Regulating temporary agency work - the effect of equal pay legislation on wages and employment opportunities[*]

Maria Forthun Hoen[†]   Simen Markussen[‡]   Marte Strøm[§]

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Abstract

We study the implementation of the Directive on Temporary Agency Work (TAWD) in Norwegian law in 2013. The directive introduced a principle of equal pay and working conditions for temp agency workers. We use full-population register data and employ a difference-in-difference model to identify the effects of the reform. We study all employees in temp agencies in Norway and use coarsened exact matching methods to find a control group among regular workers who are similar on observable characteristics to the temp agency workers. We find that wages of temp agency workers increased by nearly 3 percent in the first year after the implementation of the directive. The effects are driven by immigrant temp agency workers who received 4-6 percent higher wages after the reform.

[†]Institute for Social Research. E-mail: m.f.hoen@samfunnsforskning.no
[‡]Institute for Social Research. E-mail: simen.markussen@frisch.uio.no
[§]Institute for Social Research. E-mail: marte.strom@samfunnsforskning.no

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1 Introduction

The usage of temporary work agencies has increased in many OECD countries in the last decades, but the growth has been heavily debated in all countries. One of the reasons for the debate is that some worker groups, in particular marginal workers and immigrants, are over-represented in temp agency work (OECD, 2020) and that temporary agency workers (TAWs) receive lower pay than comparable workers on ordinary contracts (Forde and Slater, 2005; Nienhüser and Matiaske, 2006; Jahn, 2010; Drenik et al., 2023). These patterns indicate that employment through temp agencies may be a way for employers to pay, e.g., labor immigrants from low-wage countries their reservation wage instead of the going rate. This has led to policy changes in several countries, and half of the OECD countries have restricted which occupations and industries that may use temp agency contracts, and/or placed restrictions on contract duration and the number of contract renewals (OECD, 2020). In 2008, the Directive on Temporary Agency Work (TAWD) was adopted in the EU, and in 2013, it was implemented in Norwegian law through the EEA Agreement. The directive introduced a principle of equal pay and working conditions for temporary agency workers (TAWs). In the present paper, we analyse pay differences between temp agency workers and regular workers (direct employees), and estimate the effect of the directive on TAW wages. We are particularly concerned with how the reform affected the wages and employment opportunities of immigrants.

We employ a difference-in-differences model and full-population register data to identify the effects of the TAWD. Our point of departure are all employees in temp agencies in Norway. We compare them to observational similar regular workers—that is, workers who are directly employed in a firm in which they perform their job. To find a control group that is similar on observational characteristics, we use coarsened exact matching method and match on characteristics that are important for wage-determination; age, experience, and occupation. The new regulation was decided in June 2012, and was implemented the 1st of January 2013. Hence, we use the period 2010-2014 in the analyses. We estimate the effect on the whole population of temporary agency workers, and do heterogeneity analyses across immigrant and occupation

groups.

We find that the implementation of TAWD had a clear positive effect on wages for temp agency workers. Before the directive, TAWs had roughly 8 percent lower wages than comparable direct employees. In 2013, wages increased by 2.7 percent relative to workers not employed in a temp agency, which is a clear improvement, but not enough to close the wage gap. The results are driven by immigrants, indicating that TAWD was efficient in improving the wages of the group of workers that policy makers were mostly concerned about.

Our study relates to the literature on temp agency work and employment opportunities. Temporary agency work is, as already mentioned, relatively low paid, but several studies find positive employment effects of temp agency work ("stepping-stone effects") (Kvasnicka (2009) for Germany; Amuedo-Dorantes et al. (2008) for Spain; Lane et al. (2003) for the USA; Gerfin et al. (2005) for Switzerland; Booth et al. (2002) for the UK; Ichino et al. (2008) for Italy). One notable exception is Autor and Houseman (2010) who use quasi-experimental data to find that temporary help job placements do not improve, and may in fact diminish subsequent earnings and employment outcomes among participants. However, the conclusions about stepping-stone effects depend on the comparison group: temp workers endure a lower likelihood of being hired on a permanent basis following their temporary assignment than their direct-hire temporary counterparts (Amuedo-Dorantes et al., 2008). Gerfin et al. (2005) compare non-profit employment programmes to temporary help jobs and find that temp job is better. Effects of job placements are also heterogeneous across different worker groups. Autor et al. (2017) find that neither direct hire nor temp-job placements significantly affect the lower tail of the earnings distribution, while direct-hire placements have positive earnings effects on higher quantiles. Hence, there is the possibility that while temp agency work may represent an easier way into employment for some groups, it may rather be a dead end for marginal workers.

Immigrant workers from low-wage countries are over-represented in temp agency work (OECD, 2020). On the one hand, this may be due to poor employment opportunities in the regular labor market. Employing an immigrant (directly) is associated with higher risk due to potential problems with, e.g., language barriers and skill mismatch. Employing someone

through a temp agency reduces the risk, as the contract can be ended when the assignment is over. Employing from a temp agency represents a risk-free opportunity to screen workers, and this is also one of the most important reasons stated by firms to use TAWs (Houseman, 2001; Kalleberg, 2000). There is furthermore a cost-saving aspect of temp agency work that creates incentives for the employer to hire a marginal worker through a temp agency instead of directly. As regular workers, groups with lower bargaining power, such as immigrants, will benefit from union bargaining at the workplace. The wages of TAWs are however set on an individual basis, which may result in lower wages paid by the temp agencies. The TAWD cut this opportunity of cost saving by requiring that TAWs should earn the same wage and have equal work conditions as they would get if they were employed directly. Our findings show that immigrant TAWs from low-income countries had particularly low wages (12 percent less than comparable direct employees) before the TAWD, and experienced the highest wage increase afterwards of 4-6 percent.

The rest of the paper is organized as follows. In Section 2, we outline the history of temporary agency work in Norway and elaborate on the Temporary Work Agencies Directive. In Section 3, we present the empirical strategy and the estimation model. In Section 4, we describe our data and the matching method, and discuss necessary identifying assumptions. In Section 5, we present the main results, as well as heterogeneity results for different groups of workers, and examine possible mechanisms. In Section 6 we establish robustness of our results, and in Section 7, we conclude.

2   Institutional framework

2.1   Temporary work in Norway

Temporary agency work was allowed on a full scale in Norway in 2000, after a partly prohibition lasting since 1971. Before 2000, only clerical officers and shop salespersons were allowed in temp agencies —although anecdotal evidence indicates illegal hiring of TAWs in other occupations as well. Figure 1 shows the share of TAWs among all workers (panel a) and

among workers from three different origin groups (panel b). The groups are Eastern European Countries (EEC), less-developed countries (LDC), and high-income countries (HIC), as well as natives in panel a. Since 2000, there has been a strong growth in the use of temp agencies, with a particularly steep growth after the enlargements of the European Union towards East after 2004. By 2011, the share of workers employed in a temp agency had risen to above 2 percent (panel a), but fell slightly again in 2014.

The share of TAWs in the economy is sensitive to business cycle fluctuations, as illustrated in the figure. The dashed line in both figures shows Norway's GDP in current prices, seasonally adjusted (right axes). Two crises during the period had substantial impact on temp agency work, namely the financial crisis in 2008/-09 and the oil price shock in the second half of 2014. The TAW employment share fell during the financial crisis, but rose sharply again when the economy recovered. The larger volatility of temp agency work compared to regular work complicates the present analysis, as the exit from temp agency work is larger and perhaps more selective during economic downturns. We therefore concentrate on a relatively stable period before and after the implementation of the TAWD and estimate the model using the years 2010-2014. In order to have two post-reform years, we include 2014, despite the possible asymmetric influence of the oil price shock on TAWs and regular employees. Section 4 explains our attempts to adjust for this.

