. Intuitively, if firms that previously relied heavily on temporary employment ceased hiring entirely after the reform, adding firm fixed effects would strongly reduce the estimated coefficients, even though the reform did causally reduce temporary employment.

Training Next, we examine how the reform affected firms' training offers. Panel (a) of Figure 3 plots raw trends in the share of job postings advertising firm-provided training. Prior to the reform, in line with the literature, training was systematically less common in occupations with

[10]Since this type of contract was banned by the reform, this is the most exact measure of exposure to it. However, the EU-LFS does not include detailed information on the type of temporary contract, whereas the Spanish EPA, which identifies this type of contract, only includes information on occupations at the 1-digit level, which makes it difficult to assign occupations to treatment accurately.

Figure 3: Job Postings with Training



(a) Share of postings with training

(b) Reform effects

Notes: Panel (a) reports the share of postings that mention firm-provided training for three groups of occupations. Occupations are grouped into terciles according to the share of temporary contracts in 2021. Panel (b) plots the β coefficients from estimating equation (1) with occupation and quarter fixed effects. The dependent variable is the share of job postings that mention firm-provided training. Occupations are grouped into terciles according to the share of temporary contracts in 2021. Reported summary effects of the reform are the λ_2 coefficients from estimating equation (2) with occupation and quarter fixed effects, like column (2) in Table 2. Standard errors are in parentheses and are clustered by occupation. Vertical bars indicate 95% confidence intervals around each point estimate. The vertical dashed lines denote the 2022 labour market reform. *Source:* Indeed

higher reliance on temporary contracts and these differences were stable over time. Following the reform, training mentions increased most markedly in high-exposure occupations, narrowing the pre-existing training gap and eventually eliminating it by 2024.

Panel (b) of Figure 3 presents event-study estimates. Pre-reform trends are flat and parallel across exposure groups. Beginning in 2022, training increased persistently in high-exposure occupations. Averaged over 2023-2024, high-exposure occupations experienced a 4.3 percentage point increase in advertised firm-provided training relative to low-exposure occupations, while the middle tercile shows a 2.5 percentage point increase. The increase of 4.3 percentage points corresponds to roughly a 50 percent increase relative to the pre-reform training incidence of 8.1 percent of job postings in low-exposure occupations.

Table 2 reports the estimated effect of the reform on training across specifications. Column (1) contains the raw estimates without any control variables. The estimates change little when adding occupation and year-quarter fixed effects in column (2) and region fixed effects in column (3). Including firm fixed effects in column (4) attenuates the estimates to 1.6 percentage points for the top tercile and 1.0 percentage points for the middle tercile. This attenuation suggests that the observed increase in training is driven by two distinct channels: a within-firm behavioural

adjustment to the new legal regime and a compositional shift of job postings toward firms more likely to offer training.

Table 2: Reform Effect on Firm-Provided Training

	(1)	(2)	(3)	(4)
Post 2022 x 2nd tercile	0.024***	0.025***	0.024***	0.010**
	(0.007)	(0.008)	(0.008)	(0.005)
Post 2022 x 3rd tercile	0.038***	0.043***	0.042***	0.016**
	(0.009)	(0.010)	(0.010)	(0.007)
Pre-reform mean DV (1st tercile)	0.081	0.081	0.081	0.082
Pre-reform mean DV (2nd tercile)	0.054	0.054	0.054	0.055
Pre-reform mean DV (3rd tercile)	0.029	0.029	0.029	0.029
Occupation and quarter FE		✓	✓	✓
Region FE			✓	✓
Firm FE				✓
Number of firms	135,228	135,228	135,227	66,826
Observations	3,056,310	3,056,310	3,056,297	2,987,896

Notes: The table reports the λ_2 coefficients from estimating versions of equation (2). The dependent variable is whether a job posting mentions firm-provided training. Column (1) contains no control variables. Column (2) adds quarter and occupation FEs like in panel (b) of Figure 3 and corresponds directly to the specification shown in equation (2). Column (3) adds indicators for regions (autonomous communities). Column (4) adds firm fixed effects. Treatment assignment is based on occupations' 2021 temporary contract shares. The reported pre-reform means of the dependent variable are shown separately for terciles of the 2021 occupation-level temporary contract share. Standard errors are clustered at the occupation level. Significance levels: * 10%, ** 5%, *** 1%. *Source*: Indeed

An important question is whether training is the only margin along which firms adjust to the higher expected separation costs associated with more permanent contracts. In principle, firms might respond in various ways, including adjusting wages, other job amenities, recruitment intensity or training provision. In institutional settings with collective bargaining and wage compression, the scope for downward wage adjustment is limited. At the same time, a compressed wage distribution allows firms to capture part of the returns to training (Acemoglu and Pischke, 1999), making training a particularly likely margin of adjustment.[11]

To assess the presence of other margins of adjustment and to test whether our results might be driven by other, alternative explanations, we conduct a series of tests. First, to check for broader changes in job quality—such as those that might arise if occupations with high reliance

[11] In our dataset, information on wages is available only for a minority of postings (23 percent) due to low salary transparency in Spain. Posted wages are, therefore, subject to measurement error and selection. Difference-in-difference estimates using annualised posted wages as the outcome do not indicate any systematic wage declines following the reform, but these estimates lack precision and thus do not let us draw broader conclusions.

on temporary contracts experienced tighter labour markets— we examine trends in commonly advertised amenities other than training. Appendix Figure A.12 shows no major systematic changes in the mentions of pension plans, tax-exempt benefits, flexible schedules, private health insurance, life insurance or subsidised food. Although some of the estimates are statistically significant, their magnitudes are small relative to the training effects and their timing is not aligned with the reform. We also do not find any impact on job posting duration or the share of postings that require no prior experience (Appendix Figure A.13). This shows that the increase in training is the main non-wage amenity that changes after the reform and suggests that our results do not reflect tighter labour markets or increased recruitment frictions.

Second, we test whether the increase in training reflects a broader European trend that might be driven by EU-wide policies, international HR practices or general occupation-specific trends coinciding with the Spanish reform. We apply the same occupation-based treatment assignment to job postings in France, Germany, the Netherlands and the UK and estimate identical event-study specifications around a placebo reform date in 2021. As shown in Appendix Figure A.14, none of these countries show similar increases in training, supporting the interpretation that the effect we document is caused by a policy specific to Spain.

Third, the results are robust to alternative treatment definitions and weights (Appendix Figure A.15), including defining treatment groups based on the 2019 temporary contract share, at the job-title level, or at the level of 1-digit ISCO occupations using the share of *obra y servicio* contracts, as well as weighting each occupation equally.

Fourth, to assess whether our estimates are driven by any occupation-specific post-pandemic recovery dynamics—for instance, in hospitality and tourism-intensive occupations with high pre-reform temporary employment—we conduct a leave-one-out exercise that sequentially excludes each occupation from the sample. The estimated reform effects on training offers remain stable across iterations (Appendix Figure A.16). In other words, our results are not driven by any single occupation or by a narrow set of occupations experiencing differential post-pandemic recoveries.

Appendix Table B.3 examines whether the reform affected training participation in the past 4 weeks as measured in the EU-LFS. We find a statistically significant increase in formal training among workers in high-exposure occupations relative to low-exposure occupations in the specification that includes individual-level controls. This result corroborates our vacancy-based findings and suggests that the increased training intentions documented in job postings have begun to

translate into realised training outcomes. In absolute terms, the estimated effect is smaller than in the vacancy data—0.6 percentage points, compared with 1.6 percentage points in the most saturated specification with firm fixed effects in the Indeed data—but it is similar as a fraction of the pre-reform first-tercile mean (15% and 20%, respectively). We still prefer to focus on job posting data as the main measure of the reform's effects on training because it directly captures firms' training offers at the hiring stage—a more precise test of our initial hypothesis—without conflating firm-provided and employee-initiated training.[12] The absence of an effect on overall training in the EU-LFS, which combines formal and non-formal training, is consistent with this distinction as well as with the possibility of partial substitution between firm-sponsored training and worker-initiated training. Despite these differences in measurement, the qualitative alignment between the two data sources strengthens the conclusion that the reform increased firms' investment in worker training.

