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Gender and job search in the Dutch market for temp staffing and payrolling jobs [★]

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Abstract

We examine the role of commercial temp work agencies (TWAs) in matching temporary staffing workers to client firms in the Dutch labour market. Our research question is whether the process of search and recruitment by TWAs reduces search frictions, and whether it affects the gender pay and commute gap. We empirically analyse the labour-market outcomes of temporary workers by using information on about 300 thousand job placements by the TWA Randstad Holding over the period 2013-2017. We use temporary workers on so-called “payrolling jobs” as a comparison group for the temporary staffing workers. Both groups are employed by the temporary work agency, but the temp agency is only involved in the recruitment process of staffing workers and not of payrolling workers. The estimates indicate that compared to temporary payrolling workers, temporary staffing workers experience lower wages and lower commutes. Importantly, we show that the gender commute gap is about 10 percentage points smaller for staffing workers, whose search is directed by the temp agency, compared with payrolling workers. Interestingly, the gender pay gap is about 3 percent and equal for both staffing and payrolling workers. Overall, job search by a TWA narrows the gender commute gap, whereas the gender wage gap does not seem to depend on the type of job search and is relatively small for temporary workers.

Keywords:

Temp work agency, Temporary staffing jobs, Temp payrolling jobs, Wages, Commute, Gender

JEL Classification:

J31, R12, R23

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1. Introduction

A prominent active labour market policy of many governments is to reduce search frictions that slow down the creation of productive job matches. For example, the provision of better information on local demand and supply could raise the efficiency of regional job search, so that both sides of the labour market would benefit. Another top priority on the socio-economic policy agenda of governments is the removal of the gender pay gap. For instance, employers are not allowed – through a code of conduct and anti-discrimination laws – to signal any preferences for gender, age, and ethnicity during the process of recruitment.¹ Our paper demonstrates that a reduction of search frictions can contribute to the aim of establishing equal labour-market opportunities for females and males.²

One way to reduce search frictions is by help from commercial temp work agencies (TWA) in linking workers and firms. The business practice of a TWA is to provide client firms with temporary staffing workers who have specific knowledge, skills and experience. The TWA is continuously involved in a process of searching and screening potential workers, which is less costly for the TWA than the client firm because of returns to scale. Importantly, the TWA is the legal employer of the temporary workers and is responsible for the human resource services such as salary payments as well as the contribution of social benefits. Consequently, the client firms are not financially liable to the employer risk of for instance dismissal and sickness absence, but do pay a mark-up to the TWA for the recruitment and retention of temporary workers. Our paper examines whether TWAs improve the job search efficiency of job seekers, taking a different angle than previous studies.³ We build on the argument of Neugart and Storrie (2006) who demonstrate that the Mortensen-Pissarides model of job search can be used to explain the improvement in matching efficiency of temp work, examining whether TWA contributes to the search by job seekers.

We will address two specific questions of research. First, does the process of search and recruitment by TWAs reduce spatial search frictions? Job seekers may benefit from the search efforts of the TWA, since despite the large number of firms, local labour markets can be thin (Manning,

¹For the Netherlands the recruitment code refers to the Equal Treatment act of 1994, which explicitly mentions unlawful discrimination for advertisements for job vacancies and procedures leading to the filling of vacancies.

²For instance, see EU text “Equal opportunities and access to the labour market,” which is part of the EU pillar of social rights <https://ec.europa.eu/commission/equal-opportunities-and-access-labour-market>.

³Previous literature emphasizes the role of screening and selection in the careers of the temporary workers, focusing on whether temp agency work leads to a stepping stone of fixed or permanent employment and whether it affects wage differentials (Houseman, 2014). Jahn and Rosholm (2018) find no effect of TWA intermediation on the long-term labour-market outcomes of workers in Germany. In contrast, Ichino et al. (2008) find positive effects for Italy, as did Jahn and Rosholm (2014) for Denmark. Furthermore, the pay gap between workers in temporary jobs and permanent jobs has been investigated, which is negative and increasing over time for Germany (Jahn and Pozzoli, 2013), but positive for Australia (Laß and Wooden, 2019). In addition, there has been research on the procyclicality of the demand for temp labour: for US see Houseman et al. (2003), for the Netherlands see De Graaf-Zijl and Berkhout (2007); and for Germany see Jahn and Bentzen (2012).

2003). More efficient search by the TWA would lead to a higher hourly wage, a lower commuting distance, and/or a different compensating differential. Thereby, TWA search for temporary staffing workers, compared with individual job search for temp payrolling workers, could lead to better labour-market outcomes.