Panel b of Figure 1, visualizes the increasing importance of temp agencies as immigrant employers, in particular for Eastern European immigrants. By the end of the period, nearly one of three workers from EEC were employed in a temp agency. The share of TAWs among LDC and HIC grows steadily from around 3-4 percent to 7-8 percent. Furthermore, the figure illustrates the particularly high sensitivity of migrant TAWs to business cycle fluctuations, as the EEC TAW employment share follows closely the economic trend. For this reason, it is important to control for general economic developments and regional labor market conditions in the analyses. We do both, as well as numerous alternative model specifications and robustness checks.

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2.2 The Temporary Agency Work Directive

The regulation of temporary agency work in the EU has been a long process and is related to the regulation of "atypical employment" (Frenzel, 2010). There has been a concern with the precariousness of such work in the European Commission, and legislative proposals have been made since the 1980s to extend social protection to, e.g., part-time, fixed-term, and temp agency work. These questions are however highly controversial and there has been little consensus among member states. In November 2008, the Directive on Temporary Agency Work 2008/104/EC (TAWD) was adopted in the EU, and in January 2013, it was implemented in Norwegian law through the EEA Agreement. The decision to implement the directive in Norwegian law was made by the parliament (Stortinget) on 12 June 2012.

The leading principle in the TAWD, is the principle of equal treatment for temporary agency workers. The equal treatment implies that a TAW is to be granted pay and working conditions equal to those that the worker would himself or herself have been granted as a direct employee of the user undertaking, either as a temporary or permanent employee. Nevertheless, when setting the work and employment conditions of the TAW, conditions enjoyed by other employees of the user undertaking shall be taken into account when these employees have comparable duties and qualifications, experience, etc. to those of the TAW.

From 6 July 2015, the principles of equal treatment could be deviated from if the firm had a tariff agreement with a large union (at least 10 000 members). The introduction of this exception, together with the oil-price shock beginning in July 2014, restrict our period of analysis to stop in 2014. In addition, a new registration system for employment spells in the registry data (see Section 4) complicates comparisons of spell-level outcomes such as hourly wages between 2014 and 2015.

3 Empirical strategy

We estimate a difference-in-difference model to identify the effect of the equal pay legislation on temp agency workers. The observation period is from 2010-2014; three years before the

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reform and two years after. We first estimate an event-history difference-in-difference model with a full set of year dummies:

$$y_{it} = \delta \text{Treated}_i + \gamma_t + \sum_{t=2010}^{2014} \beta_t \text{Treated}_i \times \text{Year}_t + X_i + \varepsilon_{it} \qquad (1)$$

where y_{it} is the outcome variable of interest in year t for individual i. The main outcome is log hourly wages. Treated$_i$ is the treatment dummy equal to 1 if the individual is a TAW. We use 2012 as reference year, the year before the implementation of the directive. We include year-fixed effects γ_t and several control variables (X_i). ε_{it} are heteroskedasticity robust standard errors. X_i removes possible influence of compositional changes over the period, as well as (time-constant) differences in wages of TAWs in local labor markets (regions). In a robustness check we also include time-varying controls, controlling for different trends across region and occupation. We test robustness of our results with different specifications of X_i, and include successively fixed effects for: i) no controls, ii) three separate immigrant origin groups (Eastern European Countries, less-developed countries, and high-income countries) and gender, iii) occupation and labor market region, and iv) TAW-by-region. Unfortunately, we can not control for industry, neither constant nor time-varying, as temp agencies constitute a separate industry used to identify TAWs in the data. We do not observe in which firm the TAWs are actually performing their job (the user undertaking ant it's industry). Consequently, we can not control for firm-fixed effects either.

The panel is a repeated cross-section panel of TAWs and a control group of direct employees. The reason we use a repeated cross-section, is that TAWs are typically employed for only a year or two, and workers who were TAWs before the TAWD implementation are therefore unlikely to be so in the post period as well.[1] That makes an intention-to-treat setup inappropriate in this setting. To estimate wage effects for temporary employed, we therefore need to study the wage development of TAWs more generally, and make the same conditions for comparisons with direct employees in each period. We use coarsened exact matching to find a suitable comparison group. We match year-by-year on age, labor market experience, region, and occu-

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[1]Furthermore, wage increases by tenure are possibly different for direct employees and TAWs.

pation. We test for pre-trends in an event-study graph, plotting the outcome in the treatment and control group each year before and after the reform. The pre-trends are reassuring.

4 Data and matching

4.1 Data

The empirical analyses are based on high-quality individual-level administrative register data of the universe of workers and residents in Norway. Unique anonymized identifiers for all individuals and firms allow us to merge all available data sources. The main source is the Register of Employers and Employees, which includes information on wages, duration, contracted working hours, occupation, industry, firm, etc., for all employment spells each year over the period 2000-2014. For each individual and year, we keep the main job, defined by the largest sum of wage payments over the spells within the same employer (firm). The main outcome, hourly wage, is then the (duration-weighted) average of the hourly wage of each employment spell, calculated as total annual salary (the sum of cash payments and salaries in kind) divided by number of hours worked per year.

Industry data follow the Standard Industrial Classification of 2007 (SIC 2007) from Statistics Norway. Temp agencies (TA) are firms registered with the industry code 78.200. Workers who have their main job in a TA are thus temporary agency workers (TAWs), and the main interest of the present analysis. Unfortunately, we do not observe the user undertaking where TAWs are actually performing their job (rented), only the temp agencies in which they are employed. This missing link complicates the analysis, because we can not compare direct and temp agency employees working in the same firm. Instead we compare TAWs and direct employees with similar characteristics, like occupation, experience, etc.

We draw demographic data from the Central Population Register, and define immigrants as persons born abroad by two foreign-born parents. The native population includes persons born in Norway by immigrant parents (second generation immigrants). We divide immigrants into three groups by birth country: High-income countries (HIC), consisting of member states

of the European Economic Area (EEA) prior to 2004, North America, Japan and Oceania; Eastern European countries (EEC), consisting of countries that entered the EU in 2004-2007 and European Countries outside the EEA; and less-developed countries (LDC), defined as the rest of the world.

Geographic units are given by 46 labor market regions or commuting zones of Norway, following Bhuller (2009). For non-residents, we use the localization of the work place (firm). Due to temp employment's high sensitivity to business cycle fluctuations (see Figure 1) and the particularly high dependency on oil prices in the south-western region of Norway, we drop the regions Stavanger and Haugesund. As we will show, TAW wages fell sharply in 2014, when an oil price shock hit the Norwegian economy (see Section 2). Dropping the two main "oil regions" reduces this drop, but by far eliminates it. Another reason for the drop, may be related to the transition into a new registration system for employment spells to the Employer-Employee register introduced in January 2015. Because employers often report spells with a lag, in particular end dates, and it was no longer possible to report in the old system in 2015, some spells are incorrectly set to last until 31 December, although they ended earlier. Hence, they have too long duration and consequently too low hourly wage (annual wage divided by annual hours). The problem is particularly large for TAWs, with more frequent and shorter spells. For this reason, we drop spells that miss end dates each year and do not continue into the preceding year.[2]

The Database for Statistics on Higher Education provides data on highest completed education for all individuals enrolled in education in Norway (Barrabés and Østli, 2015). Hence, for a large share of immigrants, education data are missing.[3] Whenever education is missing, we assign the lowest level of compulsory education (lower secondary) and do robustness checks with higher levels, as well as assigning different levels to different groups.

