Banning Outsourcing: The 2023 Restriction of Temp Agency Hiring in the Construction Sector in Oslo

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Abstract

This paper provides the first evaluation of a 2023 reform that *banned* firms' use of temporary agency labor in Norway. We study the effects on temporary agency workers and client firms. The ban applied to construction sites in the Oslo region, enabling a difference-in-differences (DiD) design that we implement using rich administrative register data, as well as spell-level data from temp agencies that allows linking temp agency workers to their hiring firms. Workers initially employed by temp agencies in construction experience earnings losses of about 15 percent relative to the control group. About 60 percent of the losses in temp agency employment result in permanent jobs, while about 40 percent result in unemployment. Firms that hire temp agency workers show only very small effects in terms of hiring and financial outcomes.

1 Introduction

As a prominent facet of alternative work arrangements, the use of temporary agency workers has increased in many OECD countries (Katz and Krueger, 2019). This growth has been controversial and has been subject to active policy debates, with countries varying in their regulatory approaches. On the one hand, temporary agency work is associated with income instability, and agency workers are often paid less than directly employed workers performing similar tasks at the same workplace (Drenik et al., 2023; Bergeaud et al., 2024), with outsourcing also linked to persistently worse employment outcomes and reduced non-wage benefits (Goos et al., 2025). This suggests that cost reduction is an important motivation for firms' use of temporary agency labor, and that agency hiring may enable firms to suppress wages (Weil, 2014). Importantly, this evidence also suggests the limited effectiveness of existing regulations that mandate equal pay for temp agency workers

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and direct employees (as in Argentina; see Drenik et al., 2023). On the other hand, temp agencies can provide a stepping stone for workers to build experience and human capital (Autor, 2001) and increase the operational flexibility of firms (Houseman, 2001). Hence, the overall effects of temp agency labor, and the effects of regulations that facilitate, curb, or even outright ban it, are ambiguous (see also Bilal and Lhuillier, 2021, for a structural analysis of the equity-efficiency trade-off of outsourcing). Restrictions on temporary agency hiring can be understood as a form of employment protection legislation (EPL), and a large theoretical literature has shown that such regulations have ambiguous effects on employment and welfare (Cahuc and Postel-Vinay, 2002; Boeri and Garibaldi, 2007). The insider-outsider theory (Lindbeck and Snower, 1988, 2001) provides a further lens: by eliminating a flexible entry point into the labor market, banning temp agency work may protect insiders while pushing outsiders into unemployment or more precarious contract forms.

In this paper, we study the effects of a reform introduced in Norway in 2023 that *banned* the use of temporary agency workers on construction sites in the greater capital region of Oslo, effective April 1, 2023. Since the ban applied only to the Oslo region and only to the construction sector, other regions serve as a natural control group, allowing us to implement a difference-in-differences (DiD) design. We examine the effects of the ban on both sides of the market: workers' employment transitions, job quality, and earnings; and client firms' hiring decisions, labor inputs, and financial performance. The reform also tightened the nationwide rules for temporary agency hiring more broadly; we focus on the regional ban, as it provides the sharpest source of identifying variation.

The Norwegian ban offers an unusually clean setting for studying the effects of restricting temporary agency labor. Several features contribute to this. First, the sector- and region-specificity of the ban creates a well-defined treatment and control group. Second, the ban had a sharp implementation date and was *absolute* in the Oslo region, fully precluding all permissible conditions for temp agency hiring on construction sites, unlike the nationwide tightening, which merely removed one of several legal bases. Third, the reform was motivated by longstanding political objectives of the Labor Party government to promote permanent employment, not by a macroeconomic downturn or a sector-specific crisis, making it plausibly exogenous to contemporaneous labor-market conditions.

The closest recent policy analogue is Mexico's 2021 ban on domestic outsourcing, which sharply reduced outsourcing and is estimated to have raised wages and improved related labor-market outcomes (Estefan et al., 2024; Moreno-Contreras and van Gameren, 2025). However, Mexico is an unusual institutional setting: outsourcing was widely used to circumvent mandatory profit-sharing (sometimes effectively outsourcing the entire workforce), so the measured effects of the ban may partly reflect enforcement of profit-sharing compliance rather than the impact of restricting outsourcing per se, limiting extrapolation to more "normal" temp-agency settings (Colonna and Aldeco Leo, 2024). A restriction on outsourcing to non-core functions in Peru in 2022 had no detectable effects on employment or wages (Jiménez and Rendon, 2025). Norway's ban, by contrast, targeted standard temp agency arrangements in a well-functioning Nordic labor market

characterized by compressed wage structures, strong unions, and generous social insurance (Barth et al., 2014), allowing us to isolate the direct effects of eliminating temporary agency labor on workers and firms.

A key empirical challenge in studying temporary agency labor is that standard administrative data identify the temp agency as the worker's employer but do not identify the *client firm* where the worker actually performs their tasks. This is a well-known obstacle in the literature (Drenik et al., 2023; Goldschmidt and Schmieder, 2017). We overcome this challenge by combining full-population Norwegian linked employer-employee register data, which allow us to identify all temp agency workers in the economy by the industry code of their employer, with detailed employment records from major temp agencies that link each worker-spell to the specific client firm. This linkage is essential for understanding the mechanisms through which the ban affected the labor market. On the worker side, it allows us to trace whether displaced temp agency workers transition to direct employment at their former client firms or end up at entirely different employers or in unemployment. On the firm side, it allows us to identify which construction firms actually relied on temp agency labor before the ban and to study how these firms adjusted their workforce composition and operations in response.

We find that the ban sharply reduced temporary agency employment among affected workers: the probability of working through a temp agency fell by approximately 30 percentage points relative to the control group. A substantial share of these workers transitioned to permanent direct employment, with the probability of holding a permanent job increasing by about 20 percentage points initially, attenuating to 10–13 percentage points over time. However, the ban also pushed a significant fraction of workers into unemployment, with an increase of approximately 10 percentage points. Earnings from temp agencies fell by roughly NOK 10,000, largely, though not fully, offset by earnings from other types of employment, implying overall earnings losses of about 15 percent. In sum, about 60 percent of the reduction in temp agency employment was absorbed into permanent jobs, while about 40 percent resulted in unemployment. On the firm side, the probability of hiring temp agency workers declined by about 15 percentage points, but firms showed almost no compensatory increase in direct employment levels or total wage bills. Instead, firms substituted toward other margins of workforce flexibility: the share of fixed-term contracts among direct employees increased. The effects on revenue and profitability were small. The reform thus partially achieved its stated goal of converting temporary into permanent employment, but at the cost of pushing a significant share of affected workers into unemployment. Firms, rather than expanding permanent hiring to replace lost temp agency labor, adjusted along other margins of flexibility.

To our knowledge, this paper provides the first evaluation of an outright ban on temporary agency work in an advanced economy with a standard labor market setting. Our contribution is related to several strands of the literature. Most closely, Estefan et al. (2024) and Moreno-Contreras and van Gameren (2025) study Mexico's 2021 outsourcing ban; as discussed above, that setting differs substantially, and our results reveal a more nuanced picture with significant

disemployment effects alongside gains in permanent employment. On the data side, our approach builds on Drenik et al. (2023), who pioneered the use of linked temp-agency-to-client-firm data in Argentina to study wage gaps between temp and direct workers; we bring a similar data innovation to the evaluation of a major policy reform. More broadly, the paper contributes to the extensive literature on the labor market effects of temporary agency work and its regulation. Prior work has debated whether temp agencies serve as stepping stones to permanent employment (Autor, 2001; Kvasnicka, 2009; Autor and Houseman, 2010; Jahn and Rosholm, 2014) or primarily enable firms to reduce labor costs and suppress wages (Houseman, 2001; Dube and Kaplan, 2010; Weil, 2014; Goldschmidt and Schmieder, 2017; Bergeaud et al., 2024; Gurer and Taymaz, 2025; Felix and Wong, 2024). Felix and Wong (2024) show that the legalization of outsourcing in Brazil harmed incumbent workers through layoffs and lost wage premia while expanding entry for younger workers, suggesting that the effects of outsourcing regulations are heterogeneous across worker types. Our setting provides direct causal evidence from a binding policy intervention, rather than cross-sectional or correlational comparisons, on how an outright prohibition reshapes outcomes for both workers and firms. The finding that the ban partly displaced workers into fixed-term contracts rather than permanent positions also resonates with Blanchard and Landier (2002), who show that partial labor market reforms can have unintended consequences when firms substitute across contract types. More broadly, our results connect to the EPL literature: Cahuc and Postel-Vinay (2002) show theoretically that the effects of restricting temporary contracts depend on the overall strictness of employment protection, and Boeri and Garibaldi (2007) demonstrate that two-tier reforms produce only transitory employment gains. Our finding that a significant share of displaced temp workers end up in unemployment rather than permanent jobs is consistent with the insider-outsider framework (Lindbeck and Snower, 1988, 2001), in which eliminating a flexible labor market channel harms outsiders who lack access to insider positions.

The remainder of the paper is organized as follows. Section 2 describes the institutional background and data. Section 3 presents our empirical approach. Section 4 presents the results, including the aggregate effects on temp agency work, effects on individual temp agency workers, and effects on client firms. Section 5 concludes.

2 Institutions and Data

2.1 Institutional background and the reform

Institutional context before the reform. The default form of employment in Norway is permanent, but fixed-term and temp agency employment are allowed in certain situations. Hiring of workers from temp agencies is regulated by Section 14-12 of the Working Environment Act. The rules are largely the same as those governing direct fixed-term employment, but with some differences. Fixed-term employment is regulated by Section 14-9, second paragraph, stating that

> "an agreement on fixed-term employment may nevertheless be entered into:

(a) when the work is of a temporary nature

(b) for work in place of another person or others (substitute work)

(c) for practical training

(d) with participants in labour market measures organized by or in cooperation with the Labour and Welfare Administration

(e) with athletes, sports coaches, referees and other leaders within organized sport"

Before the regulatory changes in 2023, hiring from temp agencies was permitted in the same situations, items a–e. In addition, it was legal to hire workers beyond the situations covered by items a–e if the undertaking was bound by a collective agreement with a trade union having the right to conclude collective agreements under the Labor Disputes Act.[1]

The use of temp agency work has increased steadily in Norway after it was first allowed in 2000, especially after the 2004 EU enlargement by Eastern European countries and in certain sectors such as construction (Cools et al., 2022). The growth has been controversial, and the Labor Party-led government proposed a reform to limit the use of temp agencies in June 2022. The purpose of the reform is described in Prop. 131 L (2021–2022)[2] as: "The proposals are justified by the government's objective of ensuring full-time and permanent positions that support the bilateral relationship between the employee and the employer. Permanent employment provides individual workers with security and predictability regarding their future work situation and income. A high share of permanent positions can also contribute to more productive, adaptable, and competitive enterprises, partly as a result of investments in employees' skills and competence." (Second paragraph, first chapter, own translation)

The reform. The most important changes in the reform were:

- that hiring-in pursuant to Section 14-9, second paragraph, item a ("when the work is of a temporary nature") was no longer permitted
- that hiring-in from staffing agencies for construction work on building sites in Oslo, Akershus, Østfold, Buskerud, and Vestfold was not permitted
- that workers who have been continuously hired in for more than three years are entitled to permanent employment with the hiring enterprise

The amendments were adopted by the Storting (Parliament) on 20 December 2022 and became active on April 1 2023. During the three transitional months between April and July 2023, hiring agreements that existed when the amendments entered into force could continue to be used, and

[1] In such undertakings, "the employer and employee representatives who together represent a majority of the category of employees concerned by the hiring-in may enter into a written agreement on time-limited hiring-in notwithstanding the provisions of the first paragraph" (Section 14-12, second paragraph). We plan to study such agreements in future work.

[2] https://www.regjeringen.no/no/dokumenter/prop.-131-l-20212022/id2919207/

hiring was also permitted where contracts for services and binding offers presupposing the use of temp agency labor had been entered into before the amendments took effect. In addition, the Ministry adopted regulations allowing temp agency labor for healthcare personnel to ensure sound operation of health and care services, as well as for workers with specialized expertise for clearly defined projects. Further, temp agency hiring was still permitted if the employer and employee representatives enter into an agreement as described in Section 14-12, second paragraph. Such agreements may therefore, in principle, be used to cover needs that were previously covered by item a ("when the work is of a temporary nature"). However, the prohibition in Oslo, Akershus, Østfold, Buskerud, and Vestfold was absolute, *fully precluding the permissible conditions for temp agency hiring in items a–e.*

2.2 Register Data

Our primary data source consists of linked administrative register data. These data provide long time series, cover the full population, and include unique anonymized identifiers for individuals, establishments, and enterprises, enabling longitudinal tracking across and within data sources. The main register data are drawn from the employer-employee (EE) register (A-ordningen), introduced in 2015 as a unified reporting system for employers to the welfare system administration (NAV), Statistics Norway, and the tax administration. The data have monthly frequency and contain detailed information on employees and their employment relationships, including wages, occupation (Standard Occupational classification, STYRK 98), start and end dates, contracted weekly working hours, labor market status, industry classification (Standard Industrial classification, SIC 2007), and municipality of the workplace. From January 2021, we also observe contract type (permanent or fixed-term employment).

Our wage measure is based on monthly cash payments, which include all monetary remuneration in the employment relationship, including overtime pay, bonuses, holiday pay, and similar payments. For a subset of firms we observe overtime pay, equal to reported monthly overtime compensation. Overtime compensated through time off in lieu is therefore excluded, as is unreported or unregistered overtime. We convert weekly working hours into monthly hours and top-code at the 99.9th percentile.

We link the EE registry data with accounting data for all private limited liability firms (AS) in Norway, which account for roughly three-quarters of private sector employment, including detailed information on revenues and costs. For a changing sample of approximately 15,000 firms that complete an additional annual survey (the OKI survey), the data also include information on expenditures for temporary agency workers.

We obtain information on sole proprietorship from the Register of Business Enterprises and Establishments, based in part on the Central Coordinating Register for Legal Entities. Information on wage income and business income from the Tax Administration's income register is used to identify self-employed contractors, while deduction for trade union membership is used to measure unionization rates at the firm level. Finally, we use residential and demographic information,

including immigration category and country of origin, from the Central Population Register. Immigrants are defined as persons born abroad to two foreign-born parents.