The second question is to what extent TWA search narrows gender gaps in labour-market outcomes? We start our line of reasoning with a broad empirical literature that has shown the existence of a gender wage gap (Blau and Kahn, 2017), a gender commute gap and a smaller local labour market for female workers (Crane, 2007; Black et al., 2014; Meekes and Hassink, 2019b,a). Lower commutes and smaller local labour markets for female workers can be explained by a higher disutility of commute, e.g. because of a stronger preference for time spent at home. Consequently, as females already work relatively close to home, a reduction of spatial search frictions through TWA job search may have a stronger effect on the commuting distance of males. Given the positive association between wages and commutes, a compensating differential model based on costly commute would predict a smaller gender pay gap with TWA job search.

There are two empirical challenges that make it hard to investigate both questions of research. A first issue is that information on the labour-market outcomes of temporary workers is not well included in the nowadays widely used matched employer-employee data sets based on tax records. From the perspective of the tax authority, only the legal employer of the staffing worker matters for the tax revenues, but not the client firm at which the employee is based. A second issue is that due to the specific involvement of temp staffing workers in the client firm, it is hard to relate them to comparable workers who did not become employed through the help of a TWA.

We make use of the actual labour outcomes in the client firms, by using administrative information on job placements from Randstad Holding, which is a global leader in temporary work and human resource consulting services. We define a temporary staffing worker as a worker who took up a temporary staffing job or a temporary secondment job through the job search and recruitment process of Randstad Holding.⁴ To deal with the first empirical challenge, we use Dutch data on temporary workers from Randstad Group Netherlands that offer a unique advantage as they contain information on the salary payments and the worker's place of home and place of work at the client firm. We use information of about 300 thousand temp staffing and payrolling workers over the period 2013-2017.

To deal with the second empirical challenge, we use temporary payrolling workers as a comparison group for the temporary staffing workers. There is – to our knowledge – no academic literature on temp payrolling workers. Payrolling can be defined as the provision of temporary

⁴Other studies focus on related categories of workers with temporary contracts. For instance, no indication of a stepping stone was found by Autor and Houseman (2010) for a field experiment with US temp help workers, Esteban-Pretel et al. (2011) for Japanese contingency workers, and De Graaf-Zijl et al. (2011) for a diverse set of temporary workers consisting of fixed-term jobs, temporary agency work, on-call contracts and subsidised temporary jobs. Booth et al. (2002) found an effect for fixed-term contracts.

workers to a customer firm where the workers have been recruited – possibly interviewed, tested and approved – by the client firm itself. A payrolling contract may be established if the client firm has the proper knowledge and experience to properly evaluate potential workers, but would like to outsource the human recourse services that are costly in terms of risk and time to the temp agency. In legal terms, the workers become employees of the TWA that provides the payrolling services. Hence, the major difference between both types of temporary workers is that the process of job search and recruitment is different although both types of workers are employed by the TWA.

The major empirical outcomes are as follows. With respect to the first research question, we show that commuting distance is about 13 to 18 percent lower for the temporary staffing workers compared to the temporary payrolling workers, which suggests that TWA search helps in reducing spatial search frictions. The hourly wage is 8 to 10 percent lower for the temp staffing workers compared to the temp payrolling workers. These findings are consistent with a compensating differentials model, resulting in lower commuting and lower wages. With respect to the second research question, we show that the gender commute gap is about 10 to 12 percentage points smaller for the temp staffing workers than for the temp payrolling workers. The temp payrolling workers, who are characterised by individual search, have the usual gender difference in commute that is also demonstrated by other studies. Importantly, we show that the gender pay gap is about 3 percent for both staffing and payrolling workers. Interestingly, these findings are not consistent with a compensating differentials model and suggest that male temporary workers benefit relatively much in terms of TWA's search efficiency, improving the male worker's commuting distance.

Our findings may have some useful insights for future research directions on TWA. First, it adds to a sizeable literature that has emphasized building up experience through temp agency work. TWA search can be used as an instrument of active labour market policy for re-integrating vulnerable groups for stable job positions (Jahn and Rosholm, 2013). Our paper suggests that temp agencies contribute to better job search by reducing spatial frictions. Second, it seems that the search component of temp agencies may affect the regional composition of commute of gender. It seems that patterns of commute between males and females become more similar, so that males benefit more from the efficient search by the TWA. Although the gender commute gap becomes less pronounced with TWA search, it does not change the gender pay gap. There is no indication of any compensating wage differential mechanism.