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[2]Each year 2010-2013, the estimation sample is reduced by around 0.4 percent, and in 2014 by 0.74 percent. The sample of TAWs is however reduced by as much as 4.4 percent in 2014.

[3]24 percent of the EEC immigrants in the baseline estimation sample lack educational information, and 40 percent among TAWs from EEC. Numbers are comparable for HIC immigrants, but substantially lower for LDC immigrants, possibly because the majority is refugees with educational attainment from Norway or labor migrants from outside the EEA and therefore stronger incentives to register their educational attainment in order to get a job.

We draw income data from the Norwegian Tax Register, and define a person as in employment when annual labor earnings exceed one basic amount (BA) of the Social Security system.[4] Labor market experience is the number of years with earnings above one BA. Earnings and wages are deflated to 2012-levels using the annual BAs.

When selecting our estimation sample, we aim at ending up with a sample of TAWs that are reasonable to compare with direct employees. This excludes very short and low part-time contracts, as well as persons working few hours in total during a year. Such TAWs are less appropriate to match to regular employees because of the different characteristics of their employment. Furthermore, because of the asymmetry between TAWs and direct employees in the sensitivity to errors in the data (small/short spells are more volatile), we drop unreasonably low and high hourly wages. For these reasons, we limit the sample to employed persons aged 20-50, who are not in education or an apprenticeship, earn between 0.001-0.05 BA (USD 14 to 705) per hour, work above 20 hours per week and 100-3000 hours per year, and are employed for at least 30 days during the year. We drop occupations in the armed forces, legislators, senior officials and managers (major occupation groups 0 and 1) due to irregular/uncertain wage setting of TAWs in these occupations. In addition, we drop administrative employees in the temp agencies (with occupation "Employment agents and labor contractors"). The final sample consists of roughly 93,300 TAWs matched to nearly 1,849,000 regular employees in total over the years 2010-2014.

4.2 Matching

In order to find a comparison group for the TAWs, we match each of them to one or several direct employees using coarsened exact matching (CEM, see Blackwell et al. (2009)). Instead of matching on exact characteristics, the CEM algorithm groups characteristics into matching strata and matches individuals belonging to the same stratum, but returns the exact values for post-matching analyses. We match on observable characteristics that are likely to affect wage determination—that is, six age groups (five-year intervals), five labor market experience groups

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[4]One BA was equal to 82 122 NOK, or roughly USD 14 108, in 2012.

(0-1, 2-3, 4-6, 7-10, and 11+ year), (exact) labor market region, and detailed (four-digit) occupation. The matching is done separately year-by-year because of the repeated cross-section structure of the data, meaning that a TAW may be matched to different employees each year and individuals may change between treated and control groups when main labor market activity changes. As a robustness check, we match on education instead of occupation, both in the full sample and among natives with complete education data.

Table 1 shows observable characteristics in the reference year 2012 for the matched sample of TAWs and direct employees, weighted by the matching weights (number of treated and controls within each stratum relative to the whole sample). Although we do not match on gender, the two samples are perfectly balanced in that dimension. The same holds for the share of immigrants from LDC and HIC, but in the TAW sample, the EEC immigrant share is somewhat larger than in the employee sample—possibly because of the strong over-representation of this group in temp work relative to regular work (30 percent of TAWs are from EEC, but only 5 percent of direct employees in the unmatched sample). Not surprisingly, the table shows that TAWs earn less, work less in terms of both days and weekly hours, and have nearly half the occupational tenure than direct employees.

4.3   Identifying assumptions

The key assumption for the difference-in-differences approach in Section 3 to identify a causal relationship is that the treated and controls would have had parallel post-2013 wage trajectories if the TAWD was not introduced. Similarity of observable characteristics and parallel pre-trends are reassuring for this assumption to hold—albeit, not a formal proof. The control group in our analysis is matched to TAWs on several observable characteristics, and is therefore very similar to the treatment group (Table 1). Figure 2 shows the outcome variable over the estimation period for the weighted samples of treated (TAWs) and controls (direct employees). Panel a shows average log hourly wage and Panel b shows the log (percentage) difference. We see that the pre-trends are reassuringly parallel.

Another important assumption for a causal interpretation, is the no-anticipation assumption.

The implementation of the TAWD in Norwegian law had been debated since it was adopted in the EU in 2008. The implementation was therefore anticipated, but the actual timing was not known until the passing of the legislation in Parliament in July 2012. Firms may therefore have started to adjust to the new legislation already in 2012, and as robustness, we estimate the model using 2011 as the reference year in Section 6 (Figure A.1). Results are unchanged.

5 Results wages

5.1 Main results

In Figure 3 we show the results from the estimation of Equation 1 with four sets of control variables. The wages of TAWs increase by 2.5-2.8 percent after the implementation of the TAWD, depending on the specification of the control vector. In the preferred model, with both occupation- and TAW-by-region-fixed effects, the increase is 2.7 percent. The increase is largest in 2013, the first year after the implementation. In 2014, the effect is reduced to around 1 percent. However, as explained in Section 2 and 4, the drop in 2014 may be related to other factors. Firstly, the oil price shock that started in July 2014 may have had a negative effect on temp agency hiring - which may have resulted in a selective exit from temp agency work. Secondly, employers may have adjusted to the new legislation on equal pay by employing TAWs in lower-paying subcontractors instead of directly into higher-paying main contractors. Thirdly, the new employment registration system in 2015 may have affected the registration of TAWs and direct employees asymmetrically (see Section 4). We will investigate further the role of different channels for the 2014 drop in future versions of the paper.

In Figure 1, we saw that the TAW employment share flattened out in 2013 and fell in 2014. Figure 4, Panel a, reveals that in our (matched) estimation sample, the share of TAWs go down even more than in the full (unmatched) population—and more than the number of TAWs.[5] This naturally raises the question of whether the estimated wage increase is caused by selective

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[5]Figure 4 is based on the matched and weighted sample of TAWs and direct employees, and Figure 1 shows raw data for (unmatched) workers within the same wage and annual working hours boundaries, but without any restrictions on weekly hours, age, and non-employment activity, like students.

attrition of TAWs when they potentially became more expensive to hire and the demand for them therefore went down. Another possible, and perhaps more speculative, explanation is that employers adjusted to the new legislation by reducing *contracted* working hours, and thereby seemingly increasing the hourly wage, without reducing *actual* hours worked (which we do not observe). Did the remaining TAWs work more or less after the reform?

The number and share of hours worked by TAWs in total during a year fall as well (Panel b), but less than the share of workers (0.23 and 0.33 percentage points reduction in the share of hours and workers, respectively). Hence, remaining TAWs actually worked on average *more* compared to direct employees in 2013. The two bottom panels of the figure confirm this. Although already on an upward trend, average hours worked per year (Panel c) and number of days employed (Panel d) continued increasing for TAWs from 2012 to 2013, but less than the increase the previous year. In the next section, we examine possible mechanisms behind the estimated hourly wage increase, as well as which groups of workers were affected the most.