5 Conclusion

This paper studies whether increasing contractual stability of employment strengthens firms' incentives to provide training to workers. Exploiting Spain's 2022 labour market reform, which sharply restricted temporary contracts, we show that occupations more exposed to the reform experienced both a large shift from temporary to permanent hiring and a significant increase in training advertised in job postings. Other features of job postings remained broadly unchanged. In occupations most exposed to the reform, training increased by 4.3 percentage points on average relative to low-exposure occupations, and by the end of 2024 the pre-reform training gap was fully eliminated. These findings provide direct evidence that restricting temporary employment and inducing a shift towards more open-ended firm-worker relationships increases firms' willingness to provide training.

We also detect a statistically significant increase in formal training participation in EU-LFS data in a specification with individual controls, suggesting that the shift in firms' training intentions has started to materialise in training outcomes. However, we find no effect on overall training participation in the EU-LFS, which combines formal and non-formal training. One

[12] An additional potential issue in the EU-LFS data is that it focuses on training in the past 4 weeks. As most workers do not receive training so regularly, the expected effect on training in the past 4 weeks is muted.

potential explanation is partial substitution: as firms increase provision of training under permanent contracts, workers may reduce their own investment in self-funded training. As noted in the introduction, a substantial share of training in Spain was historically self-funded by workers, suggesting considerable scope for such an adjustment. This potential shift in the composition of training matters because employer-funded training generates higher wage returns than worker-funded training (see Hansson (2008), as well as Caparrós Ruiz et al. (2010) for Spain). If substitution is indeed taking place, then the shift toward firm-sponsored training may yield improvements in labour market outcomes even beyond what aggregate training participation effects suggest.

From a policy perspective, our results suggest that reforms that reduce firms' ability to rely on temporary contracts can encourage them to internalise more of the costs of skill formation. By strengthening incentives for firm-sponsored training, greater employment stability may help narrow long-run gaps in human capital accumulation and career progression between workers previously segmented across contract types. More broadly, the results show that labour market institutions shape not only contract composition but also firms' incentives to invest in human capital.

References

Acemoglu, D. and J. Pischke (1998): "Why Do Firms Train? Theory and Evidence," *The Quarterly Journal of Economics*, 113, 79–119.

——— (1999): "The Structure of Wages and Investment in General Training," *Journal of Political Economy*, 107, 539–572.

Adams, A., T. Le Barbanchon, and A. Marcato (2022): "On-the-job Training and Labor Market Concentration," Working Paper.

Adhvaryu, A., N. Kala, and A. Nyshadham (2023): "Returns to On-the-Job Soft Skills Training," *Journal of Political Economy*, 131, 2165–2208.

Adrjan, P., G. Ciminelli, A. Judes, M. Koelle, C. Schwellnus, and T. M. Sinclair (2025): "Working from home after COVID-19: Evidence from job postings in 20 countries," *Labour Economics*, 96, 102751.

Aguirregabiria, V. and C. Alonso-Borrego (2014): "Labor contracts and flexibility: evidence from a labor market reform in Spain," *Economic Inquiry*, 52, 930–957.

Ahn, H. J., B. Hobijn, and A. Şahin (2023): "The Dual U.S. Labor Market Uncovered," NBER Working Paper.

Albert, C., C. García-Serrano, and V. Hernanz (2005): "Firm-provided training and temporary contracts," *Spanish Economic Review*, 7, 67–88.

Álvarez, G. and R. Carrasco (2016): "Measuring the Impact of On-the-job Training on Job Mobility," *Revista de Economía Aplicada*, 24, 5–25.

Arulampalam, W., A. L. Booth, and M. L. Bryan (2004): "Training in Europe," *Journal of the European Economic Association*, 2, 346–360.

Auciello-Estévez, I., J. Pijoan-Mas, P. Roldan-Blanco, and F. Tagliati (2023): "Dual labor markets in Spain: a firm-side perspective," Banco de España Occasional Paper.

Becker, G. S. (1964): "Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education, First Edition," *NBER Books*.

Bentolila, S. and J. J. Dolado (1994): "Labour flexibility and wages: lessons from Spain," *Economic Policy*, 9, 53–99.

Booth, A. L., M. Francesconi, and J. Frank (2002): "Temporary Jobs: Stepping Stones or Dead Ends?" *The Economic Journal*, 112, F189–213.

Bratti, M., M. Conti, and G. Sulis (2021): "Employment protection and firm-provided training in dual labour markets," *Labour Economics*, 69, 101972.

Cabrales, A., J. J. Dolado, and R. Mora (2017): "Dual employment protection and (lack of) on-the-job training: PIAAC evidence for Spain and other European countries," *SERIEs*, 8, 345–371.

Cahuc, P., P. Carry, F. Malherbet, and P. S. Martins (2022): "Employment Effects of Restricting Fixed-Term Contracts: Theory and Evidence," Working Paper.

Cammeraat, E. and M. Squicciarini (2021): "Burning Glass Technologies' data use in policy-relevant analysis: An occupation-level assessment," OECD Science, Technology and Industry Working Paper.

Caparrós Ruiz, A., M. L. Navarro Gómez, and M. F. Rueda Narváez (2010): "Rentabilidad salarial de la formación laboral: un análisis con datos de panel," *Estudios de Economía Aplicada*, 28, 1–20.

Conde-Ruiz, J. I., M. García, L. A. Puch, and J. Ruiz (2025): "Reforming Dual Labor Markets: "Real" or "Contractual" Temporary Rates?" *LABOUR*, 39, 162–187.

Damiani, M., F. Pompei, and A. Ricci (2016): "Temporary Employment Protection and Productivity Growth in EU Economies," *International Labour Review*, 155, 587–622.

Dolado, J. J., C. García-Serrano, and J. F. Jimeno (2002): "Drawing lessons from the boom of temporary jobs in Spain," *The Economic Journal*, 112, F270–F295.

Dolado, J. J., S. Ortigueira, and R. Stucchi (2016): "Does dual employment protection affect TFP? Evidence from Spanish manufacturing firms," *SERIEs*, 7, 421–459.

Dustmann, C., A. Lindner, U. Schönberg, M. Umkehrer, and P. Vom Berge (2022): "Reallocation effects of the minimum wage," *The Quarterly Journal of Economics*, 137, 267–328.

Ferreira, M., A. de Grip, and R. van der Velden (2018): "Does informal learning at work differ between temporary and permanent workers? Evidence from 20 OECD countries," *Labour Economics*, 55, 18–40.

Forsythe, E., L. B. Kahn, F. Lange, and D. Wiczer (2020): "Labor demand in the time of COVID-19: Evidence from vacancy postings and UI claims," *Journal of Public Economics*, 189, 104238.

Garcia-Louzao, J., L. Hospido, and A. Ruggieri (2023): "Dual returns to experience," *Labour Economics*, 80, 102290.

García-Pérez, J. I., I. Marinescu, and J. Vall Castelló (2019): "Can fixed-term contracts put low skilled youth on a better career path? Evidence from Spain," *The Economic Journal*, 129, 1693–1730.

Grasso, G. and K. Tatsiramos (2023): "The Impact of Restricting Fixed-Term Contracts on Labor and Skill Demand," Working Paper.