From the EE register we observe employees in temp agencies and their monthly earnings, contracted working hours, and occupations in the employment relationship at the temp agency. However, we do not observe individual assignments, nor the identity of the hiring enterprises where the assignments are performed. For this linkage and details on each assignment, we utilize data supplied by temp agencies directly, as described below.

2.3 Temp Agency Data

Our secondary data source consists of microdata from the temp agencies Adecco, Manpower, JKS, Jobzone, Sonar, and Vikarkompaniet, covering approximately 20 percent of all temp agency workers. These data contain detailed information on each individual assignment, including assignment duration (hours and days), total wages, wages per assignment, occupation or professional field, and the identity of the hiring enterprise.

Statistics Norway anonymized the agency data and linked them to the administrative registers. This linkage allows us to track temp agency workers and their employment characteristics across employers. It also enables analyses of firms that hire workers from these six temp agencies and of changes in direct employment before and after the regulatory reform, as measured with the EE data.

2.4 Variable definitions

Temp agencies are defined as enterprises classified under industry code 78.200 (Temporary employment agency activities) and **temp agency workers** as all employees with positive wage earnings in a temp agency, except for administrative employees (Client/personnel consultants).

The **prohibition zone (Oslo region)** is based on the firm's registered business address in the EE register and includes Oslo, Akershus, Østfold, Buskerud, and Vestfold.

Construction occupations are defined using STYRK 98 occupation codes corresponding to construction trades and related manual occupations.[3]

Construction firms are registered with one of the following industry codes (SIC 2007): 41 Construction of buildings, 42 Civil engineering, and 43 Specialized construction activities.

Self-employed individuals are defined as persons operating a sole proprietorship and employees in limited liability companies with only one employee, as identified in the Register of Business Enterprises and Establishments.

[3]The construction occupation codes (STYRK 98) are: 7121 Bricklayers and stonemasons, 7122 Concrete workers and site laborers, 7123 Iron fixers, 7124 Shutterers, 7125 Carpenters and joiners, 7126 Road workers and construction workers, 7127 Tunnel, mountain and blasting workers, 7128 Scaffolding builders, 7131 Roofers, 7132 Insulation workers, 7133 Glaziers, 7134 Plumbers, 7141 Painters and related workers, 7212 Welders, 7213 Tinsmiths, etc., 7214 Sheet-metal workers, 7215 Riggers and cable splicers, 7241 Electricians, electrical and electronic equipment mechanics and fitters, 7421 Cabinet-makers, 8331 Earth-moving and related plant operators, 8332 Crane, hoist and related plant operators, 8333 Lifting-truck operators, and 9310 Laborers in construction and maintenance.

2.5 Analysis samples

The sample for our worker-level analyses includes all individuals aged 20–67 receiving positive wage payments from a temp agency in November 2022 who are registered with a construction occupation at the same temp agency in the EE register data, have an active employment relationship, and are not apprentices.[4] Table 1 shows descriptive statistics for these workers, stratified by construction sector and the Oslo region, corresponding to our difference-in-differences design. The sample comprises 43,135 temp agency workers: 5,148 in construction occupations in the Oslo region (the treatment group), 10,604 in construction outside Oslo, and the remainder in non-construction occupations. Construction temp workers work substantially more hours through their agency (137–140 hours/month) than non-construction temp workers (118–129 hours/month), but earn somewhat less per month. They are almost exclusively male, more likely to be immigrants (38–51%), and older (average age around 41) than non-construction temp workers. The high immigrant share is notable given that immigrants in Norway, particularly those from low-income countries, face declining employment prospects over time and greater dependence on social insurance (Bratsberg et al., 2014), suggesting that this group may be especially vulnerable to the ban. Unionization rates are higher outside Oslo, at 44% for construction workers versus 28% in the Oslo region.

For our firm-level analyses, we construct two distinct samples of client firms in the building and construction sector. The first sample consists of firms that hired one or more temp workers for a full month (roughly 150 working hours) during the last quarter of 2022 (October–December) from one of the six temp agencies in the temp agency data. The second sample consists of firms that reported costs incurred to temporary agency workers above roughly one annual wage (360,000 2015-NOK) in 2022 in the OKI survey. Both samples are restricted to firms with at least five employees in the EE register on average during the last quarter of 2022; we allow firms to go in and out of business during the observation period (no balancing of samples).[5] Table 2 compares treated firms in the Oslo region with control firms in the rest of Norway. In the temp agency data sample, treated firms are substantially larger than controls (293 versus 59 internal workers on average), reflecting the concentration of large construction firms in Oslo. A similar but less pronounced pattern holds in the OKI survey sample (198 versus 88 internal workers). Treated and control firms are broadly comparable in the share of fixed-term contracts (around 4%), while treated firms have a somewhat higher share of immigrant workers and lower unionization rates.

[4] Table A.1 in the Appendix shows descriptive statistics comparing all workers in the economy, all temp agency workers, and temp agency workers observed in the temp agency data. Temp agency workers work fewer total hours, have lower total wages, are more often immigrants or non-residents, younger, less experienced, and less unionized.

[5] Table A.2 in the Appendix shows descriptive statistics for the full sample of private-sector firms and the two samples of client firms. Client firms are on average larger, use more external labor, and are more unionized than the average firm. The OKI-data sample is on average larger than the temp agency data sample.

3 Methodology

The unique features of the 2023 ban of temp agency hiring in construction in the Oslo region permit a difference-in-differences estimation. The reform was introduced at the same point in time in the whole country, but with regional variation in the construction sector ban. This gives us variation in policy across regions over time that we exploit to identify causal effects of the ban on workers and firms.

We estimate a standard difference-in-differences model of the following form:

$$y_{it} = \delta \text{Treated}_i + \gamma_t \text{Month}_t + \sum_{t=2022m5, t \neq 2022m11}^{2024m12} \beta_t \text{Treated}_i \times \text{Month}_t + X_i + \epsilon_{it}, \quad (1)$$

where y_{it} represents the outcome variable of interest, measured in each month t for individual or firm i.

In the worker analysis, the sample consists of temporary agency workers with a construction occupation in the temp agency data (see Section 2) in November 2022. Within this group, Treated_i is an indicator equal to one if the individual was hired out to a client firm located in Oslo, Akershus, Østfold, Buskerud, or Vestfold, and equal to zero if the client firm was in any other region of Norway.

In the client firm analysis, the sample consists of construction firms that hired from one of the temp agencies in our data during the last quarter of 2022. Here, Treated_i is equal to one if the firm was located in the Oslo region and zero otherwise.

We fix the set of individuals/client firms to those observed in the reference period (November 2022 and last quarter of 2022, respectively) and follow them before and after the reform. As such, the estimates are intention-to-treat effects.

We control for common business cycle trends in the construction sector in Norway with monthly indicators, Month_t, and other characteristics of the individual/client firm with the vector X_i. In the individual analysis, it consists of indicators for immigrant background, resident status, gender, age, age squared, and occupation-group dummies. In the firm analysis, it includes the mean age of workers, the immigrant share, the share of male workers and indicator variables for size (3 categories: 0–21, 21–100, or 100+ employees). All control variables are fixed in the reference period November 2022 and ϵ_{it} are error terms clustered at the individual or firm level.

The coefficients of interest are β_t on the interaction term $\text{Treated}_i \times \text{Month}_t$. They represent the estimated difference between the treatment and control groups over time, relative to November 2022.

The general tightening of the rules (that hiring-in pursuant to Section 14-9, second paragraph, item a ("when the work is of a temporary nature") was no longer permitted) affected both groups. The control group is therefore also partly affected by the reform. However, the ban was limited to the Oslo region and the estimates thus represent the causal effects of that ban, net of the effects of the general tightening.

4 Results

We present our results in three parts. We first document the aggregate effect of the reform on temp agency work using economy-wide data. We then turn to formal difference-in-differences estimates, first for individual temp agency workers and then for client firms.

4.1 Effect on temp agency work

We begin by documenting the aggregate effect of the reform on temp agency work. Figure 1 shows the total earnings of temp agency workers in the economy, separately by the capital region and the rest of the country, as well as the total earnings of direct employees. Panel (a) shows earnings for all workers with a construction occupation, while Panel (b) shows earnings for non-construction workers in the economy. All series are indexed to 1 in November 2022. Total earnings capture variation at both the extensive and intensive margins of employment. Figure A.1 in the appendix presents the corresponding developments in employment (Panels a and b) as well as hires and separations (Panels c and d).

The first notable feature is that temporary agency work is highly cyclical. For example, activity declined sharply after 2022, when the escalation of Russia's invasion of Ukraine led to rising energy and material costs and surging inflation across Europe, slowing down activity in the Norwegian construction sector (Statistics Norway, 2023).

Second, trends in the Oslo region and the rest of the country are relatively similar in the years prior to the reform, but diverge after the reform. Post-reform, total wages paid to temporary agency workers in the Oslo region are around 60 percent lower than in the pre-reform period, with a corresponding decline in employment (Figure A.1, Panels a and b). Panels (c) and (d) show that this decline was driven by a sharp drop in new hiring as soon as the ban was passed and again when it went into effect, while separations initially continued at a similar rate.

Third, the construction sector broadly mirrors the rest of the economy in both respects. However, the post-reform difference in total wages paid to temporary agency workers between the Oslo area and the rest of Norway is substantially larger in construction, which is consistent with the stricter regulations applied to this sector.

Finally, there is evidence of early adjustment to the new rules already from December, when the ban was passed. During the anticipation period (December 2022–March 2023), total earnings of temporary agency workers declined more in Oslo than in the rest of the country. This decline continued in the Oslo area throughout the transition period (April 2023–June 2023), before stabilizing at a lower level after the transition ended in July 2023. These aggregate patterns motivate the formal DiD analyses in the following subsections.

4.2 Effects on temp agency workers

We now turn to individual-level DiD estimates for the sample of temp agency workers in construction defined in Section 2.

Wage earnings. Figure 2 illustrates the impact of the reform on the earnings of pre-reform temporary agency workers. Panel (a) and (b) show that total earnings from all employers decline, particularly in the longer run. Panel (c) and (d) show that earnings from temporary agencies fall by approximately NOK 10,000. Finally, panel (e) and (f) show that the reduction in temporary agency earnings is largely, though not fully, offset by a roughly equivalent increase in earnings from other types of employment.

These changes in earnings are largely driven by shifts in employment at the extensive margin. Figure 3 shows that the probability of receiving positive earnings from any employer decreases by around 7 percentage points, as shown in Panels (a) and (b). Panels (c) and (d) show about a 27 percentage point lower probability of receiving earnings from a temporary agency employer, which is partially offset by an increase in the probability of receiving earnings from a non-temporary employer, accounting for about two-thirds of the decline.

There is also a common time trend in mean outcomes for both the treatment and control groups. Employment in temporary agencies declines over time in both groups, while employment with non-temporary employers increases. The reform appears to have accelerated this reallocation process, although some pre-reform temporary agency workers do not transition into alternative employment.

Figure A.3 in the appendix shows similar effects for workers in the temp agency data sample.

Labor market status. Figure 4 presents stacked estimated effects on labor market status and employment type. Figure A.2 shows the corresponding estimates for each outcome in separate figure panels. The vast majority of temp agency workers have permanent contracts at the agency. When employment opportunities in temp agencies are reduced, affected workers must transition into alternative employment relationships, which may be either permanent or fixed-term, or they may not find alternative employment.

Figure 4 shows that pre-reform temporary agency workers experience a 30 percentage point reduction in the probability of holding a temp-agency job after the reform. It further illustrates how these workers are distributed across four post-reform labor market states: (i) permanent employment with a non-temp employer, (ii) fixed-term employment with a non-temp employer, (iii) unemployment with receipt of unemployment benefits, and (iv) neither employed nor receiving unemployment insurance.

Pre-reform temp agency workers experience a 20 percentage points increase in the probability of holding a permanent job with a non-temp agency employer, which attenuates to approximately 10–13 percentage points in the longer run. At the same time, there is a 5 percentage point increase in the probability of holding a fixed-term direct contract, which likewise declines over time. In addition, there is an almost 10 percentage point increase in the probability of being unemployed. During the first year, nearly all non-employed workers are registered as unemployed and receive unemployment insurance. Over time, however, the share receiving unemployment benefits declines, while an increasing proportion are observed neither in employment nor on

unemployment benefits. This group may include individuals who are unable to find work after exhausting their benefit entitlements, as well as labor migrants who leave the country.

The stated objective of the reform was to increase firms' reliance on permanent direct employment rather than temporary agency work, thereby improving labor market outcomes for agency workers. Our difference-in-differences estimates suggest that the reform achieved this objective only partially. The likelihood of holding a permanent direct employment relationship with the client firm increased, consistent with the policy's intent. However, the reform also led to an increase in transitions into unemployment and fixed-term direct employment, consistent with the substitution dynamics emphasized by Blanchard and Landier (2002) and the theoretical predictions of Cahuc and Postel-Vinay (2002). Fixed-term direct contracts are, in principle, characterized by at least as much, if not greater, employment insecurity as temp agency work, given that agency workers are typically permanently employed by the agency, which facilitates reallocation to new assignments upon contract completion. The increase in unemployment is consistent with the insider-outsider framework (Lindbeck and Snower, 2001): the ban eliminates a channel through which outsiders, including the large share of immigrants in this workforce (Bratsberg et al., 2014), gained access to employment.

Figure A.4 shows similar estimates in the temp agency data sample.

4.3 Effects on client firms

We now turn to firm-level effects. We show results for client firms in the temp agency data, and in the Appendix present figures with results for the OKI survey client firms. Note that as of now we only have balance sheet data for firms up to 2023, but we will update the paper with data for 2024 when it becomes available later this year.

Firm labor inputs. Figure 5 shows how firms that employed temporary agency workers prior to the reform responded to the policy change. Panel (a) shows that wages paid to temp agency workers decreased by approximately NOK 50,000 in the short run, though we note some evidence of a pre-trend in this outcome. On the extensive margin, the probability of hiring temp agency workers declined by about 15 percentage points in the temp agency data. Naturally, the effects are noisier and smaller in the OKI survey sample (Figure A.7 in the Appendix), as the outcomes are measured in the temp agency data and therefore covering only 23 percent of the OKI firms.