5.2   Heterogeneity and mechanisms

The next step of the analysis is to estimate heterogeneity of effects along several dimensions of workers characteristics, in order to reveal possible underlying mechanisms behind the observed effect, including intensive margin effects. The workers we are particularly interested in, are those with the weakest attachment to the labor market (although our sample consists of relatively strongly attached workers in order to have a sensible matching) and also most prone to social dumping. Therefore, we split the sample by weekly working hours, immigrants' country of origin, and main occupation groups (defined by broad education level) to examine which workers were affected the most and in what way.

5.2.1   Working-time categories

We have seen that TAWs became a smaller part of the economy after the implementation of the TAWD in 2013. Temp agency usage went down, but temp agencies' employees worked more and earned more per hour worked. Their annual wage payments increased (Figure 5). But was

it first and foremost those already working full time who saw their wages increase, or more part-time workers becoming full-time employed? And who had the largest wage increase? Figure 6 explores the intensive margin effects of TAWs and heterogeneity among workers with different (contracted) weekly working hours. The top row shows the shares of four categories of part-/full-time workers as defined in the legend (left axes), among TAWs (left) and direct employees (right). Full-time work corresponds to 37.5 hours per week. The right axes show average number of working hours in the full samples of TAWs and direct employees. Because our sample is limited to employees working at least 20 hours per week, we can only examine the effects among those with relatively large part-time work. (A separate examination of marginal workers with fewer working hours will be included in future versions of the paper.)

The figures reveal that although average working hours of TAWs increased, driven by a larger share of full-time employees, it was the wages of the workers with the *smallest* part-time contracts (below full time) that increased the most, both per hour (second top row) and in total (second bottom row). Their employment duration also increased the most (bottom row). Apparently, the most marginal workers in the sample, and one of the main target groups of the directive, gained the most.

5.2.2 Immigrant origin groups

In Figure 7, we split the sample of TAWs by country of origin and estimate effects within four separate groups: i) EEC, ii) LDC, iii) HIC, and iv) natives. The TAWs are matched to direct employees of all origins. We see that the positive wage effect of the directive is driven by immigrants from the two groups of low-income countries, namely EEC and LDC. The results are consistent with migrant TAWs from low-wage countries receiving wages below the going rate due to a lower reservation wage. The directive adjusted, at least partly, for this lower pay.

5.2.3 Occupation groups

In Figure 8, we split the sample by major occupation groups, roughly corresponding to education level: 2 "Professionals", 3 "Technicians and associate professionals", 4 "Clerical support

workers", 5 "Service and sales workers", 7 "Craft and related trades workers", 8 "Plant and machine operators and assemblers", and 9 "Elementary occupations". The wage effect is largest in group 7, 8, and 9 (see Panel a), which also have the largest shares of both TAWs and immigrants, as visible from Panel b. The effect on temp agency wages is 5-6 percent, almost twice the size of the average effect, indicating that general legislation may be efficient in solving problems that seem concentrated in certain occupations and industries. Typical industries for these occupations are building and construction and manufacturing. These industries are main immigrant employers and there has been problems over the period with low immigrant pay.

6 Robustness

Figure A.1 shows that the change of reference year from 2012 to 2011 hardly changes the estimated reform effect. Further, A.2 shows that matching on (2-digit) education instead of occupation, and assigning immigrants with missing education data the lowest level of compulsory education, does not change the estimated effect either. Finally, in order to test the extra sensitivity of TAWs to general labor market conditions, we interact labor market region (commuting zone) fixed effects with the TAW dummy, see Figure A.3. (More robustness checks will be included in future versions of the paper.)

7 Conclusion

We study the implementation of the Directive on Temporary Agency Work (TAWD) in Norwegian law in 2013. The directive introduced a principle of equal pay and working conditions for temp agency workers. We use full-population register data and employ a difference-in-difference model to identify the effects of the reform. We study all employees in temp agencies in Norway and use coarsened exact matching methods to find a control group among regular workers who are similar on observable characteristics to the temp agency workers. We find that wages of temp agency workers increased by nearly 3 percent in the first year after the

implementation of the TAWD. The effects are driven by immigrant temp agency workers who received 4-6 percent higher wages after the implementation of the TAWD.

References

Amuedo-Dorantes, C., Malo, M. A., and Munoz-Bullon, F. (2008). The role of temporary help agency employment on temp-to-perm transitions. *Journal of Labor research*, 29:138–161.

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.

Autor, D. H., Houseman, S. N., and Kerr, S. P. (2017). The effect of work first job placements on the distribution of earnings: An instrumental variable quantile regression approach. *Journal of Labor Economics*, 35(1):149–190.

Barrabés, N. and Østli, G. K. (2015). Norsk standard for utdanningsgruppering - revidert 2000 dokumentasjon. Technical report, Statistics Norway.

Bhuller, M. S. (2009). Inndeling av norge i arbeidsmarkedsregioner. Technical Report 24, Statistics Norway.

Blackwell, M., Iacus, S., King, G., and Porro, G. (2009). cem: Coarsened exact matching in stata. *Stata Journal*, 9(4):524–546.

Booth, A. L., Francesconi, M., and Frank, J. (2002). Temporary jobs: stepping stones or dead ends? *The economic journal*, 112(480):F189–F213.

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.

Forde, C. and Slater, G. (2005). Agency working in britain: Character, consequences and regulation. *British Journal of Industrial Relations*, 43(2):249–271.

Frenzel, H. (2010). The temporary agency work directive. *European Labour Law Journal*, 1(1):119–134.

Gerfin, M., Lechner, M., and Steiger, H. (2005). Does subsidised temporary employment get the unemployed back to work? aneconometric analysis of two different schemes. *Labour economics*, 12(6):807–835.

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

Ichino, A., Mealli, F., and Nannicini, T. (2008). From temporary help jobs to permanent employment: What can we learn from matching estimators and their sensitivity? *Journal of applied econometrics*, 23(3):305–327.

Jahn, E. J. (2010). Reassessing the pay gap for temps in germany. *Jahrbücher für Nationalökonomie und Statistik*, 230(2):208–233.

Kalleberg, A. L. (2000). Nonstandard employment relations: Part-time, temporary and contract work. *Annual review of sociology*, 26(1):341–365.

Kvasnicka, M. (2009). Does temporary help work provide a stepping stone to regular employment? In *Studies of labor market intermediation*, pages 335–372. University of Chicago Press.

Lane, J., Mikelson, K. S., Sharkey, P., and Wissoker, D. (2003). Pathways to work for low-income workers: The effect of work in the temporary help industry. *Journal of policy Analysis and management*, 22(4):581–598.

Nienhüser, W. and Matiaske, W. (2006). Effects of the 'principle of non-discrimination'on temporary agency work: compensation and working conditions of temporary agency workers in 15 european countries. *Industrial Relations Journal*, 37(1):64–77.