Güell, M. and B. Petrongolo (2007): "How binding are legal limits? Transitions from temporary to permanent work in Spain," *Labour Economics*, 14, 153–183.

Hansson, B. (2008): "Job-Related Training and Benefits for Individuals: A Review of Evidence and Explanations," OECD Education Working Paper.

Instituto Nacional de Estadística (2023): "Survey on the Participation of the Adult Population in Learning Activities (EADA). Year 2022. Results," INEbase, published 20 November 2023. Spanish implementation of the European Adult Education Survey (AES), coordinated by Eurostat. Includes national and regional results, microdata, and sampling errors. Fieldwork conducted May–July 2023, reference period: 12 months prior to interview.

Kudlyak, M., M. Tasci, and D. Tüzemen (2025): "Minimum wage increases and vacancies," *Labour Economics*, 97, 102765.

Maestas, N., K. J. Mullen, D. Powell, T. Von Wachter, and J. B. Wenger (2023): "The value of working conditions in the United States and implications for the structure of wages," *American Economic Review*, 113, 2007–2047.

Marinescu, I. (2017): "The general equilibrium impacts of unemployment insurance: Evidence from a large online job board," *Journal of Public Economics*, 150, 14–29.

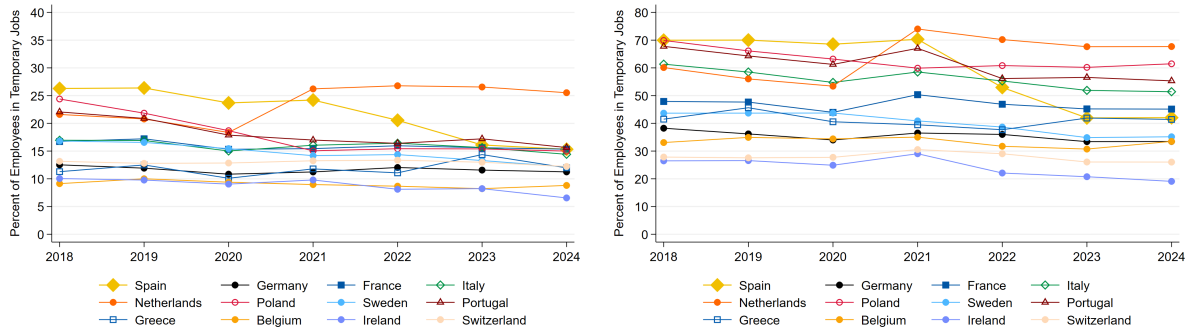
Marinescu, I., D. Skandalis, and D. Zhao (2021): "The impact of the Federal Pandemic Unemployment Compensation on job search and vacancy creation," *Journal of Public Economics*, 200, 104471.

Pijoan-Mas, J. and P. Roldan-Blanco (2025): "Dual Labor Markets and the Equilibrium Disribution of Firms," BSE Working Paper.

APPENDIX (FOR ONLINE PUBLICATION)

A Figures

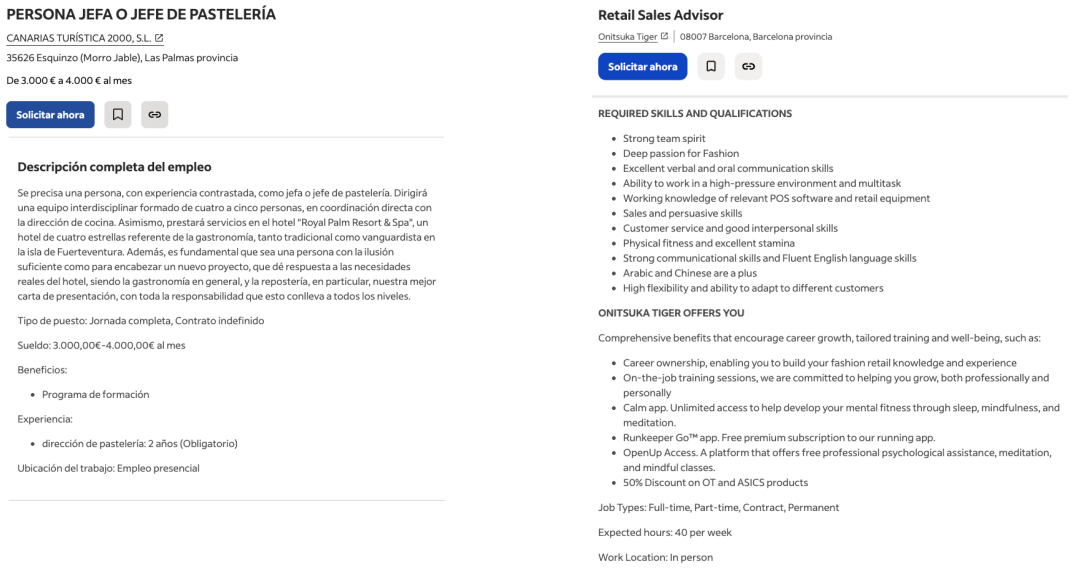
Figure A.1: Temporary Contract Share Across Countries



(a) All employees (EU-LFS) (b) Newly hired employees (EU-LFS)

Notes: The figure plots the share of employees in temporary jobs in Spain and several other European countries from 2018 to 2024. Panel (a) shows all employees. Panel (b) shows newly hired employees, defined as those with tenure of 1 year or less. Data is restricted to dependent employees who were employed and working at least 15 hours per week, excluding the self-employed (*stapro=3*). A job is classified as temporary if the contract is reported as fixed-term (*temp=3*). *Source:* EU-LFS

Figure A.2: Sample Job Postings on Indeed in Spain



PERSONA JEFA O JEFE DE PASTELERÍA

CANARIAS TURÍSTICA 2000, S.L.

35626 Esquinzo (Morro Jable), Las Palmas provincia

De 3.000 € a 4.000 € al mes

Solicitar ahora

Descripción completa del empleo

Se precisa una persona, con experiencia contrastada, como jefa o jefe de pastelería. Dirigirá una equipo interdisciplinar formado de cuatro a cinco personas, en coordinación directa con la dirección de cocina. Asimismo, prestará servicios en el hotel "Royal Palm Resort & Spa", un hotel de cuatro estrellas referente de la gastronomía, tanto tradicional como vanguardista en la isla de Fuerteventura. Además, es fundamental que sea una persona con la ilusión suficiente como para encabezar un nuevo proyecto, que dé respuesta a las necesidades reales del hotel, siendo la gastronomía en general, y la repostería, en particular, nuestra mejor carta de presentación, con toda la responsabilidad que esto conlleva a todos los niveles.