Firms appear to at least partly compensate by increasing direct employment. While Figure 6 shows that there was hardly any change in total wages paid to direct employees (Panel a) there appears to be a small increase in the number of internal workers (Panel b). Furthermore, the share of workers on fixed-term contracts among direct employees increased, suggesting that firms partially substituted external temporary labor with internal fixed-term labor (Panel c). Panel (d) shows no clear effects on overtime compensation.

Revenue and costs. Figure 7 shows changes in costs and financial outcomes. Temp agency costs reported in the OKI survey declined (Panel a), while internal labor costs (Panel b) and external services costs (Panel c) show little change. We note suggestive evidence of pre-trends for temp agency costs and labor costs overall. Total operating costs (Panel d), revenue (Panel e), and profits (Panel f) remained largely unaffected by the reform. Interestingly, tracking construction firms that have hired vs. have not hired temp agency labor before and hence are vs. are not directly exposed to the ban, we find little difference in these measures. Similar results are found for the OKI survey sample in Figure A.10 in the Appendix.

5 Conclusion

This paper provides the first evaluation of a 2023 reform that *banned* firms' use of temporary agency labor in Norway. We study effects on temporary agency workers and client firms in the building and construction sector. The ban was specific to the construction sector in one region (the Oslo region), enabling a difference-in-differences design that we implement using rich administrative and unique spell-level data from a subset of temp agencies. We find that affected workers transition out of agency work, with about 60 percent of the reduction in temp agency employment absorbed into permanent jobs, while about 40 percent results in unemployment. Firms that previously hired temp agency workers show only very small effects on direct employment and financial outcomes. These results illustrate the trade-offs emphasized by the EPL literature (Cahuc and Postel-Vinay, 2002; Boeri and Garibaldi, 2007): restricting flexible employment can increase permanent hiring but also generates disemployment, particularly among labor market outsiders (Lindbeck and Snower, 2001). The finding that firms substitute toward fixed-term contracts rather than expanding permanent hiring echoes the unintended consequences of partial labor market reforms documented by Blanchard and Landier (2002).

Our findings carry several policy implications. The ban partially achieved its stated objective of converting temporary agency employment into permanent positions, but at a substantial cost: a significant share of affected workers were pushed into unemployment rather than absorbed into direct employment. The substitution toward fixed-term contracts on the firm side suggests that when one margin of workforce flexibility is eliminated, firms seek alternative channels, potentially undermining the policy's intent to promote employment stability. Policymakers considering similar bans in other sectors or countries should weigh these trade-offs carefully, and may need to complement supply-side restrictions with demand-side measures that incentivize permanent hiring.

Several limitations should be noted. Our analysis covers only the first one and a half years after the ban took effect, capturing primarily short-run adjustment dynamics. The reform targeted a single sector in one region, which provides clean identification but limits our ability to assess general equilibrium effects or spillovers to other sectors. We also cannot observe informal adjustments to the ban, such as potential misclassification of workers as independent contractors or the use of

posted workers from abroad, which may attenuate the measured effects.

The external validity of our findings depends on institutional context. Norway's compressed wage structure, high unionization rates, and generous unemployment insurance may cushion the transition for displaced workers more than would be the case in countries with weaker social safety nets or more decentralized wage-setting. The construction sector also has distinctive features, including project-based production and seasonal demand fluctuations, that may limit direct applicability to other industries where temp agency work serves different functions.

Extending the analysis with additional data from 2024 and beyond will be important for understanding the longer-run equilibrium effects of the ban. The unemployment effects we document may attenuate over time as displaced workers find permanent positions, or they may persist if prolonged joblessness erodes workers' skills and labor market attachment. Our data already show a growing share of affected workers who have exhausted unemployment benefits without transitioning into employment, a pattern that warrants continued monitoring.

References

Autor, D. H. (2001). Why do temporary help firms provide free general skills training? *The Quarterly Journal of Economics*, 116(4):1409–1448.

Autor, D. H. and Houseman, S. N. (2010). Do temporary-help jobs improve labor market outcomes for low-skilled workers? Evidence from "Work First". *American Economic Journal: Applied Economics*, 2(3):96–128.

Barth, E., Moene, K. O., and Willumsen, F. (2014). The Scandinavian model–an interpretation. *Journal of Public Economics*, 117:60–72.

Bergeaud, A., Cahuc, P., Malgouyres, C., Signorelli, S., and Zuber, T. (2024). The wage of temporary agency workers. Technical report, IZA - Institute of Labor Economics.

Bilal, A. and Lhuillier, H. (2021). Outsourcing, inequality and aggregate output. Working Paper 29348, National Bureau of Economic Research.

Blanchard, O. and Landier, A. (2002). The perverse effects of partial labour market reform: Fixed-term contracts in France. *The Economic Journal*, 112(480):F214–F244.

Boeri, T. and Garibaldi, P. (2007). Two tier reforms of employment protection: A honeymoon effect? *The Economic Journal*, 117(521):F357–F385.

Bratsberg, B., Raaum, O., and Røed, K. (2014). Immigrants, labour market performance and social insurance. *The Economic Journal*, 124(580):F644–F683.

Cahuc, P. and Postel-Vinay, F. (2002). Temporary jobs, employment protection and labor market performance. *Labour Economics*, 9(1):63–91.

Colonna, A. and Aldeco Leo, L. R. (2024). Profit-Sharing, Wages, and Worker Compensation: Evidence from Mexico. Technical report, Social Science Research Network.

Cools, S., Hoen, M. F., and Strøm, M. (2022). Atypisk arbeid som hovedtilknytning i arbeidslivet 1995–2021: Omfang, arbeidsvilkår og overganger til fast arbeid. Technical report, Institutt for samfunnsforskning.

Drenik, A., Jäger, S., Plotkin, P., and Schoefer, B. (2023). Paying outsourced labor: Direct evidence from linked temp agency-worker-client data. *Review of Economics and Statistics*, 105(1):206–216.

Dube, A. and Kaplan, E. (2010). Does outsourcing reduce wages in the low-wage service occupations? Evidence from janitors and guards. *ILR Review*, 63(2):287–306.

Estefan, A., Gerhard, R., Kaboski, J. P., Kondo, I. O., and Qian, W. (2024). Outsourcing Policy and Worker Outcomes: Causal Evidence from a Mexican Ban. Working Paper 32024, National Bureau of Economic Research.

Felix, M. and Wong, M. B. (2024). The reallocation effects of domestic outsourcing. Cowles Foundation Discussion Paper 2416, Yale University.

Goldschmidt, D. and Schmieder, J. F. (2017). The rise of domestic outsourcing and the evolution of the German wage structure. *The Quarterly Journal of Economics*, 132(3):1165–1217.

Goos, M., Salomons, A., Scheer, B., and van den Berge, W. (2025). Domestic outsourcing and worker outcomes: Evidence from staffing firms. Working paper, Utrecht University.

Gurer, E. and Taymaz, E. (2025). Skill-biased wage effects of domestic outsourcing. Working Paper 11758, CESifo.

Houseman, S. N. (2001). Why employers use flexible staffing arrangements: Evidence from an establishment survey. *ILR Review*, 55(1):149–170.

Jahn, E. J. and Rosholm, M. (2014). Looking beyond the bridge: The effect of temporary agency employment on labor market outcomes. *European Economic Review*, 65:108–125.

Jiménez, B. and Rendon, S. (2025). Labor market effects of bounds on domestic outsourcing. *Journal of*

Development Economics, 173:103406.

Katz, L. F. and Krueger, A. B. (2019). The rise and nature of alternative work arrangements in the United States, 1995–2015. *ILR Review*, 72(2):382–416.

Kvasnicka, M. (2009). Does temporary help work provide a stepping stone to regular employment? *Journal of the European Economic Association*, 7(2-3):331–340.

Lindbeck, A. and Snower, D. J. (1988). *The Insider-Outsider Theory of Employment and Unemployment*. MIT Press, Cambridge, MA.

Lindbeck, A. and Snower, D. J. (2001). Insiders versus outsiders. *Journal of Economic Perspectives*, 15(1):165–188.

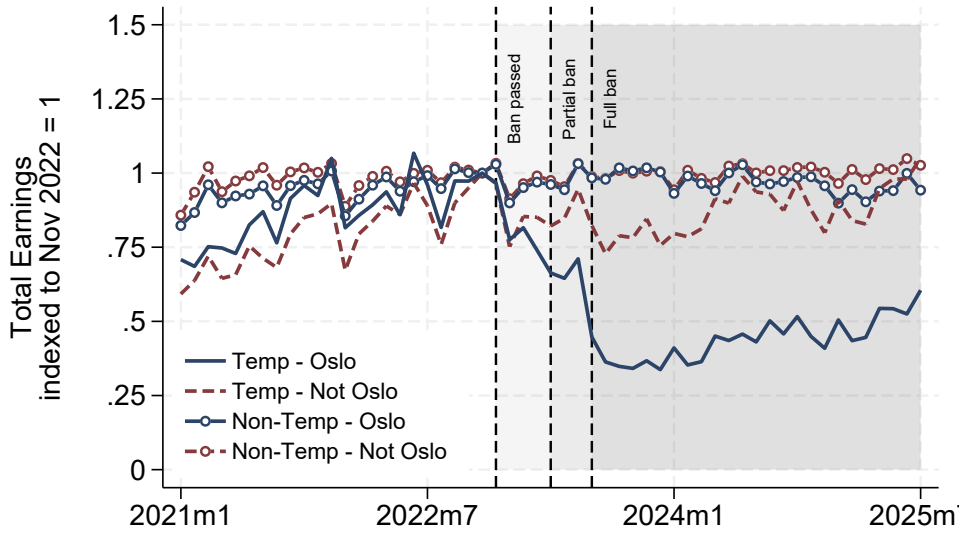
Moreno-Contreras, F. and van Gameren, E. (2025). The impact of the outsourcing ban in Mexico on labor market outcomes. An analysis using worker level data. *Journal for Labour Market Research*, 59(1):15.

Statistics Norway (2023). Economic developments in Norway. *Økonomiske analyser*.

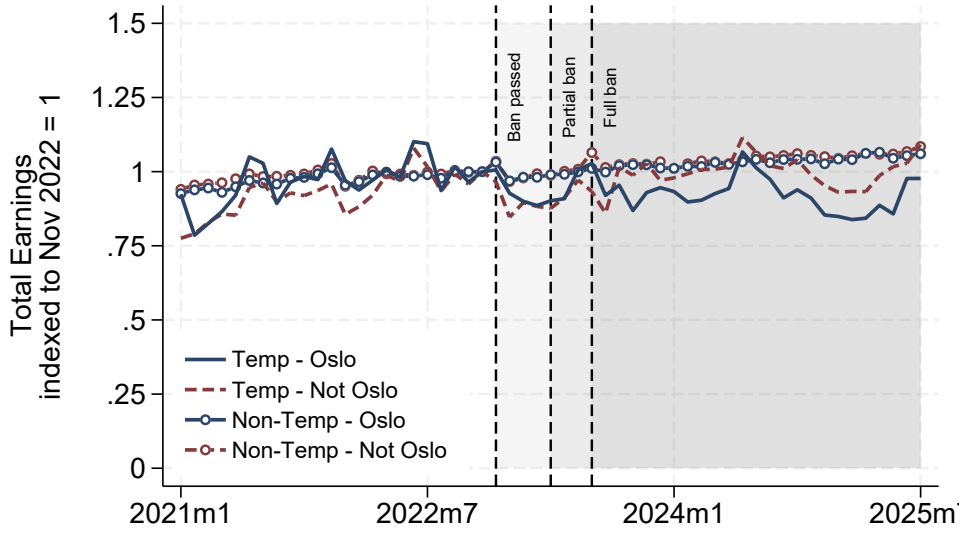
Weil, D. (2014). *The fissured workplace: Why work became so bad for so many and what can be done to improve it*. Harvard University Press.