OECD (2020). *OECD Employment Outlook 2020.*

8 List of tables and figures

Figure 1: Share of temporary agency workers, 2000-2014

(a) Among all workers, by origin group   (b) Within origin groups
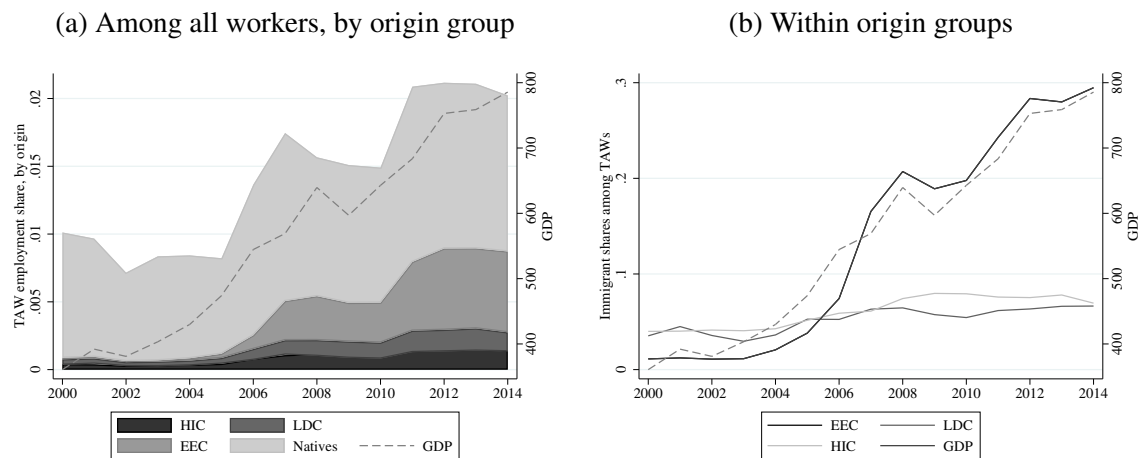
Notes. Panel a shows the share of TAWs among all employees (left axis) over the period 2000-2014, divided into four country of origin groups: high-income countries (HIC) in black, less-developed countries (LDC) in darkest gray, Eastern European countries (EEC) in medium gray, and natives in the lightest gray color. The dashed line shows Norway's GDP in current prices, seasonally adjusted (right axis). Panel b shows the share of TAWs among all workers from each origin group (left axis), together with Norway's GDP (right axis).

Table 1: Observable characteristics of TAWs and employees, 2012

	TAWs	Direct employees
Male	0.71	0.71
Age	33.47	33.49
EEC	0.33	0.27
LDC	0.06	0.06
HIC	0.08	0.09
Experience (labor market)	8.3	8.5
Annual hours	1,214.9	1,599.9
Days employed	241.4	307.4
Weekly hours	35.2	36.4
Annual salary	260,350	365,834
Earnings	333,248	409,212
Hourly wage	217.8	231.8
Experience (occupation)	2.6	3.9
N	*21,213*	*390,235*

Notes. Average numbers in the two samples of matched and weighted TAWs and direct employees (DE), respectively, in the reference year 2012. TAWs are matched (each year) to DE on age, labor market experience, occupation, and region.

Figure 2: Hourly wages of treated and controls

(a) Levels

(b) Percentage difference
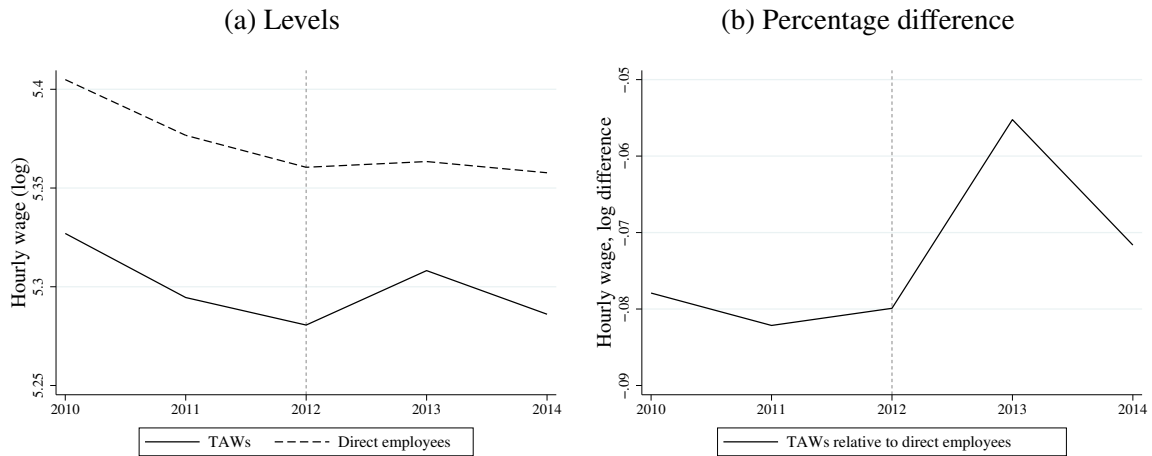
Notes. Average log hourly wages among the weighted matched sample of temporary agency workers and direct employees. Wages are deflated to 2012-value. Panel a shows log levels and Panel b shows log (percentage) difference between TAWs and direct employees.
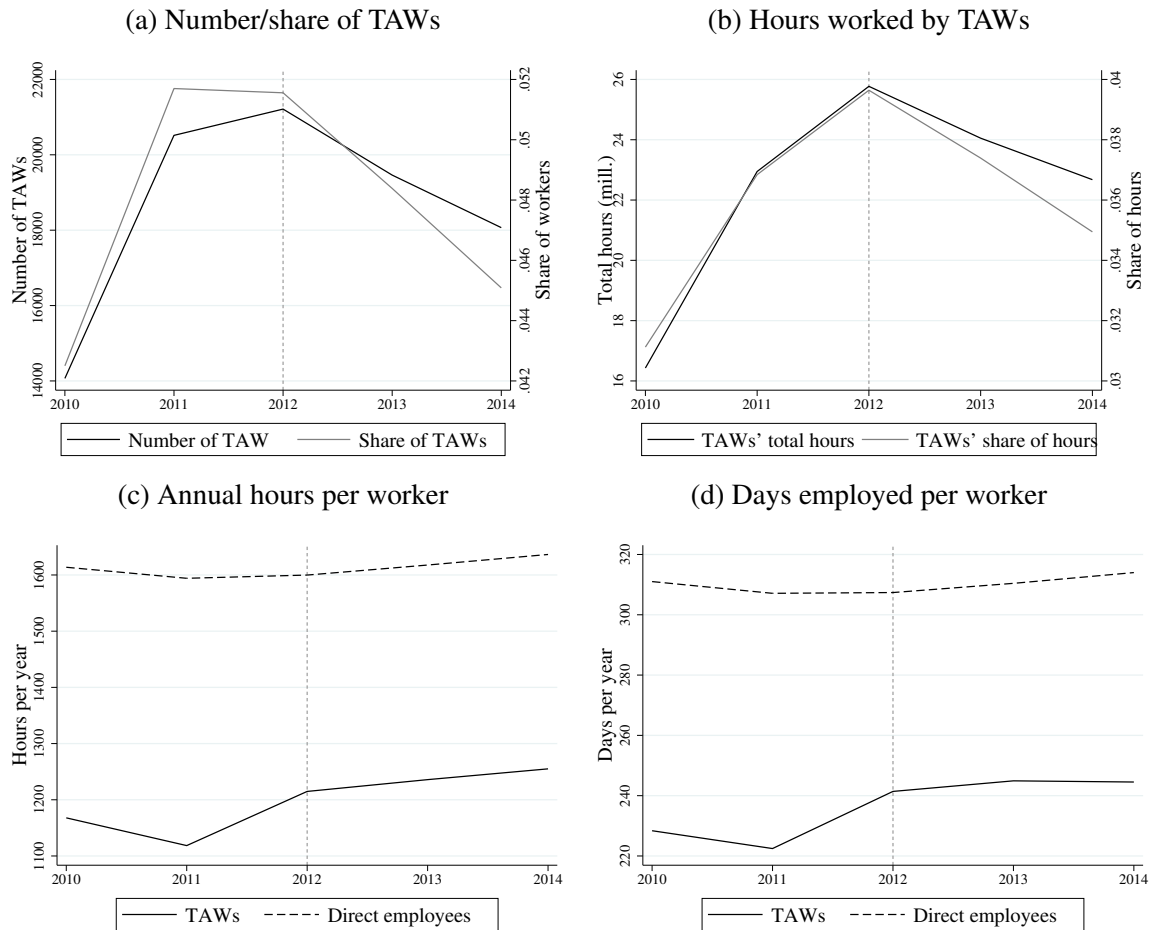
Figure 3: Main estimation results
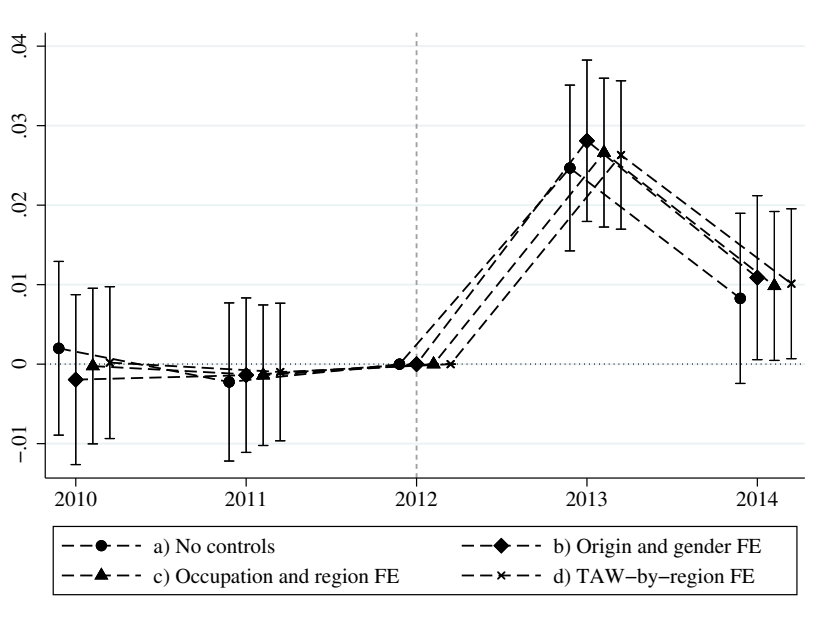
Notes. Regression coefficients from the estimation of Equation 1. The symbols are yearly estimated coefficients on temp agency workers (TAWs) relative to 2012, with 95-percent confidence intervals. Outcome is log hourly wages. Controls include dummies for TAW and year. In addition, we successively add fixed effects for: b) immigrant origin group and gender, c) detailed occupation and labor market region, and d) TAW-by-region.