Tipo de puesto: Jornada completa, Contrato indefinido

Sueldo: 3.000,00€-4.000,00€ al mes

Beneficios:

- Programa de formación

Experiencia:

- dirección de pastelería: 2 años (Obligatorio)

Ubicación del trabajo: Empleo presencial

Retail Sales Advisor

Onitsuka Tiger | 08007 Barcelona, Barcelona provincia

Solicitar ahora

REQUIRED SKILLS AND QUALIFICATIONS

- Strong team spirit
- Deep passion for Fashion
- Excellent verbal and oral communication skills
- Ability to work in a high-pressure environment and multitask
- Working knowledge of relevant POS software and retail equipment
- Sales and persuasive skills
- Customer service and good interpersonal skills
- Physical fitness and excellent stamina
- Strong communicational skills and Fluent English language skills
- Arabic and Chinese are a plus
- High flexibility and ability to adapt to different customers

ONITSUKA TIGER OFFERS YOU

Comprehensive benefits that encourage career growth, tailored training and well-being, such as:

- Career ownership, enabling you to build your fashion retail knowledge and experience
- On-the-job training sessions, we are committed to helping you grow, both professionally and personally
- Calm app. Unlimited access to help develop your mental fitness through sleep, mindfulness, and meditation.
- Runkeeper Go™ app. Free premium subscription to our running app.
- OpenUp Access. A platform that offers free professional psychological assistance, meditation, and mindful classes.
- 50% Discount on OT and ASICS products

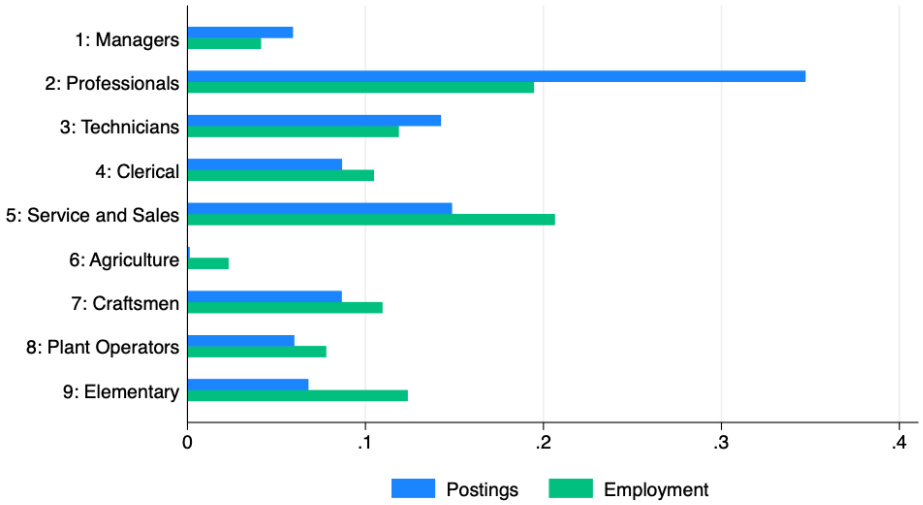
Job Types: Full-time, Part-time, Contract, Permanent

Expected hours: 40 per week

Work Location: In person

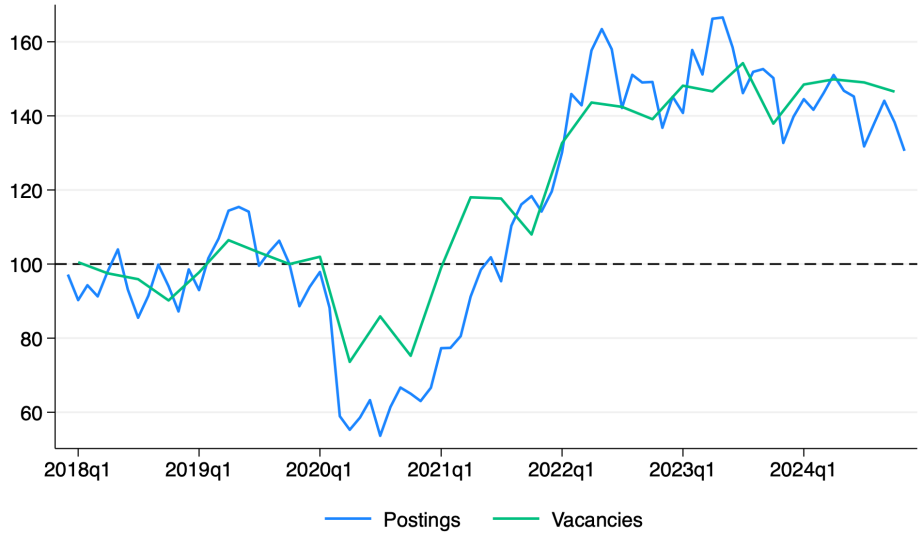
Notes: The figure shows excerpts from two job postings on Indeed in Spain that mention training and contract type, one written in Spanish and one in English. *Source: Indeed*

Figure A.3: Job Postings and Employment by ISCO 1-Digit Occupation



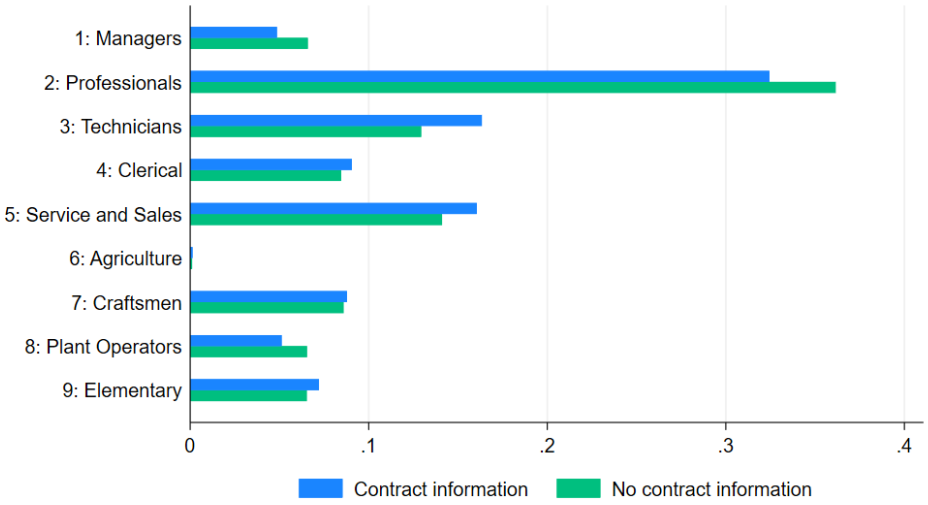
Notes: The figure shows the breakdown of Indeed job postings and employment by ISCO 1-digit occupation in 2021, the last pre-reform year. *Sources:* Indeed and INE

Figure A.4: Time Series of Job Postings and Job Vacancies, 2018-2024



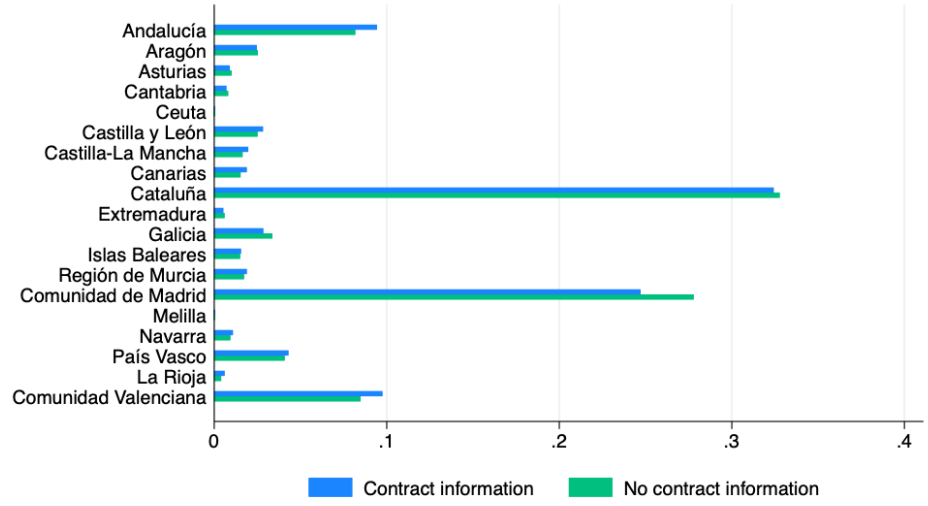
Notes: The figure shows the time series of job postings on Indeed and survey-based job vacancies in Spain, indexed to 100 in the fourth quarter of 2019. The data is not seasonally adjusted. Job posting data is monthly. Vacancy data is only available quarterly. *Sources: Indeed and Eurostat*