Figure 1: Total wage payments received by temp agency workers and directly employed workers, separately by Oslo region and the rest of Norway

(a) Construction, indexed



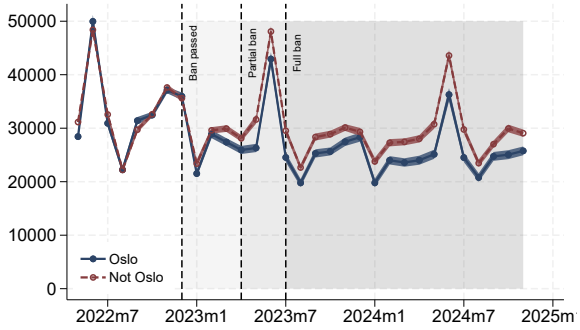
(b) Non-construction, indexed



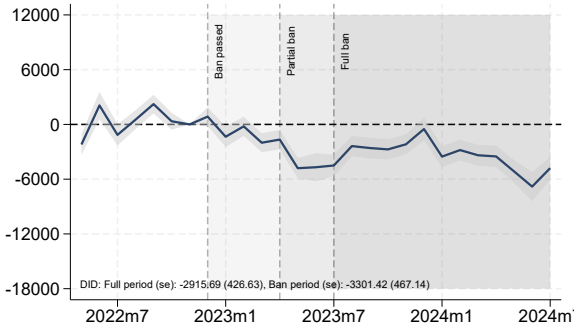
Notes: The figure shows total earnings of temp agency workers and directly employed workers, separately by work region (Oslo region: Oslo, Akershus, Østfold, Buskerud, and Vestfold, and the rest of Norway), based on data from the employer-employee register (A-ordningen). Sample includes all workers aged 20–67 with an active employment relationship in a given month and not in apprenticeship. Indexing is done per employee group and region so that the value for each group is 1 in Nov 2022. The vertical lines mark the timeline of the introduction and implementation of the reform: 1) December 2022: Ban passed, 2) April 2023: Ban in effect, 3) July 2023: End transition period

Figure 2: Worker outcomes: wage earnings. Raw means and DiD estimates

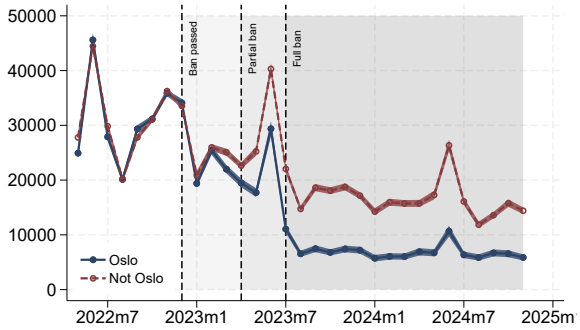
(a) Earnings from all employers, means



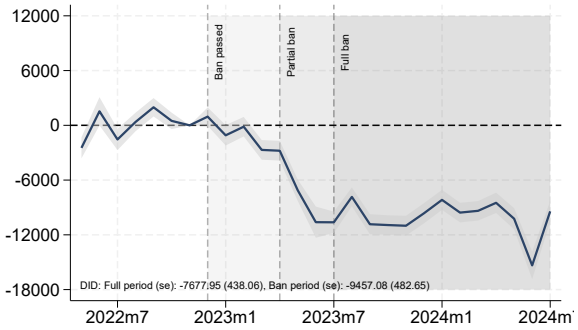
(b) Earnings from any employer, DiD



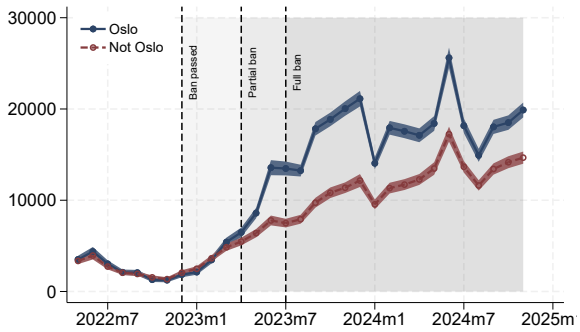
(c) Earnings from temp agency, means



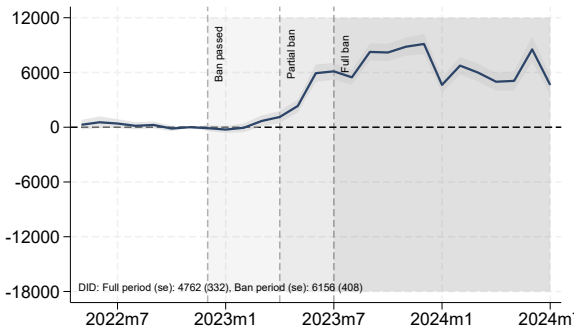
(d) Earnings from temp agency, DiD



(e) Earnings from non-temp employer, means



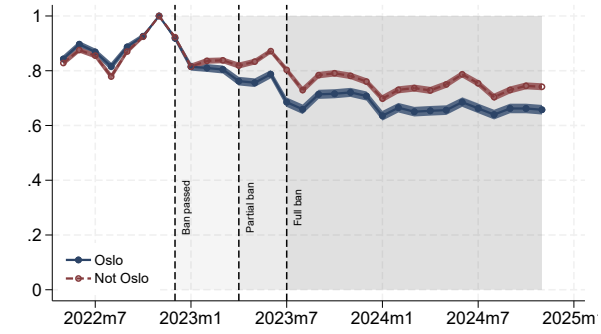
(f) Earnings from non-temp employer, DiD



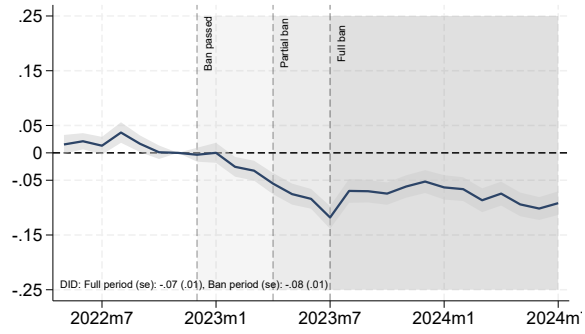
Notes: The Figure reports the raw means (left) and the estimated β_t-coefficients in Equation 1 (right) on worker-level outcomes in the sample of workers receiving positive wage payments from a temp agency in November 2022. Panel a and b shows total earnings, panel c and d show total earnings from a temp agency employer and panel e and f show total earnings from a non-temp agency employer.

Figure 3: Worker outcomes: employment. Raw means and DiD estimates

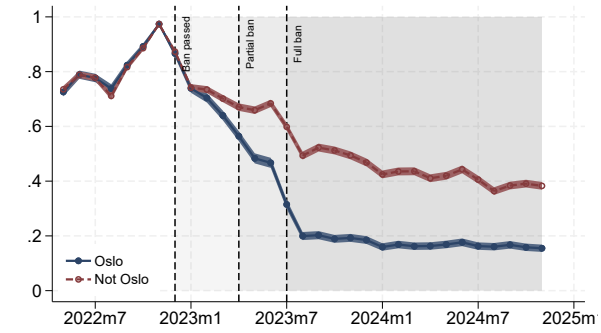
(a) Indicator: positive earnings from any employer



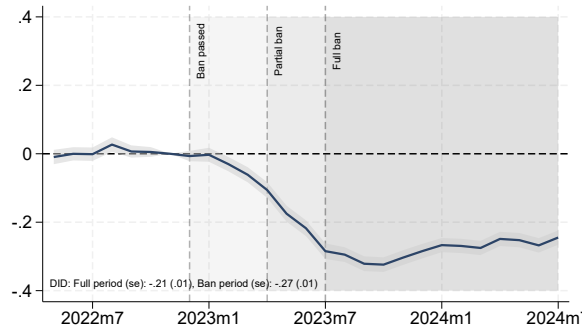
(b) Indicator: positive earnings from any employer



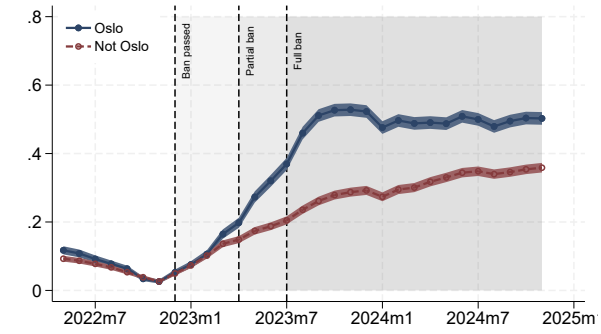
(c) Indicator: positive earnings from temp agency



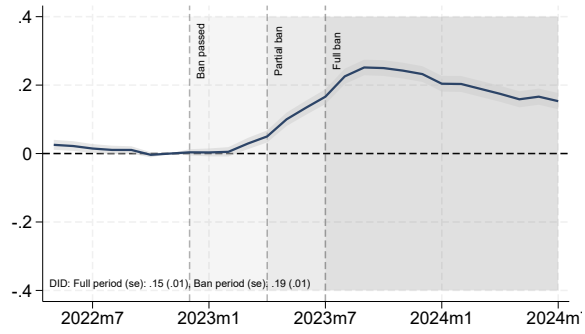
(d) Indicator: positive earnings from temp agency



(e) Indicator: positive earnings from non-temp employer

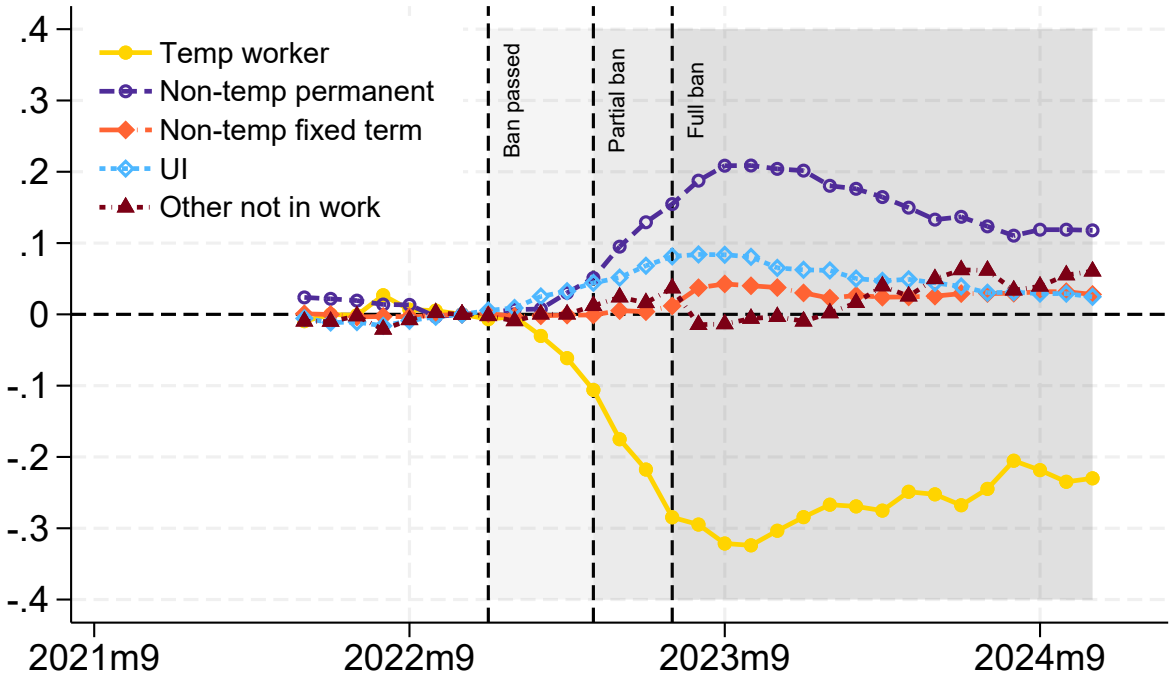


(f) Indicator: positive earnings from non-temp employer



Notes: The Figure reports the raw means (left) and the estimated β_t-coefficients in Equation 1 (right) on worker-level outcomes in the sample of workers receiving positive wage payments from a temp agency in November 2022. Panel a and b show the probability of positive earnings, panel c and d show the probability of positive earnings from a temp agency and panel e and f show the probability of positive earnings from a non-temp agency employer.

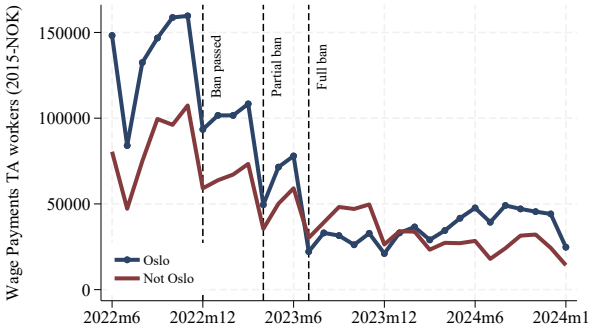
Figure 4: Labor market status



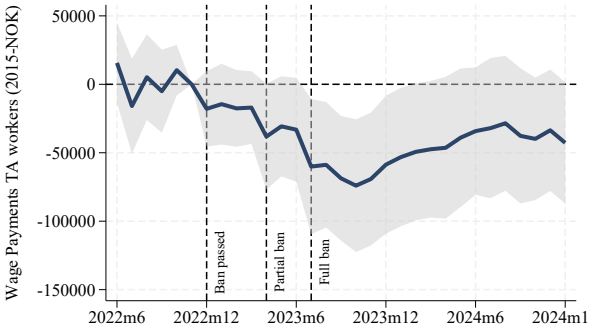
Notes: The Figure reports the estimated β_t-coefficients in Equation 1 on worker-level outcomes in the sample of workers receiving positive wage payments from a temp agency in November 2022. The outcomes are (i) permanent employment with a non-temp employer, (ii) fixed-term employment with a non-temp employer, (iii) unemployment with receipt of unemployment benefits, and (iv) neither employed nor receiving unemployment insurance.

Figure 5: Firm labor inputs: temp agency data sample

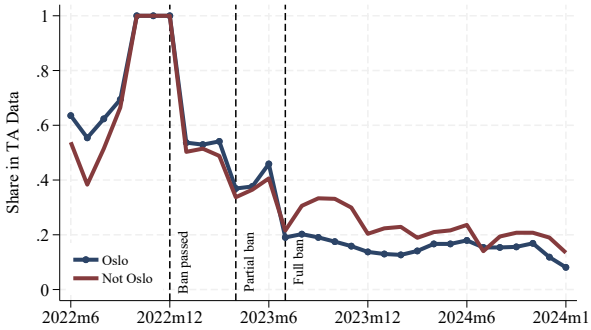
(a) Average wages paid to temp agency workers



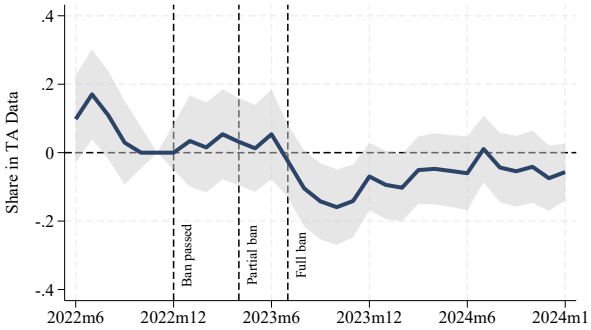
(b) DiD: Wages paid to temp agency workers