A Appendix

Figure 4: Hours and days worked by TAWs

(a) Number/share of TAWs

(b) Hours worked by TAWs

(c) Annual hours per worker

(d) Days employed per worker

Notes. Panel a shows the number (left axis) and share (right axis) of TAWs in the matched (weighted) sample of temporary agency workers and direct employees. Panel b shows total annual hours worked by TAWs(left axis) and the share of TAW hours among all hours supplied (right axis) in the matched sample. Panel c shows the average number of hours worked during a year by a TAW and a direct employee, respectively, and Panel d shows the number of days.

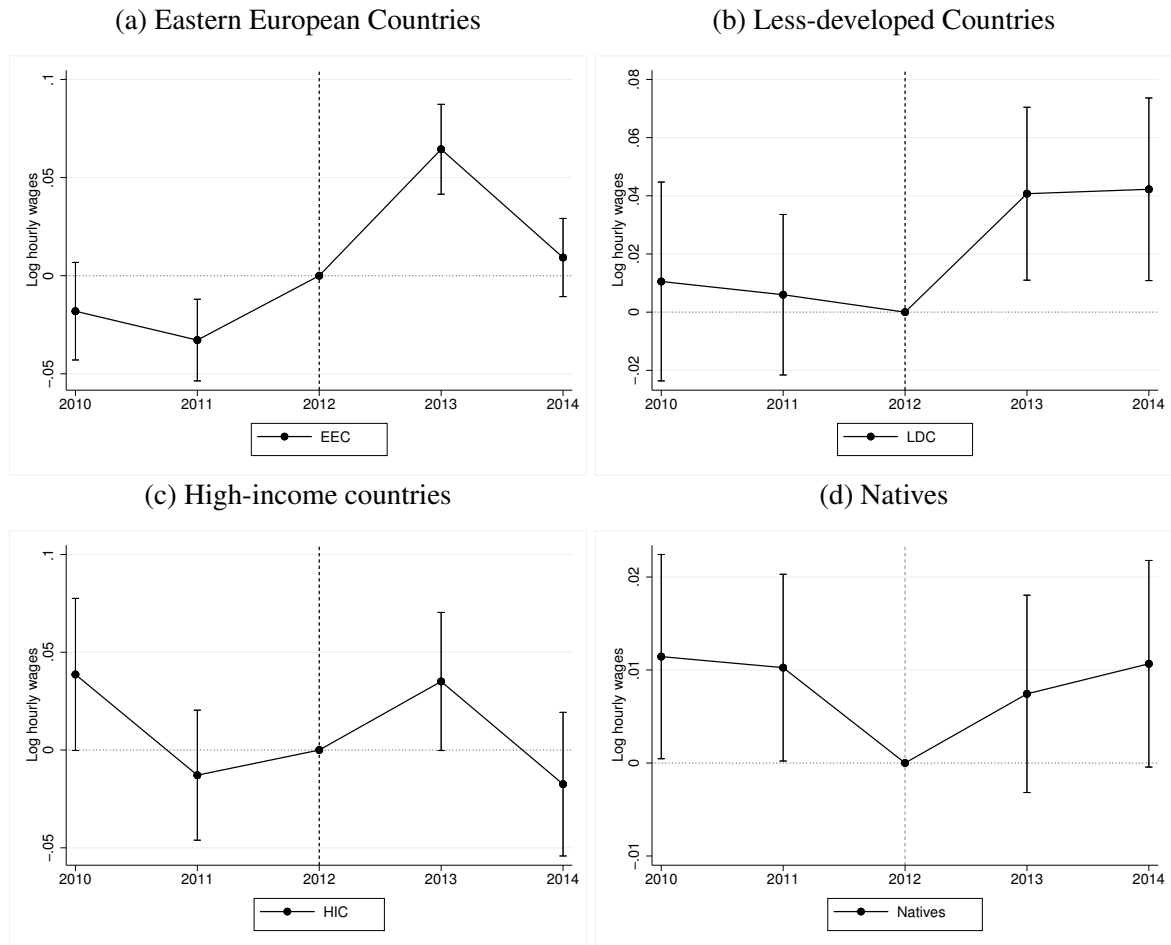Figure 5: Annual wage payments for treated and controls