Figure A.5: Postings with and without Contract Information by ISCO 1-Digit Occupation



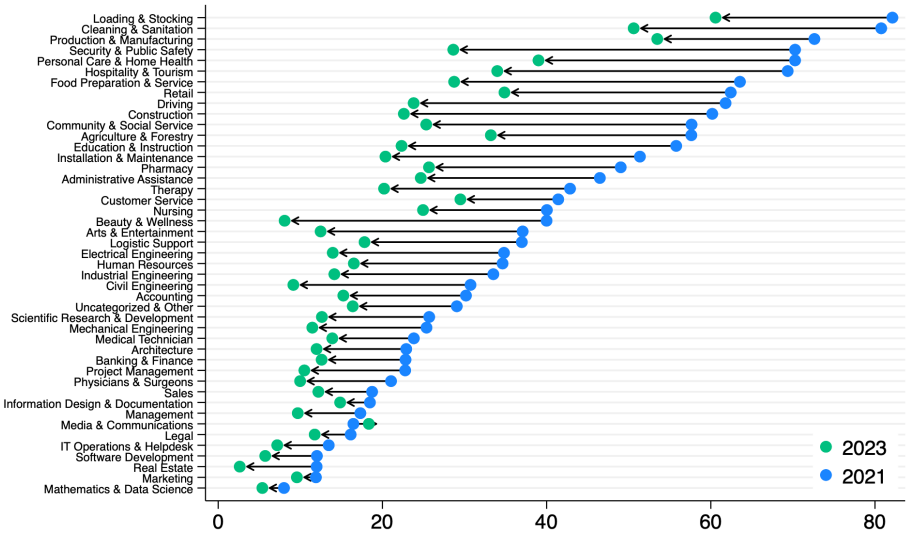
Notes: The figure compares the breakdown of Indeed job postings with and without explicit information on the contract type offered by ISCO 1-digit occupation in 2021, the last pre-reform year. *Source:* Indeed

Figure A.6: Postings with and without Contract Information by Region

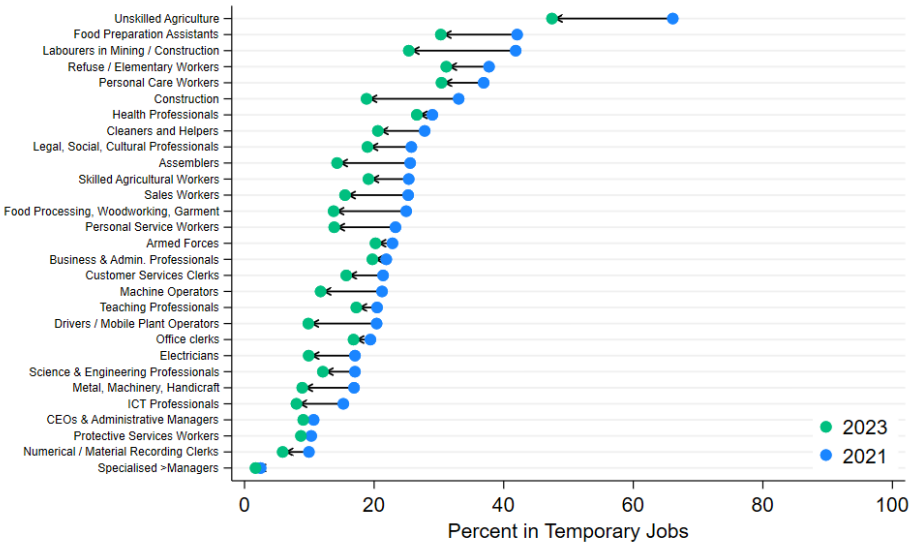


Notes: The figure compares the breakdown of Indeed job postings with and without explicit information on the contract type offered by region (autonomous community) in 2021, the last pre-reform year. *Source:* Indeed

Figure A.7: Change in Temporary Contract Share by Occupation



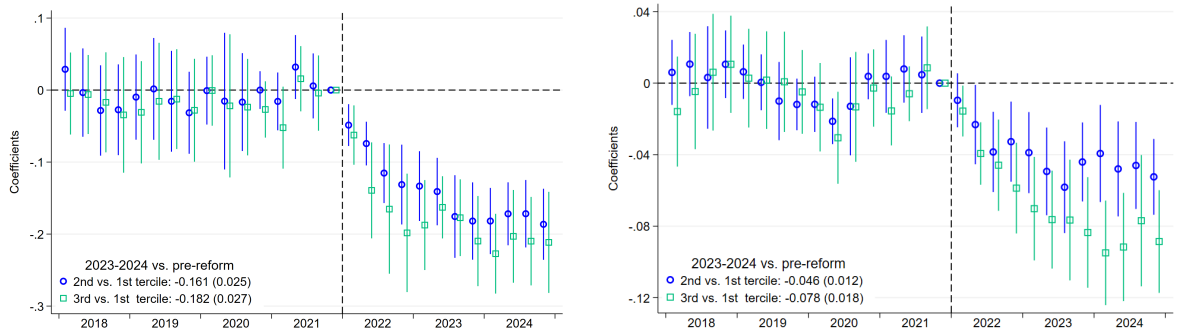
(a) Indeed Job Postings



(b) EU Labour Force Survey

Notes: The figure shows the share of temporary job postings and the share of temporary jobs in Spain in 2021 and 2023, the last pre-reform year and the first full post-reform year. Panel (a) is based on Indeed's internal occupational categories. Panel (b) is based on 2-digit ISCO occupational categories, with some occupations grouped together for clarity of presentation. *Sources:* Indeed and EU-LFS

Figure A.8: Reform Effect on Temporary Employment Share—2019 treatment assignment

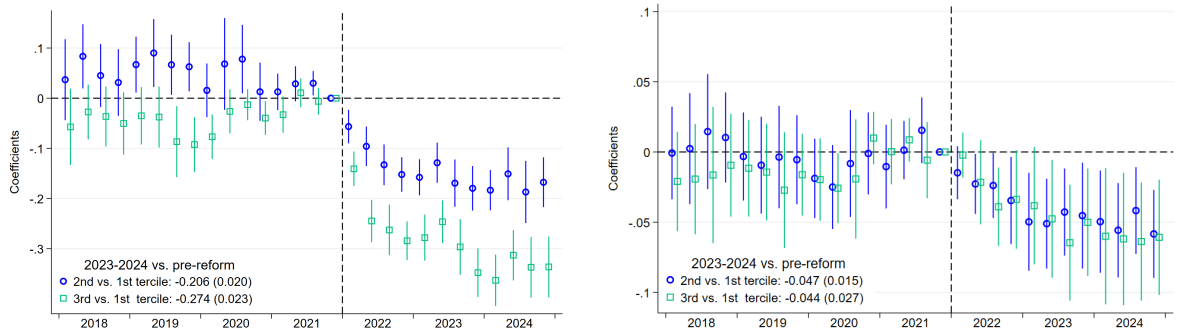


(a) Indeed Job Postings

(b) EU Labour Force Survey

Notes: The figure shows the reform effect on the temporary contract share from the same specification as in Figure 2, with the only change being the use of 2019 temporary contract shares by occupation for the assignment to terciles. Vertical dashed lines denote the 2022 labour market reform. *Sources:* EU-LFS and Indeed

Figure A.9: Reform Effect on Temporary Employment Share—Alternative Treatment Assignments