(c) Average probability of hiring from temp agency

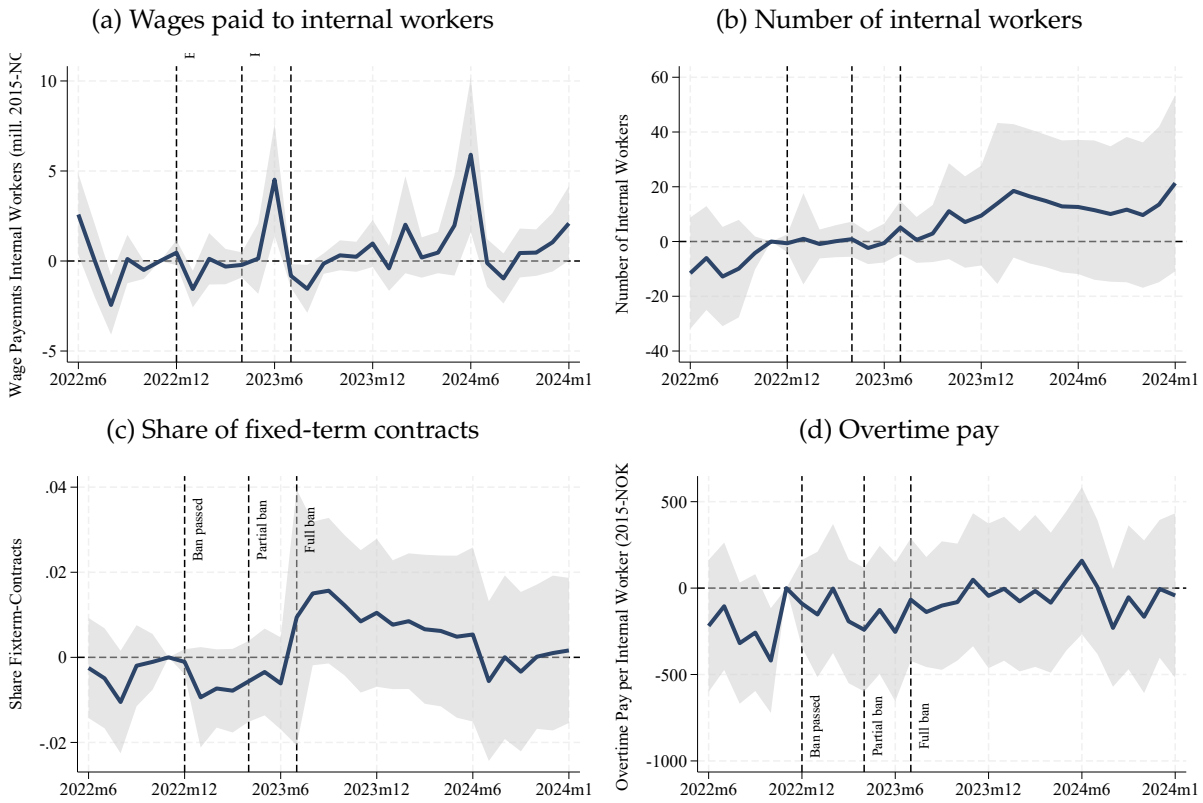


(d) DiD: Probability of hiring from temp agency



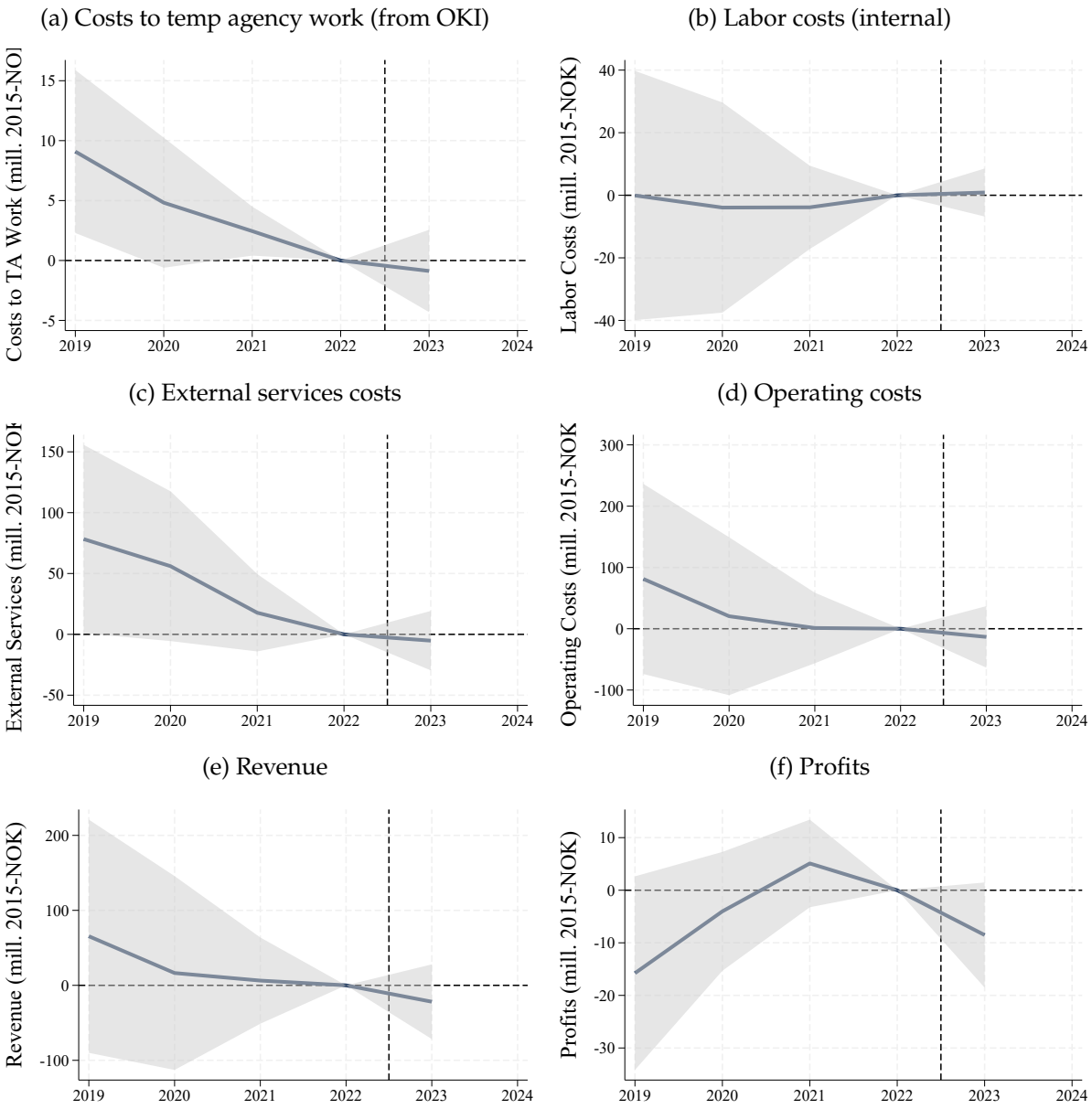
Notes: The Figure reports averages among the treated (in Oslo) and control (outside Oslo) firms and the estimated difference-in-difference estimates, the β_t-coefficients in Equation 1, in the sample of client firms in the temp agency data. Outcomes are from temp agency data. Panel a and b shows total wage payments to TA workers in and Panel c and d the share of client firms observed in the TA data. Wages (Panel a and b) are measured in 2015-NOK.

Figure 6: Firm labor inputs: temp agency data sample



Notes: The Figure reports the estimated difference-in-difference estimates, the β_t-coefficients in Equation 1, in the sample of client firms in temp agency data. Outcomes are measured with the Employer-Employee register. Panel a shows total wage payments to internal workers, Panel b the number of internal workers, Panel c the share of internal workers on fixed-term contracts, and Panel d average monthly overtime payments to internal workers. Wages and overtime are measured in 2015-NOK. Raw means are shown in Figure A.5 in the Appendix.

Figure 7: Firm revenue and costs: temp agency data sample



Notes: The Figure reports the estimated difference-in-difference estimates, the β_t-coefficients in Equation 1, in the sample of client firms in temp agency data. Panel a shows costs incurred to TA workers reported in the OKI survey, Panel b total labor costs for internal workers, Panel c costs to external services (incl. TA work, subcontracting, etc.), Panel d total operating costs, Panel e revenue, and Panel f profits (revenue minus operating costs). Panels a–c are from the OKI survey and annual accounting data, Panels d–f from annual accounting data. All outcomes are measured in million 2015-NOK. Raw means are shown in Figure A.6 in the Appendix.

Table 1: Descriptive Statistics by Construction Sector and Oslo Area

	Non-construction		Construction	
	Not Oslo	Oslo	Not Oslo	Oslo
Observations	15,248	12,135	10,604	5,148
A. Hours, days and earnings				
Hours/month, temp agency	129.023	118.209	139.828	137.270
Hours/month, other employment	3.072	4.527	1.100	1.143
Hours/month, total	132.050	122.672	140.896	138.374
Earnings/month, temp agency	38050.6	31938.3	33925.6	34658.3
Earnings/month, other employment	725.6	906.3	228.7	227.3
Earnings/month, total	38776.2	32844.6	34154.2	34885.7
Days, temp agency	29.743	29.789	29.809	29.791
Days, other employment	2.196	2.924	0.567	0.571
Union member	0.377	0.194	0.441	0.279
B. Demographics				
Female	0.364	0.472	0.007	0.010
Immigrant	0.283	0.478	0.384	0.509
Age	38.182	35.772	41.434	41.436
Permanent position, non-temp	0.039	0.054	0.012	0.012
Fixed-term contract	0.031	0.041	0.006	0.007

Notes: Construction (ConCore= 1) indicates workers in the construction sector. *Oslo* (utleie_osloviken= 1) indicates workers in the Oslo/Viken region. Sample restricted to baseline temp workers observed in November 2022.

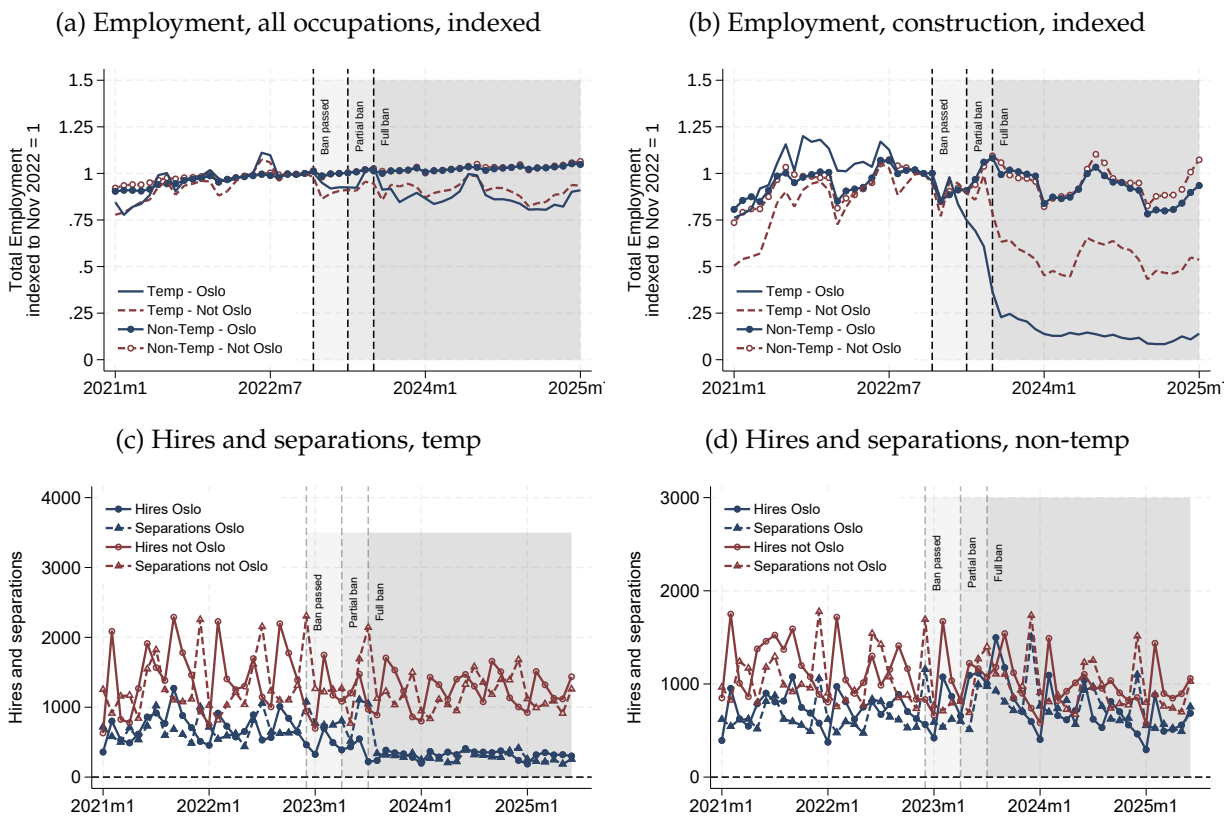
Table 2: Descriptive for firms hiring from temp agencies, November 2022

	Temp Agency Data		OKI Survey	
	Treated Oslo	Control Not Oslo	Treated Oslo	Control Not Oslo
Internal workers	293	59.3	198	88.1
Wage payments (mill. NOK)	14.3	2.63	9.58	3.92
Overtime pay (mill. NOK)	.47	.0704	.33	.139
New employees	14.3	4.19	7.17	3.57
Share fixed-term contracts	.0411	.0358	.0386	.0498
Share immigrants	.287	.221	.245	.17
Share union members	.33	.325	.323	.418
Labor costs (mill. NOK)	227	39.3	140	59
External services (mill. NOK)	283	70.2	166	90.8
Operating costs (mill. NOK)	858	202	531	269
Revenue (mill. NOK)	883	207	545	275
Profits (mill. NOK)	25	5.2	14.4	6.38
Costs TA workers, OKI (mill. NOK)	7.72	5.59	9.5	8.69
TA man-months, OKI	35.7	32.5	26.4	24.2
Wages to TA workers, TA data (NOK)	159,674	107,412	47,554	45,145
TA man-months, TA data	5.55	3.98	8.64	6.39
Number of firms	85	173	189	226
Employees	24,931	10,257	37,430	19,905

Note: Table shows mean characteristics of firms in the Oslo region (treated) and in the rest of Norway (controls) in two distinct samples of client firms, per November 2022. Client firms from temp agency data are defined as firms that hired a temp worker for at least a full month (150 working hours) in one of the three months in the last quarter of 2022 from one of the six temp agencies we have data from. Client firms from the OKI survey data are defined as firms that reported costs incurred to temp agency workers above 360,000 2015-NOK in 2022, approximately equal to 12 times the average monthly wage of full-time TA workers in the TA data. All samples are restricted to firms with at least five employees in the Employer-Employee register on average per month in the last quarter of 2022 (October-December). Accounting numbers (middle panel) are annual and reported in million 2015-NOK. Costs to Ta workers are only reported for firms in either the OKI-survey or the temp agency data. One "man-month" is defined as 150 working hours is the TA-data, and imputed to the OKI data based on the average monthly wage in the TA data. Union membership is based on deductions for member fees in the taxable income data. Number of employees (internal workers) are based on counts from the EE register in November 2022.