(a) Levels

(b) Percentage difference
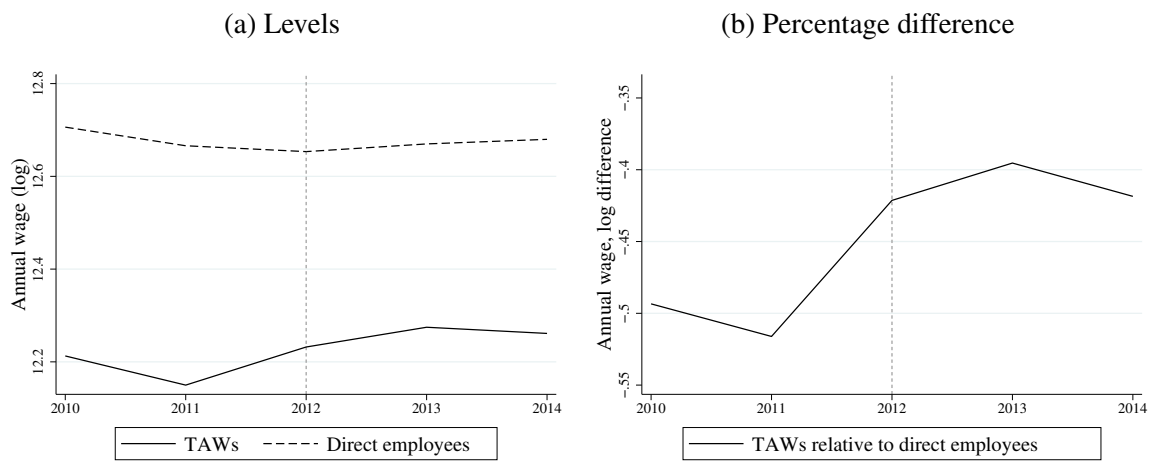
Notes. Average annual wage payments (log) among the weighted matched samples of temporary agency workers and direct employees. In log levels to the left and log (percentage) difference to the right. Wages are deflated to 2012-value.

Figure 6: Working-time categories
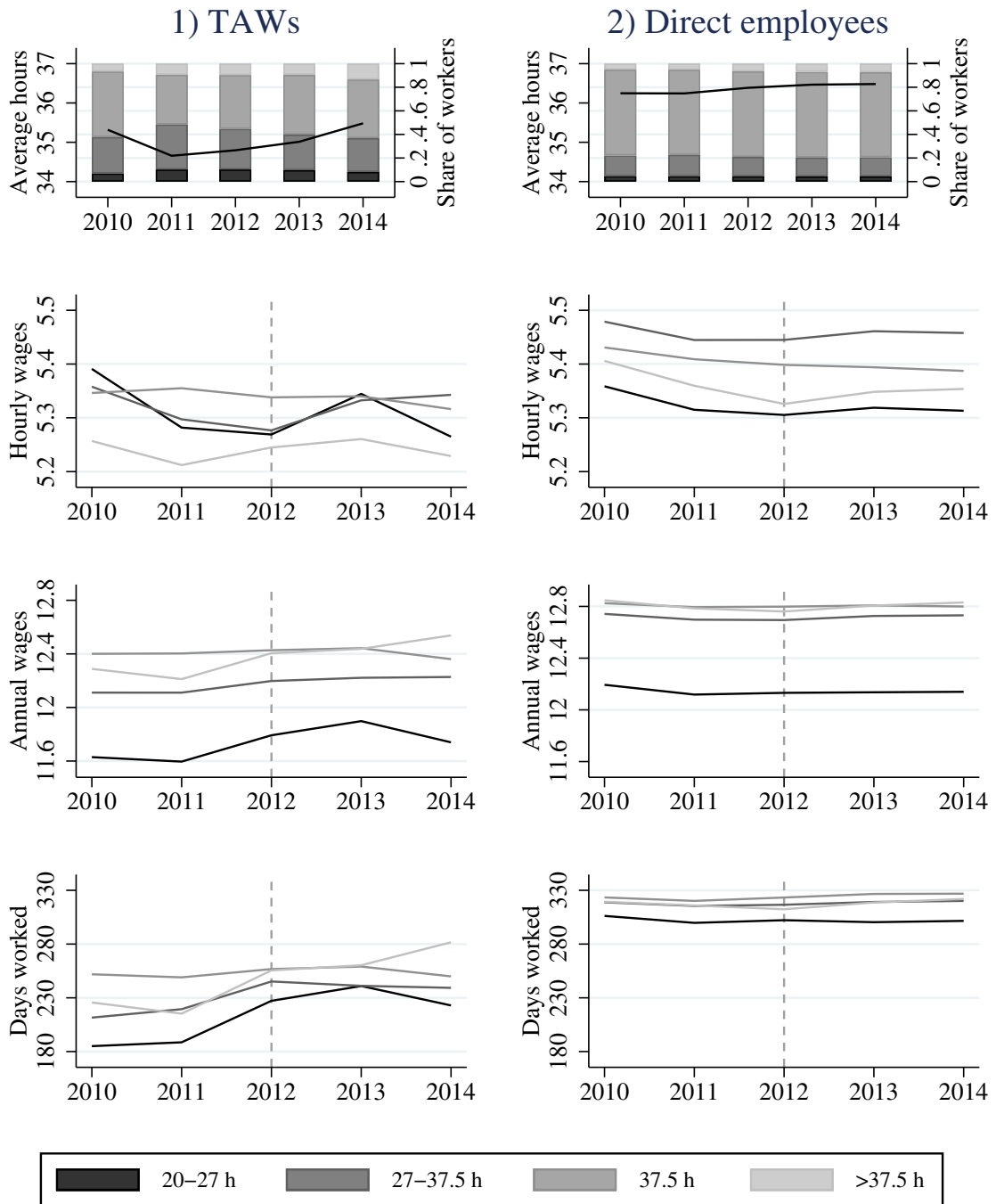
Notes. TAWs (Column 1) and direct employees (Column 2) divided into groups by (contracted) weekly working hours as specified in the legend. Full-time contract corresponds to 37.5 hours. Top row shows average weekly working hours in the full sample of TAWs/direct employees (left axis) and the share of workers within the four part-time categories (right axis). The second row shows average hourly (log) wage in each category. The third row shows average annual wage payments, and the bottom row shows the average number of days worked. Wages are deflated to 2012-value.

Figure 7: Regression coefficients by origin groups

(a) Eastern European Countries

(b) Less-developed Countries

### (c) High-income countries

(d) Natives

Notes. The figure shows regression coefficients from separate estimations of Equation 1 within immigrant origin groups, defined by the country of origin of the temp agency workers (TAW) divided into four: a) Eastern European Countries (EEC), b) Less-Developed Countries (LDC), c) High-Income Countries (HIC), and d) natives (born in Norway). Control groups include direct employees of all origins. Each subgraph shows estimated yearly coefficients on TAWs together with 95-percent confidence intervals.