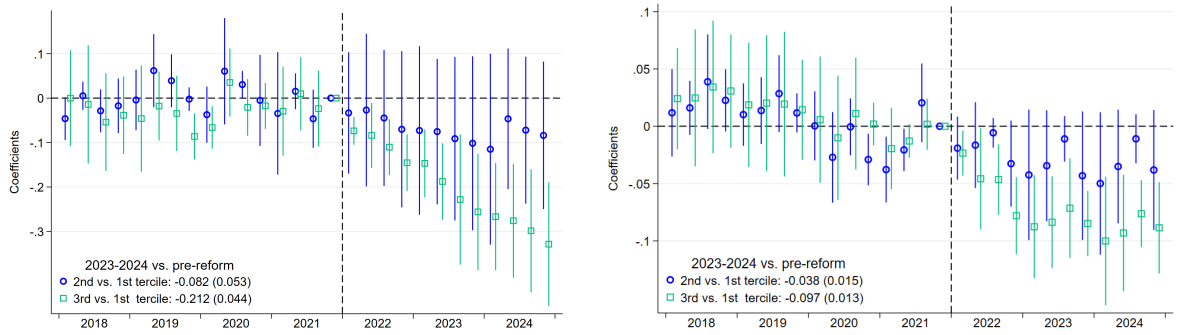


(a) Indeed Job Postings
Job-title level assignment

(b) EU Labour Force Survey
ISCO 2-digit occupation-level assignment

Notes: The figure reports event-study estimates for alternative treatment assignments. Panel (a) is based on a treatment assignment at the job title level rather than the occupation level as shown in Figure 2. Panel (b) assigns the treatment based on 2-digit ISCO occupations instead of 3-digit ISCO occupations as shown in Figure 2. Vertical dashed lines denote the 2022 labour market reform. *Sources:* EU-LFS and Indeed

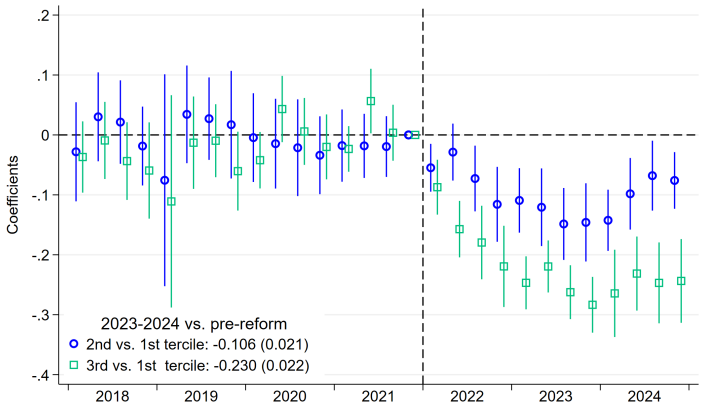
Figure A.10: Reform Effect on Temporary Employment Share—1-digit ISCO Assignment Based on Share of *obra y servicio* Contracts



(a) Indeed Job Postings (b) EU Labour Force Survey

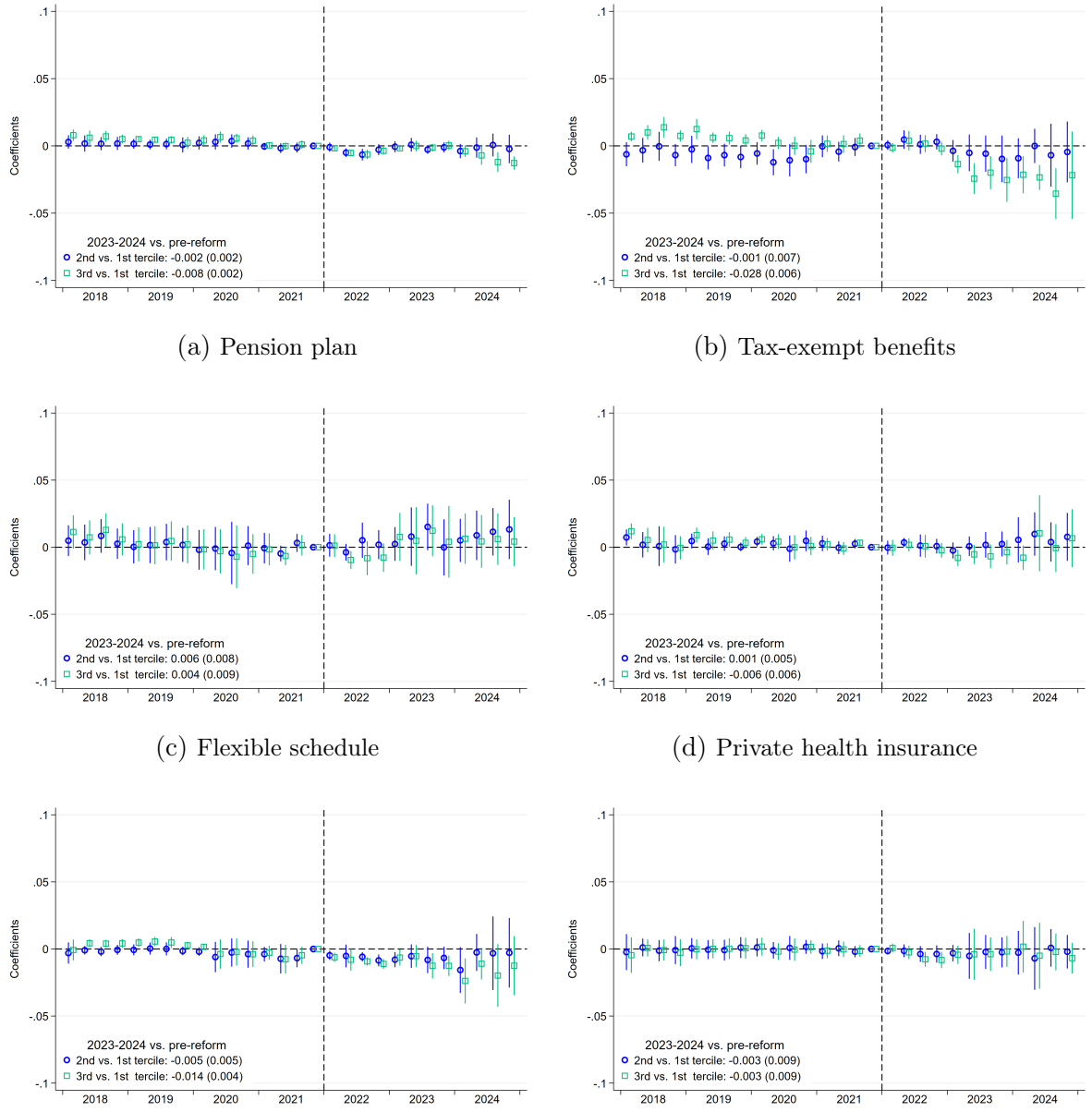
Notes: This figure uses a treatment assignment based on the share of *obra y servicio* contracts at the 1-digit ISCO level. The treatment assignment is based on EPA data, the analysis on Indeed job postings and EU-LFS data. Vertical dashed lines denote the 2022 labour market reform. *Sources:* Indeed, EU-LFS and EPA

Figure A.11: Reform Effect on Temporary Employment Share—Indeed Job Postings—Equal Weighting of Occupations



Notes: The figure reports event-study estimates weighting each occupation equally. The vertical dashed line denotes the 2022 labour market reform. *Source:* Indeed