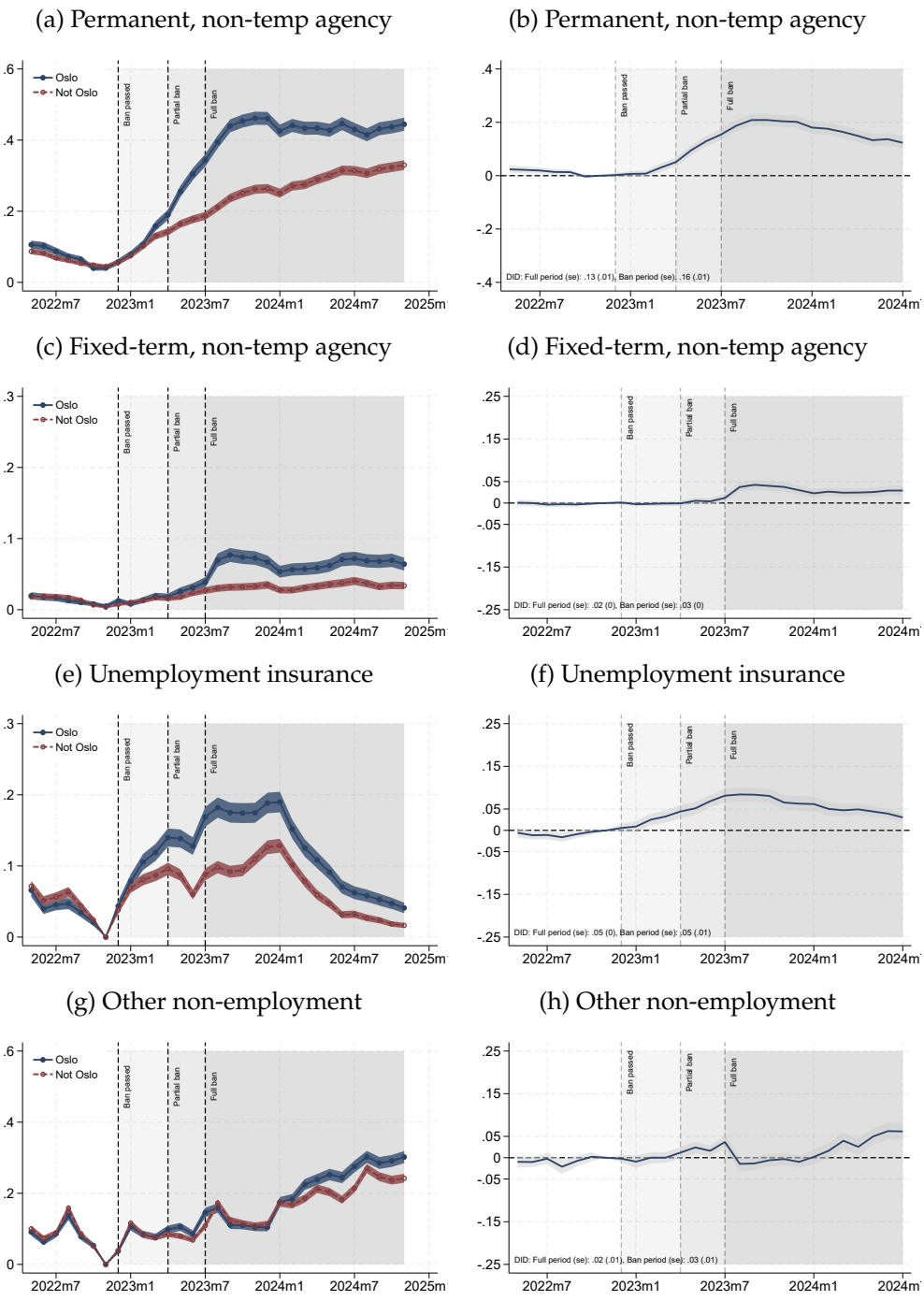
A Appendix

Figure A.1: Employment, hires, and separations, separately by Oslo region and the rest of Norway



Notes: Panels (a) and (b) show the number of temp agency workers and directly employed workers (indexed to 1 in November 2022), separately by work region (Oslo region: Oslo, Akershus, Østfold, Buskerud, and Vestfold, and the rest of Norway). Panel (a) shows all occupations and Panel (b) shows construction occupations. Panels (c) and (d) show monthly hires and separations in the construction sector for temp agency workers and non-temp workers, respectively. The data are taken from the A-ordning (the Norwegian employer reporting system). The vertical lines mark the timeline of the introduction and implementation of the reform: 1) December 2022: Ban passed, 2) April 2023: Ban in effect, 3) July 2023: End transition period.

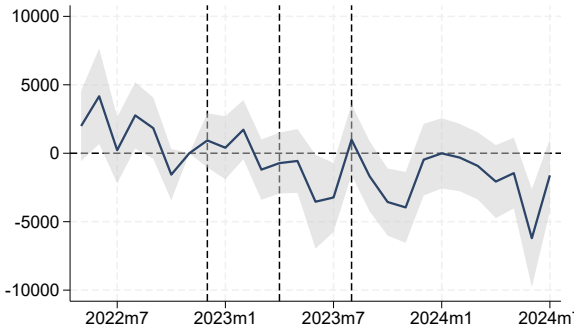
Figure A.2: Worker outcomes: labor market status



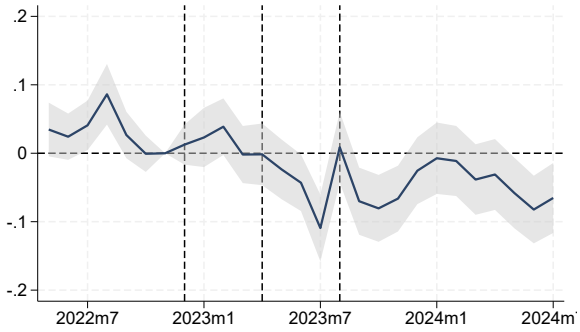
Notes: The Figure shows means (right) and the estimated β_t-coefficients in Equation 1 (left) of worker-level outcomes for the treatment and control groups in the sample of workers receiving positive wage payments from a temp agency in November 2022. Panel a and b shows the probability of having a permanent, direct contract, panel c and d shows the probability of having a fixed-term direct contract, panel e and f shows the probability of being non-employed and receiving unemployment insurance, panel g and h shows the probability of neither employment nor unemployment insurance.

Figure A.3: Wage earnings: temp agency data sample

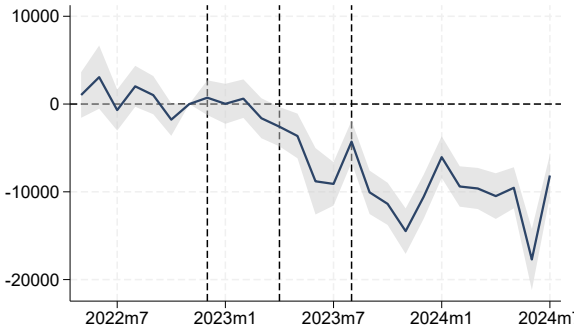
(a) Wage from any employer



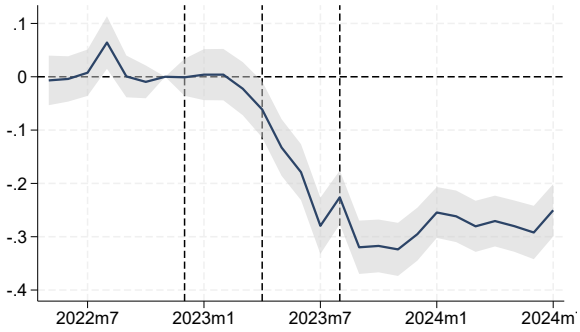
(b) Indicator: positive wage from any employer



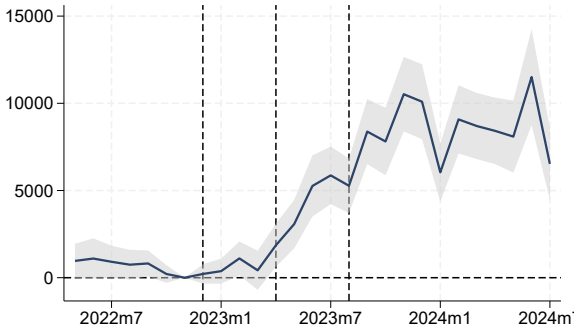
(c) Wage from temp agency



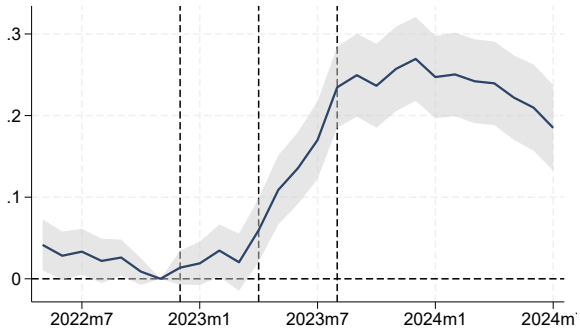
(d) Indicator: positive wage from temp agency



(e) Wage from non-temp employer

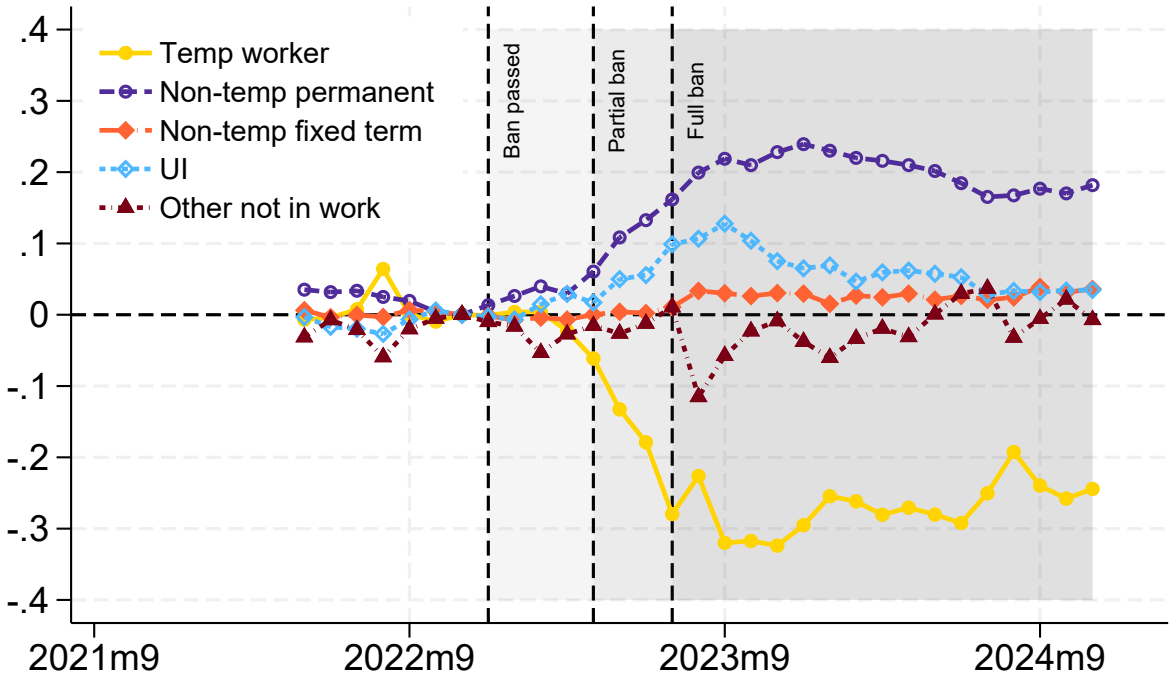


(f) Indicator: positive wage from non-temp employer



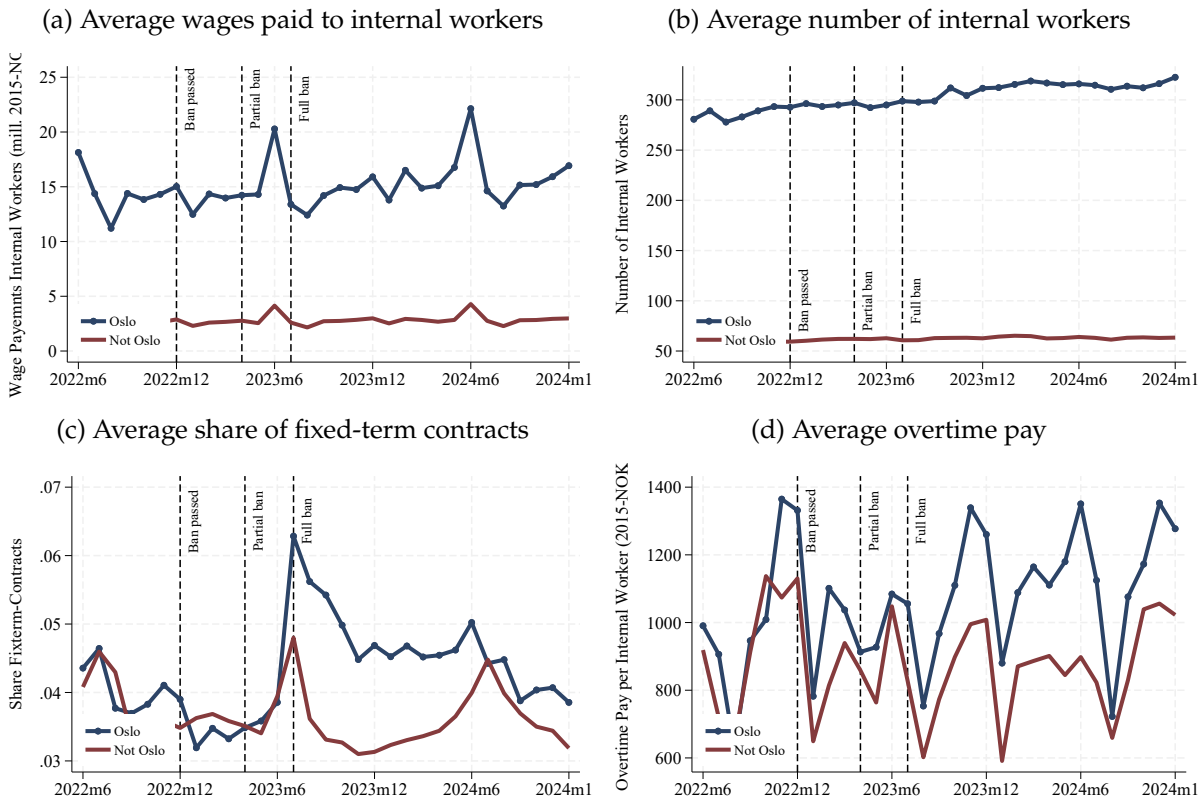
Notes: The Figure reports the estimated β_t-coefficients in Equation 1 on worker-level outcomes in the sample of workers receiving positive wage payments from a temp agency in November 2022, in the temp agency data sample. Panel a shows total earnings, Panel b the probability of positive earnings, Panel c total earnings from a temp agency employer, Panel d the probability of positive earnings from a temp agency, Panel e total earnings from a non-temp agency employer, and Panel d the probability of positive earnings from a non-temp agency employer.