Figure 8: Occupation groups

(a) Regression coefficients

(b) Immigrant shares among TAWs by origin
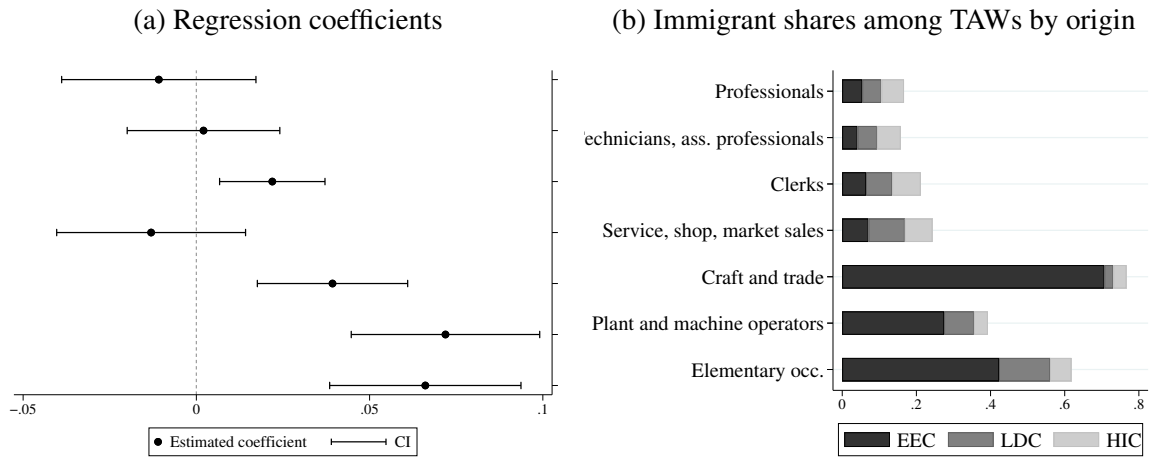
Notes. Panel a) shows estimated coefficients from separate estimations of Equation 1 within major occupation groups, together with 95-percent confidence intervals. Panel b) shows immigrant shares in each group. Groups are defined by the first digit of each occupation code. Group 6 omitted because of the small sample size, causing large standard errors.

Figure A.1: Baseline estimation with 2011 as reference year
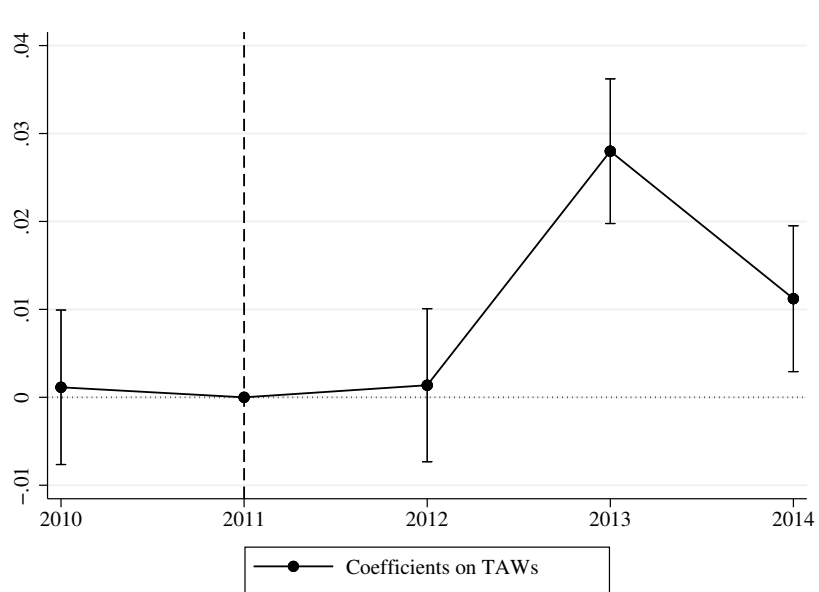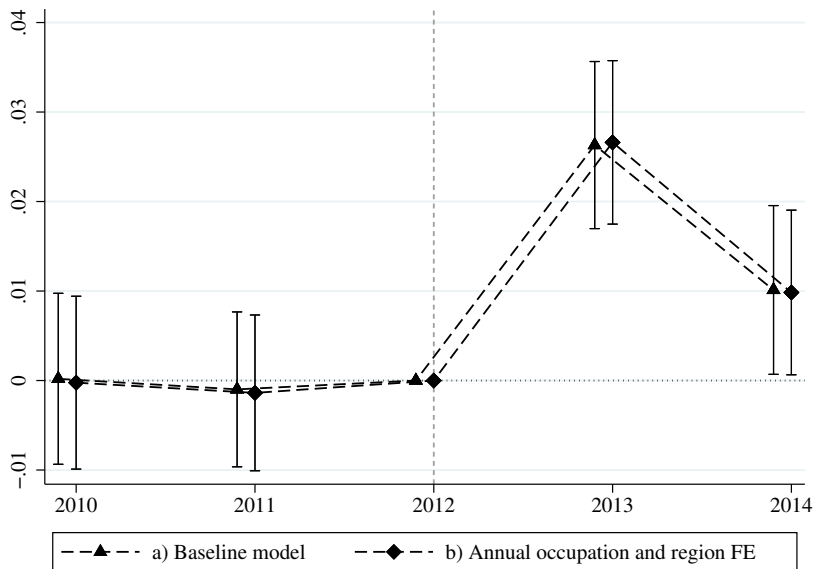

Notes. Regression coefficients from the estimation of Equation 1 with 2011 as reference year. Outcome is log hourly wages. The dots are estimated coefficients on TAWs together with 95-percent confidence intervals. Controls include dummies for TAW and year fixed effects, as well as immigrant origin group, gender, and occupation and region interacted with year.

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Figure A.2: Matching on education

a) No controls   b) Immigrants and gender FE
c) Occupation FE   d) Annual occupation and region FE
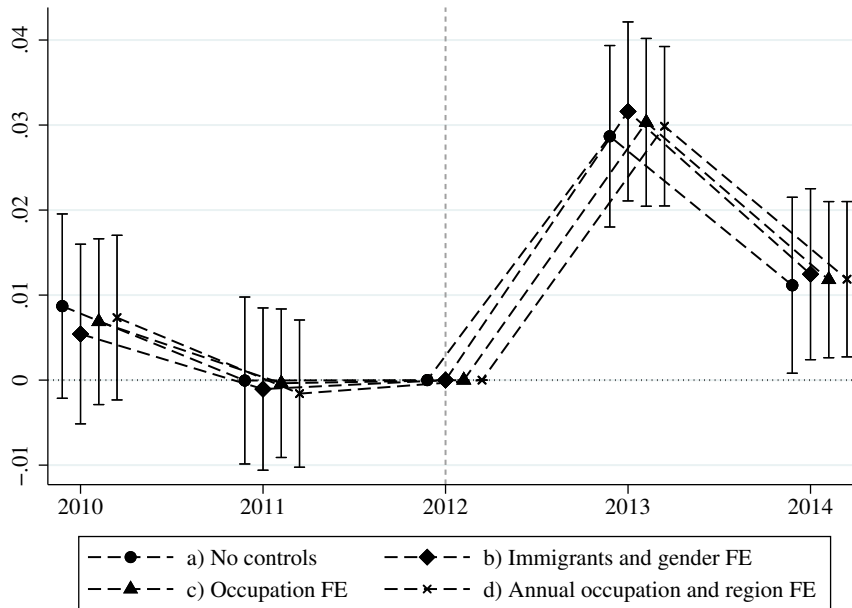
Notes. Coefficients from the estimation of Equation 1. Sample of TAWs is matched to direct employees on 2-digit education instead of occupation, in addition to age, experience and region as previously. Symbols show yearly coefficients on temp agency workers (TAW) relative to 2012, with 95-percent confidence intervals. Outcome is log hourly wages. Controls include dummies for TAW and years. In addition we successively add fixed effects for: b) immigrant origin group and gender, c) detailed occupation, and d) yearly occupation and region.

Figure A.3: Removing occupation- and region-specific trends

a) Baseline model   b) Annual occupation and region FE

Notes. Regression coefficients from the estimation of Equation 1 and the full set of controls in a). See notes to Figure 3. In b) we include occupation- and region-by-year-FE instead of constant fixed effects. Symbols are estimated coefficients on TAWs together with 95-percent confidence intervals.