Figure A.12: Reform Effect on Popular Amenities in Job Postings



(a) Pension plan

(b) Tax-exempt benefits

(c) Flexible schedule

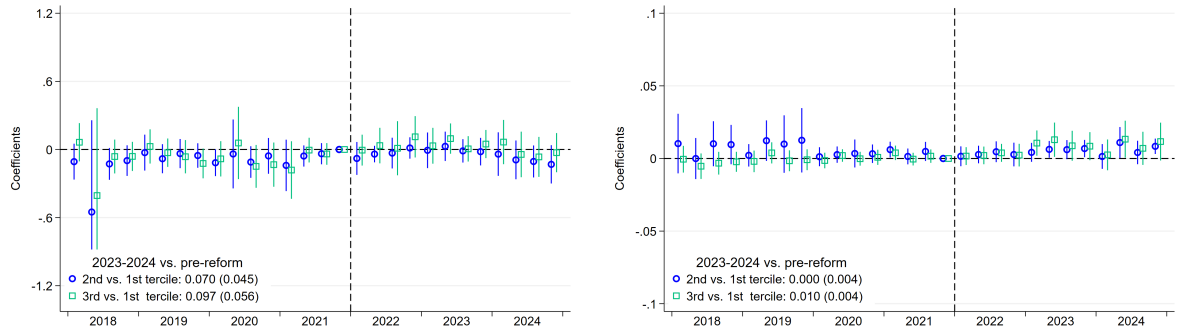
(d) Private health insurance

(e) Life insurance

(f) Subsidised food

Notes: The figure shows event study estimates of the effect of the reform on the share of job postings that advertise six popular benefits other than training. Occupations are grouped into terciles according to the share of temporary contracts in 2021. Vertical dashed lines denote the 2022 labour market reform. The y-axis scale is the same as in Figure 3, which shows the effect on training. *Source:* Indeed.

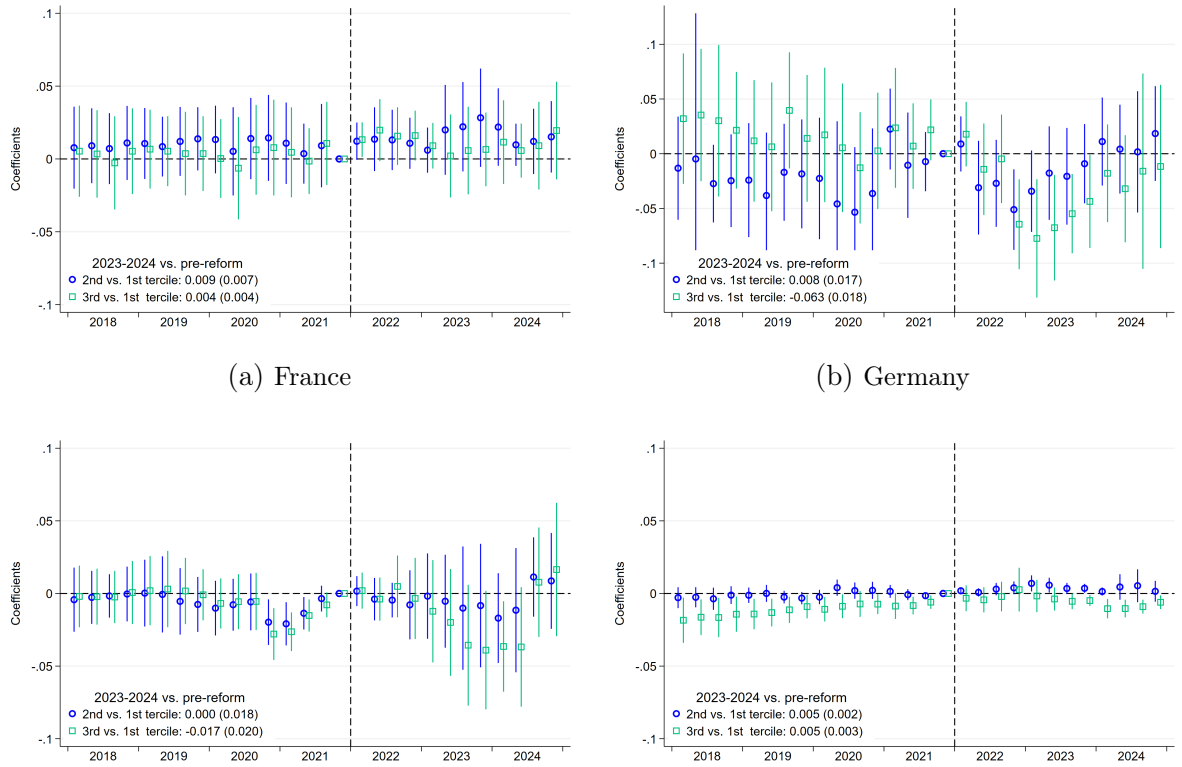
Figure A.13: Reform Effect on Recruitment Behaviour



(a) Posting duration (b) No experience required

Notes: The figure shows event study estimates of the effect of the reform on the logarithm of the number of days the posting is live on Indeed in panel (a) and the share of job postings that specify that "no experience is required." Occupations are grouped into terciles according to the share of temporary contracts in 2021. Vertical dashed lines denote the 2022 labour market reform. The y-axis scale in panel (b) is the same as in Figure 3, which shows the effect on training. *Source:* Indeed.

Figure A.14: Event Studies for Training in Job Postings in Other Large European Countries

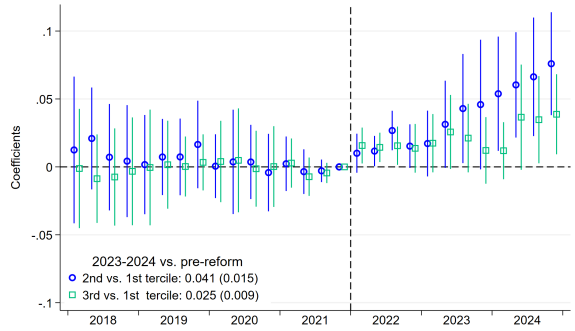


(a) France (b) Germany

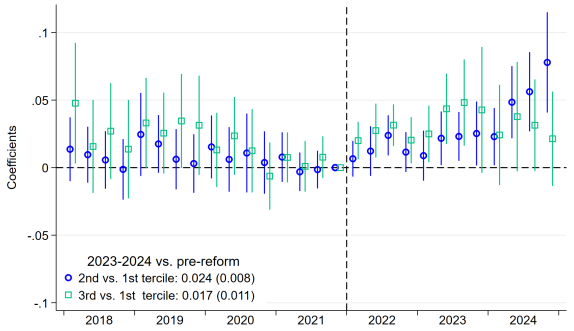
(c) Netherlands (d) UK

Notes: The figure shows event study estimates of the (placebo) effect of the Spanish reform on the share of job postings that advertise training in four other large European countries. Occupations are grouped into terciles according to the share of temporary contracts in Spain in 2021. Vertical dashed lines denote the Spanish 2022 labour market reform. *Source:* Indeed.