Figure A.4: Labor market status: temp agency data sample



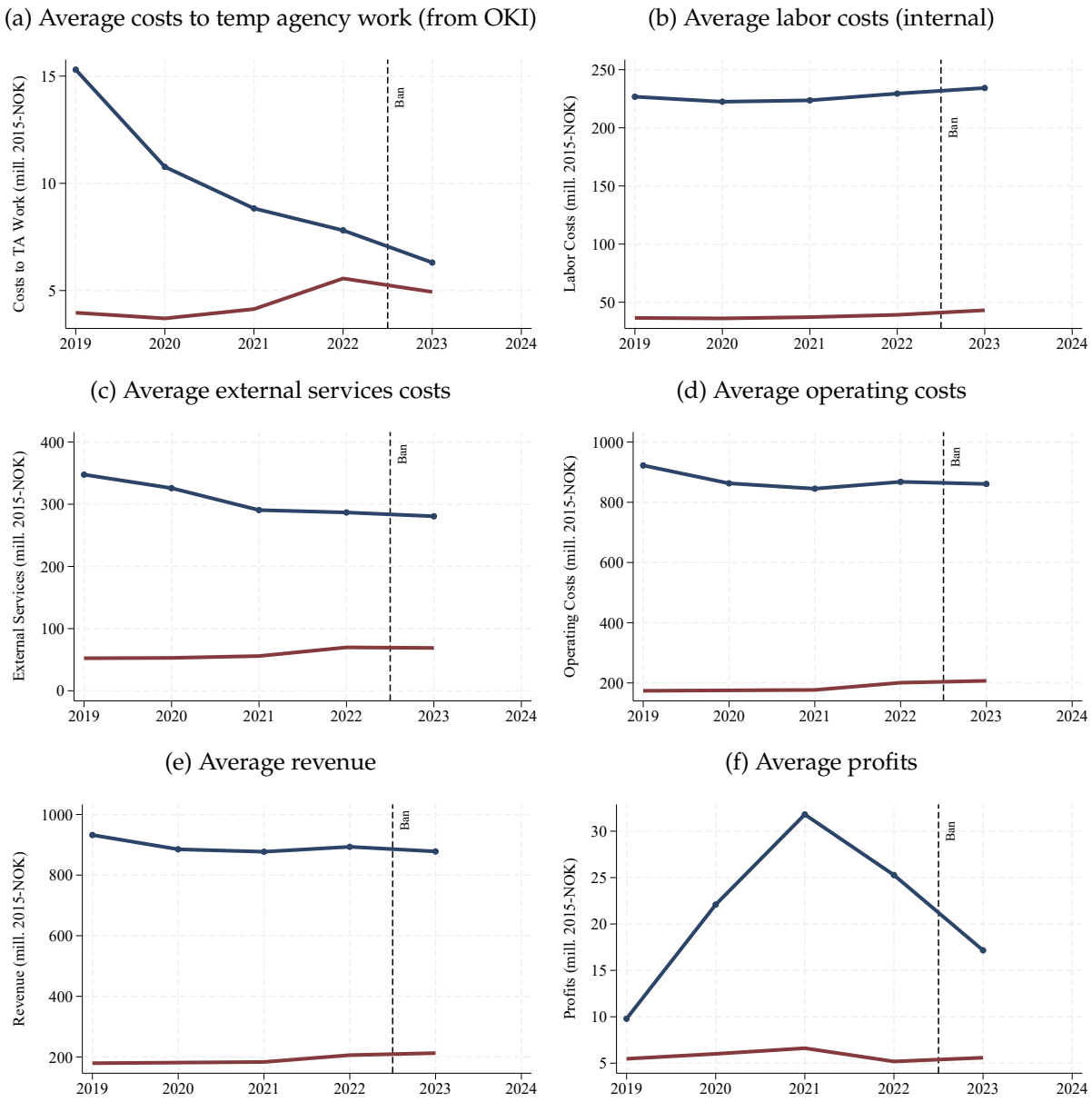
Notes: The Figure reports the estimated β_t-coefficients in Equation 1 on worker-level outcomes in the sample of workers receiving positive wage payments from a temp agency in November 2022, in the temp agency data sample. The outcomes are (i) permanent employment with a non-temp employer, (ii) fixed-term employment with a non-temp employer, (iii) unemployment with receipt of unemployment benefits, and (iv) neither employed nor receiving unemployment insurance.

Figure A.5: Firm labor inputs: raw means, temp agency data sample



Notes: The Figure reports averages among the treated (in Oslo) and control (outside Oslo) firms in the sample of client firms in temp agency data. Outcomes are measured with the Employer-Employee register. Panel a shows total wage payments to internal workers, Panel b the number of internal workers, Panel c the share of internal workers on fixed-term contracts, and Panel d average monthly overtime payments to internal workers. Wages and overtime are measured in 2015-NOK. Corresponding difference-in-differences estimates are shown in Figure 6.

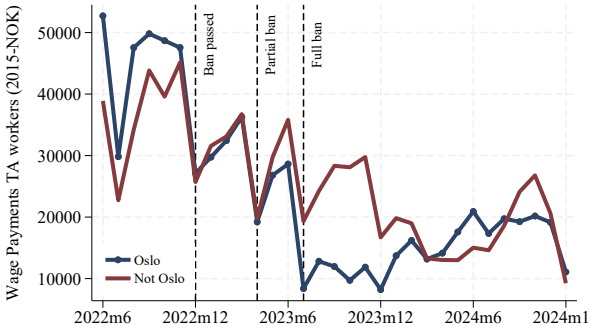
Figure A.6: Firm revenue and costs: raw means, temp agency data sample



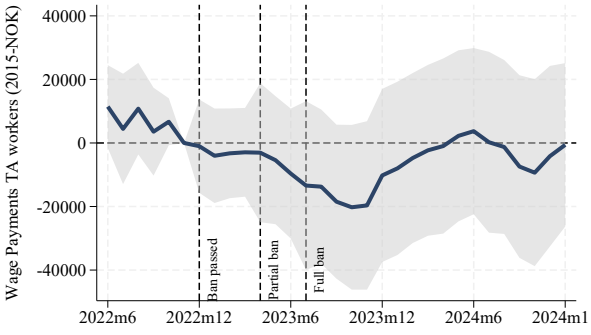
Notes: The Figure reports averages among the treated (in Oslo) and control (outside Oslo) firms in the sample of client firms in temp agency data. Panel a shows costs incurred to TA workers reported in the OKI survey, Panel b total labor costs for internal workers, Panel c costs to external services (incl. TA work, subcontracting, etc.), Panel d total operating costs, Panel e revenue, and Panel f profits (revenue minus operating costs). Panels a–c are from the OKI survey and annual accounting data, Panels d–f from annual accounting data. All outcomes are measured in million 2015-NOK. Corresponding difference-in-differences estimates are shown in Figure 7.

Figure A.7: Firm labor inputs: OKI survey data sample

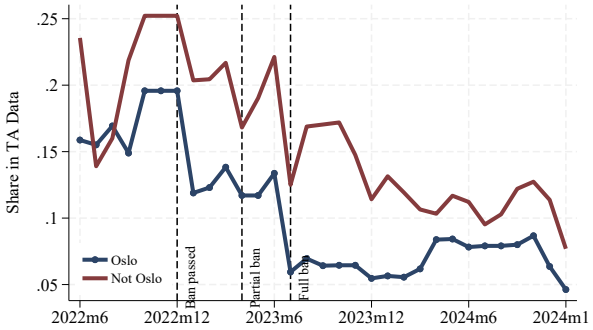
(a) Average wages paid to temp agency workers



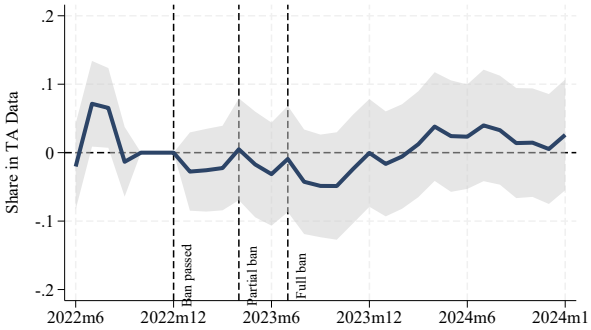
(b) DiD: Wages paid to temp agency workers