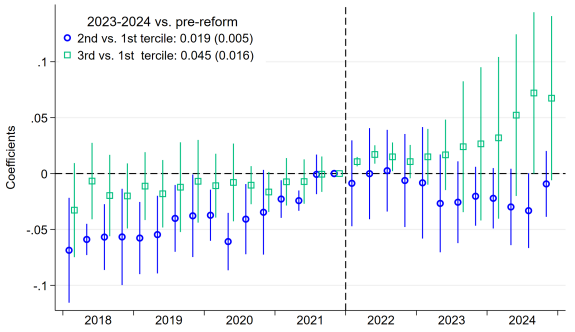
Figure A.15: Reform Effect on Training in Job Postings—Robustness



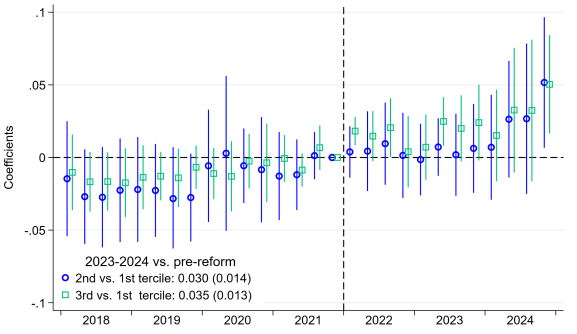
(a) 2019 treatment assignment



(b) Job-level treatment assignment



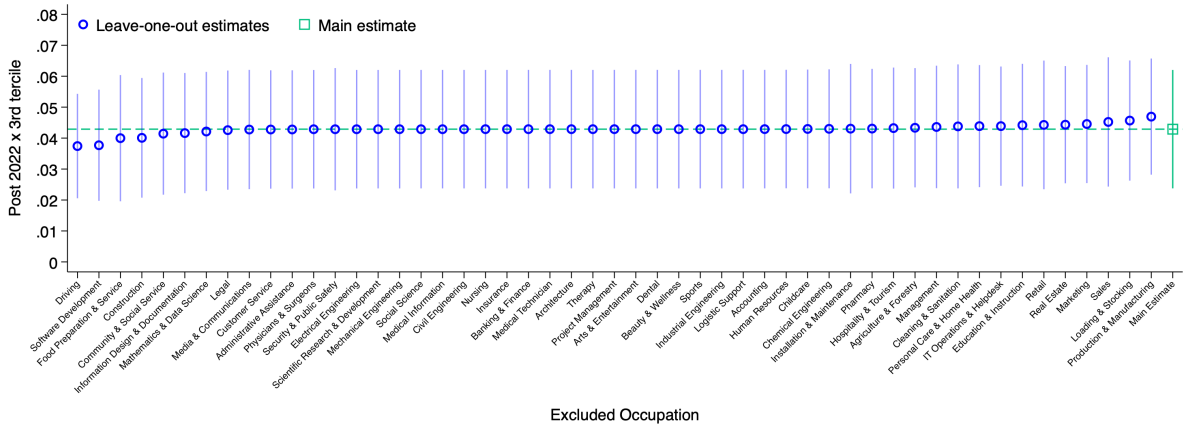
(c) ISCO 1-digit treatment assignment based on the share of *obra y servicio* contracts



(d) Equally weighting each occupation

Notes: The figure shows event study estimates of the effect of the reform on the share of job postings that advertise training. In Panel (a), occupations are grouped into terciles according to the share of temporary contracts in 2019. In Panel (b), job titles are grouped into terciles according to the share of temporary contracts in 2021. In Panel (c), assignment to terciles is based on the share of *obra y servicio* contracts by ISCO 1-digit occupation. In Panel (d), each occupation is equally weighted. Vertical dashed lines denote the 2022 labour market reform. *Source:* Indeed.

Figure A.16



Notes: The figure reports leave-one-out estimates of the effect of the reform on the share of job postings advertising training. Each point shows the estimate of λ_2^3 from equation 2 (Post 2022 $\times$ 3rd tercile), obtained from a regression with occupation and quarter fixed effects, excluding the occupation indicated on the horizontal axis. The estimate on the far right corresponds to the full-sample coefficient on Post 2022 $\times$ 3rd tercile reported in column 2 of Table 2. Standard errors are clustered at the occupation level, and 95% confidence intervals are shown. *Source:* Indeed

B Tables

Table B.1: Reform Effect on Temporary Contract Share—Job Postings

	(1)	(2)	(3)	(4)
Post 2022 x 2nd tercile	-0.109***	-0.106***	-0.106***	-0.052***
	(0.031)	(0.030)	(0.030)	(0.018)
Post 2022 x 3rd tercile	-0.232***	-0.214***	-0.210***	-0.100***
	(0.030)	(0.031)	(0.031)	(0.022)
Pre-reform mean DV (1st tercile)	0.215	0.215	0.215	0.216
Pre-reform mean DV (2nd tercile)	0.411	0.411	0.411	0.415
Pre-reform mean DV (3rd tercile)	0.673	0.673	0.673	0.681
Quarter and occupation FE		✓	✓	✓
Region FE			✓	✓
Firm FE				✓
Observations	1,139,407	1,139,407	1,139,406	1,104,615

Notes: The table shows the effect of the reform on the temporary contract share after 2022 under a range of specifications. Column (1) contains no control variables. Column (2) adds quarter and occupation FEs like in panel (a) of Figure 2. Column (3) adds indicators for regions (autonomous communities). Column (4) adds firm fixed effects. Treatment assignment is based on occupations' 2021 temporary contract shares. The reported pre-reform means of the dependent variable are shown separately for terciles of the 2021 occupation-level temporary contract share. The sample contains 67,753 firms. Standard errors are clustered at the occupation level. Significance levels: * 10%, ** 5%, *** 1%. *Source*: Indeed

Table B.2: Reform Effect on Temporary Employment—EU-LFS

	(1)	(2)	(3)	(4)
Post 2022 x 2nd tercile	-0.061***	-0.048***	-0.041***	-0.040***
	(0.016)	(0.012)	(0.011)	(0.011)
Post 2022 x 3rd tercile	-0.070***	-0.067***	-0.066***	-0.065***
	(0.019)	(0.017)	(0.017)	(0.017)
Pre-reform mean DV (1st tercile)	0.115	0.115	0.115	0.115
Pre-reform mean DV (2nd tercile)	0.233	0.233	0.233	0.233
Pre-reform mean DV (3rd tercile)	0.350	0.350	0.350	0.350
Quarter and occupation FE		✓	✓	✓
Individual controls			✓	✓
Region FE				✓
Industry FE				✓
Observations	1,294,850	1,294,850	1,294,850	1,294,850

Notes: The table shows the effect of the reform on the temporary employment after 2022 under a range of specifications. Column (1) contains no control variables. Column (2) adds quarter and occupation FEs like in panel (b) of Figure 2. Column (3) individual control variables (gender, age and education). Column (4) adds indicators for regions (autonomous communities) and industries. Treatment assignment is based on occupations' 2021 temporary contract shares. The reported pre-reform means of the dependent variable are shown separately for terciles of the 2021 occupation-level temporary contract share. Standard errors are clustered at the occupation level. Significance levels: * 10%, ** 5%, *** 1%. *Source*: EU-LFS

Table B.3: Reform Effect on Training—EU-LFS

Dependent variable:	Any training received in past 4 weeks		Formal training or education in past 4 weeks	
	(1)	(2)	(3)	(4)
Post 2022 x 2nd tercile	-0.007	-0.002	0.000	0.004*
	(0.006)	(0.006)	(0.002)	(0.002)
Post 2022 x 3rd tercile	-0.005	-0.001	0.004	0.006**
	(0.008)	(0.008)	(0.003)	(0.003)
Pre-reform mean DV (1st tercile)	0.160	0.160	0.043	0.043
Pre-reform mean DV (2nd tercile)	0.124	0.124	0.045	0.045
Pre-reform mean DV (3rd tercile)	0.139	0.139	0.049	0.049
Quarter and occupation FE	✓	✓	✓	✓
Individual controls		✓		✓
Region FE		✓		✓
Industry FE		✓		✓
Observations	1,294,600	1,294,600	1,294,600	1,294,600

Notes: The table shows the effect of the reform on training as measured in the European Labour Force Survey. Columns (1) and (3) include only quarter and occupation FEs like in panel (b) of Figure 2. Columns (2) and (4) add individual control variables (gender, age and education) and indicators for regions (autonomous communities) and industries. Treatment assignment is based on occupations' 2021 temporary contract shares. The reported pre-reform means of the dependent variable are shown separately for terciles of the 2021 occupation-level temporary contract share. Standard errors are clustered at the occupation level. Significance levels: * 10%, ** 5%, *** 1%. *Source*: EU-LFS