(c) Average probability of hiring from temp agency

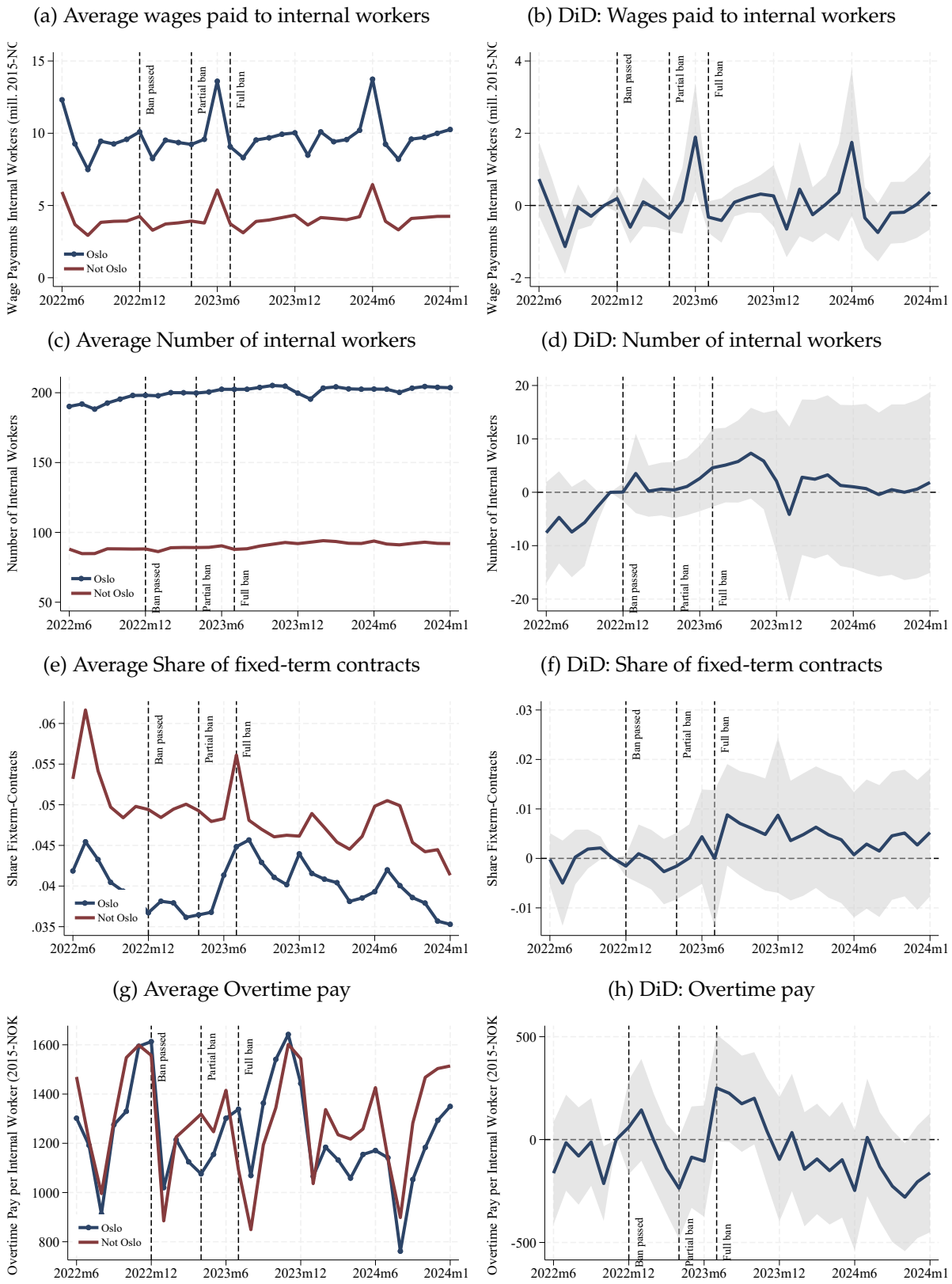


(d) DiD: Probability of hiring from temp agency



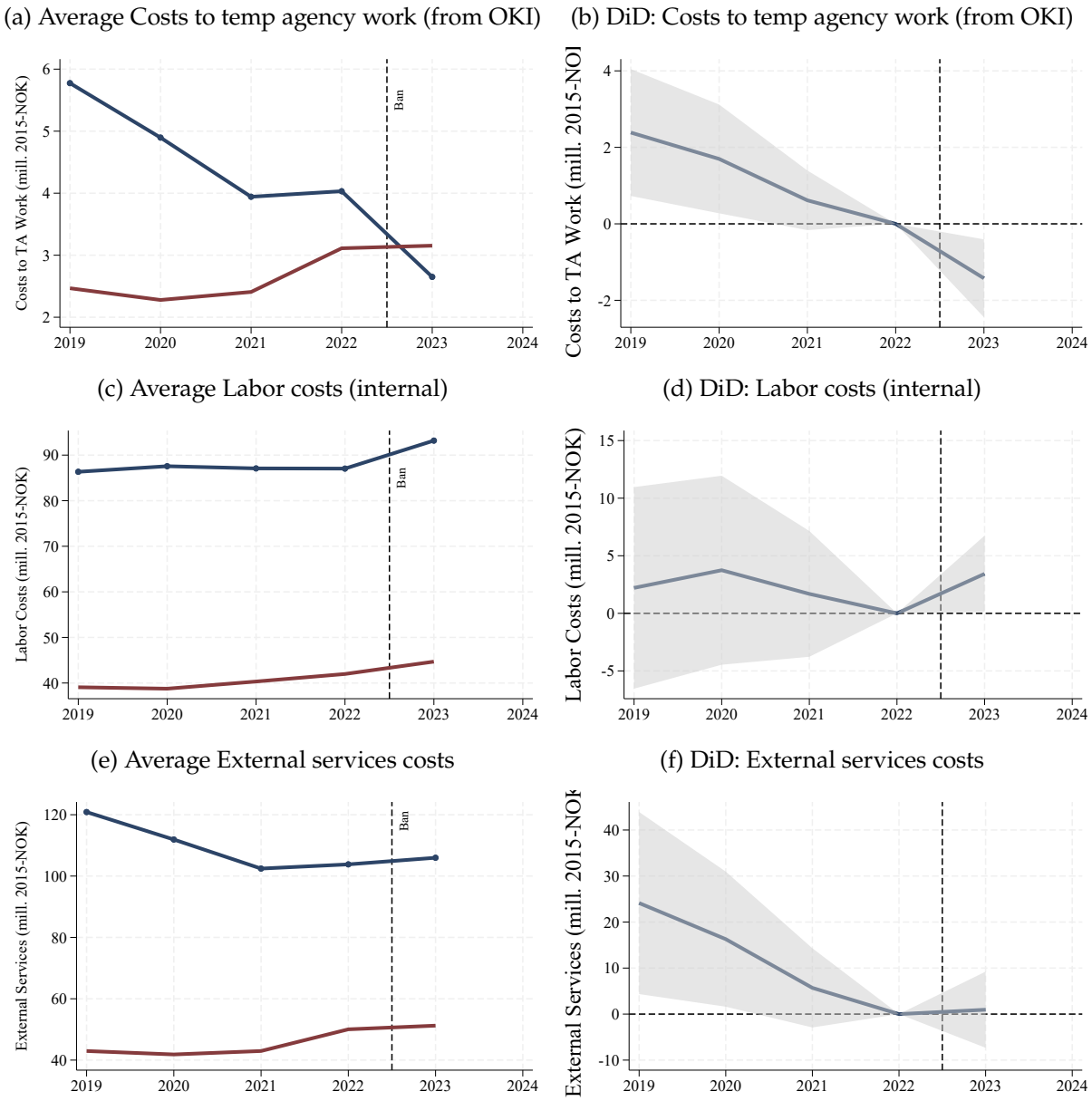
Notes: The Figure reports averages among the treated (in Oslo) and control (outside Oslo) firms and the estimated difference-in-difference estimates, the β_t-coefficients in Equation 1, in the sample of client firms in the OKI survey data. Outcomes are from temp agency data. Panel a and b shows total wage payments to TA workers in and Panel c and d the share of client firms observed in the TA data. Wages (Panel a and b) are measured in 2015-NOK.

Figure A.8: Firm labor inputs: OKI survey data sample



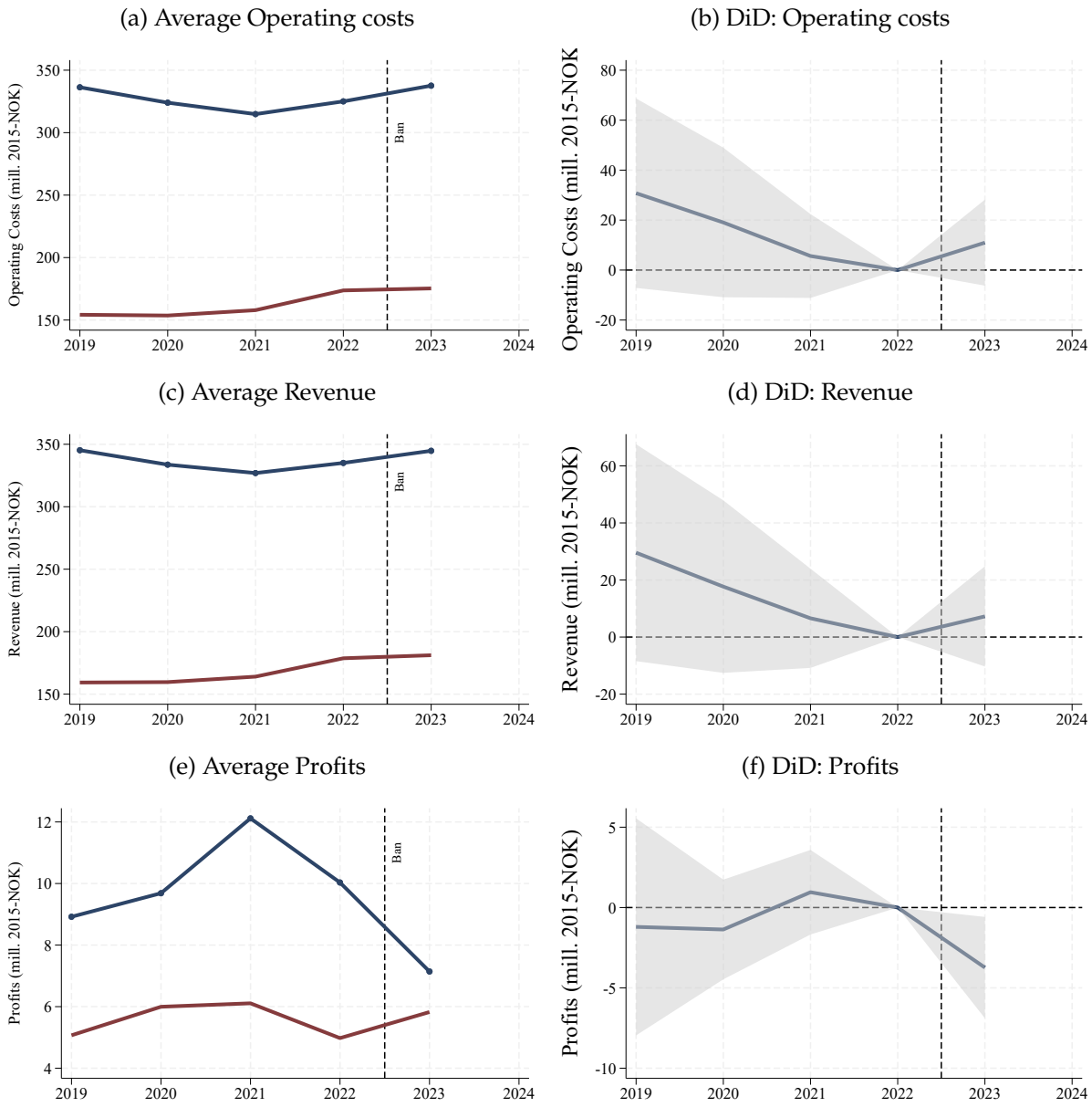
Notes: The Figure reports averages among the treated (in Oslo) and control (outside Oslo) firms and the estimated difference-in-difference estimates, the β_t-coefficients in Equation 1, in the sample of client firms in the OKI survey data. Outcomes are measured with the Employer-Employee register. Panel a and b shows total wage payments to internal workers, Panel c and d the number of internal workers, Panel e and f the share of internal workers on fixed-term contracts, and Panel g and h average monthly overtime payments to internal workers. Wages and overtime are measured in 2015-NOK.

Figure A.9: Firm revenue and costs: OKI survey data sample



Notes: The Figure reports averages among the treated (in Oslo) and control (outside Oslo) firms and the estimated difference-in-difference estimates, the β_t-coefficients in Equation 1, in the sample of client firms in the OKI survey data. Outcomes are from the OKI survey (Panel a and b) and annual accounting data (Panel c–f) and are measured in million 2015-NOK. Panel a and b shows costs incurred to TA workers reported in the OKI survey, Panel c and d total labor costs for internal workers, and Panel e and f costs to external services (incl. TA work, subcontracting, etc.).

Figure A.10: Firm revenue and costs: OKI survey data sample



Notes: The Figure reports averages among the treated (in Oslo) and control (outside Oslo) firms and the estimated difference-in-difference estimates, the β_t-coefficients in Equation 1, in the sample of client firms in the OKI survey data. Outcomes are from annual accounting data and measured in million 2015-NOK. Panel a and b shows operating costs, Panel c and d revenue, and Panel e and f profits (revenue minus operating costs).

Table A.1: Descriptive statistics of individuals, November 2022

	Agency data (leased out)	Agency employment (AMELD)	All others
Female	0.42	0.28	0.47
	[0.49]	[0.45]	[0.50]
Immigrant	0.44	0.40	0.20
	[0.50]	[0.49]	[0.40]
Age	33.9	38.4	42.5
	[12]	[12.1]	[12.6]
TWA	0.89	0.93	0.00
	[0.31]	[0.26]	[0.00]
Non-TWA	0.11	0.07	1.00
	[0.31]	[0.26]	[0.00]
Other non-employed	0.00	0.00	0.00
	[0.00]	[0.00]	[0.00]
UI	0.00	0.00	0.00
	[0.01]	[0.01]	[0.03]
Non-TWA, fixed-term	0.03	0.02	0.11
	[0.18]	[0.15]	[0.31]
Non-TWA, permanent	0.08	0.05	0.89
	[0.27]	[0.22]	[0.32]
Hours in temp agencies	129.88	124.02	0.00
	[52.88]	[52.98]	[0.00]
Hours outside temp agencies	14.4	10.9	143
	[38.9]	[35.7]	[42.4]
Hours in total	144	135	143
	[46.6]	[52.2]	[42.3]
Earnings in temp agencies (NOK)	26,702	33,092	0
	[16,718]	[26,738]	[0]
Earnings outside temp agencies (NOK)	3,163	2,613	41,601
	[9,569]	[9,537]	[37,322]
Earnings all jobs (NOK)	29,866	35,705	41,601
	[16,501]	[27,004]	[37,322]
Number of days in temp agencies	28.35	29.76	0.00
	[6.39]	[1.66]	[0.00]
Number of days outside temp agencies	5.86	3.81	30
	[11.8]	[9.95]	[.705]
Unionized	0.19	0.32	0.53
	[0.40]	[0.47]	[0.50]
Earnings in agency data (NOK)	21,814	0	.00532
	[12,016]	[0]	[8.39]
Days worked in agency data	13.47	0.00	0.00
	[8.06]	[0.04]	[0.01]
Hours in agency data	128.79	0.00	0.00
	[81.67]	[0.56]	[0.05]
Number of Workers	9,438	46,456	2,487,260

Notes: Mean characteristics of all workers observed with a positive wage payment in Nov 2022.

Table A.2: Descriptive statistics of firms, November 2022

	All firms	All OKI firms	Client firms OKI	Client firms TA data
Share client firms, OKI survey	.0447	.394	1	.363
Share client firms, TA data	.0279	.108	.227	1
Internal workers	22.1	91	138	149
Share small (5–20 empl.)	.762	.199	.0386	.274
Share medium (21–100 empl.)	.214	.599	.66	.514
Share large (+100 empl.)	.0239	.201	.301	.212
Wage payments (mill. NOK)	.936	4.17	6.5	7.17
Overtime pay (mill. NOK)	.0387	.168	.226	.25
New employees	.424	2.48	5.21	7.66
Share fixed-term contracts	.0568	.052	.0447	.0374
Average age	40.1	40.3	40.2	40.5
Share men	.906	.906	.91	.916
Share immigrants	.232	.19	.204	.242
Share union members	.179	.32	.375	.328
Share in Oslo region	.409	.416	.455	.328
Labor costs (mill. NOK)	13.8	61.9	95.8	101
External services (mill. NOK)	13.4	73.5	125	140
Operating costs (mill. NOK)	50	241	387	416
Revenue (mill. NOK)	51.9	248	397	428
Profits (mill. NOK)	1.91	7.19	10	11.7
Costs TA workers, OKI (mill. NOK)	.856	3.58	9.06	6.28
Share TA labor costs, OKI	.0477	.0469	.118	.0919
TA man-months, OKI	1.13	9.94	25.2	14.9
Wages to TA workers, TA data (NOK)	3,607	20,043	46,243	126,661
TA man-months, TA data	.116	.64	1.49	4.15
Number of firms	9,282	1,053	415	259
Employees	204,707	95,807	57,335	38,521

Note: The Table shows mean characteristics of all firms in the Employer-Employee (EE) register, all firms in the OKI survey, and client firms from the OKI survey and temp agency data, respectively, per November 2022. All samples are restricted to firms with at least five employees in the EE register on average per month in the last quarter (Q4) of 2022. Client firms in temp agency data are defined as firms that hired a temp worker for at least a full month (150 working hours) in Q4 2022 from one of the six temp agencies we have data drom. Client firms in OKI survey are defined as firms that reported costs incurred to temp agency workers above 360,000 2015-NOK, approximately equal to 12 times the average monthly wage of full-time TA workers in the TA data. Accounting numbers (middle panel) are annual and reported in million 2015-NOK. Costs to TA workers are only reported for client firms in either of the two samples. One "man-month" is defined as 150 working hours is the TA-data, and imputed to the OKI data based on the average monthly wage in the TA data. Union membership is based on deductions for member fees in the taxable income data. Number of employees (internal workers) are based on counts from the EE register in November 2022.