2. Theoretical setting

Job seekers aim to find a suitable employer. The job seeker considers occupation, skill, educational level, pay, and specific job amenities. In some cases, these amenities are costly to the job seeker – e.g. there may be unfavorable working conditions or far distances of commute to the firm. If the costly amenities cannot be fully compensated by the employer through a higher salary, job seekers are less willing to apply for these jobs. We consider the labour-market outcome of search

as determined by financial incentives that is associated with this job.

$$Y = f(\text{Fin}, \text{Search})$$

Y refers to the labour-market outcome of search, which are the hourly wage and the commuting distance. Fin are financial constraints that shape the outcome of job search. It is measured by the disutility to commute. There are search frictions – Search is the channel of search, which generates a number of potential job offers. Models of job search have shown that any removal of these search frictions would give a better job match (Petrongolo and Pissarides, 2006).

We consider differences in the outcomes of job search between the TWA and the individual job seeker. It could be argued that TWA leads to more efficient search (Neugart and Storrie, 2006), reducing search frictions in the labour market. Temp agencies provide a job match between job seekers and firms. The TWA has concluded a contract with the client firm, which stipulates terms such as the number of temporary workers to be delivered, their skill level, the minimum years of experience, the hourly wage, and the number of hours. The contracts do not mention preferred commuting distances,⁵ so that the temp agency does not optimize any relationship between the hourly wage and the commuting distance. Furthermore, the vacancies are presented by the temp agency to individual job seekers. For temporary staffing workers, there has been a general list of vacancies presented by the temp agency to job seekers. In contrast, individual job search may lead to outcomes that are more aligned to individual background characteristics.

Hypothesis 1: The efficiency of job search is higher for TWA search than for individual search. TWA search may lead to better labour-market outcomes for the job seekers that have found a job through the TWA. They can benefit through a higher wage and/or a lower commuting distance.

Next, we consider to what extent both types of job search lead to differences in labour-market outcomes between males and females. As compared with individual job search, both males and females can benefit from more efficient search by the TWA with respect to the relative additional increase of jobs nearby. Consistent with the literature, we assume that the disutility of commute is higher for females than for males. Consequently, the agency search efficiency gain leading to a shift from distant jobs to nearby jobs will be larger for males than for females, narrowing the gender commute gap. Alternatively, without any change in the commute gap, there could be a higher pay through scale effects in markets with search for males widening the gender pay gap. Finally, a compensating differentials model explains by lower commuting costs that there will be less need for a mark-up on the wage, narrowing both the gender commute gap and gender pay gap.

⁵Some client firms do give a travel allowance for temporary staffing workers. However, there are also opportunity costs in terms of time spent on commute.

Hypothesis 2: The search efficiency gain from agency search is higher for males, which narrows the gender commute gap and/or widens the gender pay gap.

3. Dutch institutional setting on temporary work

There are three essential features of the TWA. First, the TWA is the legal employer of all temp workers, so that it bears the risk of the employer-employee relationship. The client firm is responsible for the so-called good employer practice, which means that it needs to take care of the supervision, assessment and work scheduling of the temporary workers.⁶ The temporary workers are employed by the temporary work agency, from which they receive their salary, sickness payments, annual holidays allowance and pension payments. The salary of temp staffing workers is determined by the client firm. Second, there is a contract between the TWA and the client firm to which the temp workers are delivered. There is a mark-up to the provider to cover the costs of its intermediate activities (recruitment of the temporary workers and the fixed costs). Third, the TWA does the process of recruitment of the temp staffing workers. In some occasions two or three candidates are suggested by the TWA, so that the client firm has the final decision. The search by the TWA for temp workers is by diverse recruitment channels, including internet search, phone calls, email notifications, and face to face when job seekers go to a local office of the TWA.

There are two categories of TWA search workers: staffing workers and seconded workers (ABU, 2019a). The staffing workers are placed on short-term positions in the client organization, for which the maximum period is 78 weeks of work. The client organization has no (or a limited) involvement in the hiring of the employee. In case of sickness, the TWA takes care of a replacement temp worker. The seconded workers are placed on long-term positions of the client organization, often for a period of four years at maximum. After about 5.5 years in total, the TWA search workers get a fixed-term contract with the TWA.

Commercial payrolling activities in the Netherlands started in the mid-1990s.⁷ The client firms could prefer payrolling for various reasons. First, the client firms want to do the recruitment and selection of the temporary payrolling workers themselves – the TWA is not involved in the selection process of the temporary payrolling workers. Second, the client firms want to delegate the risk of the employer-employee relationship. Third, the client firms want to delegate the costly administrative duties, such as the payrolling system, annual statements, employment contract and social insurance premiums.

⁶Some large client firms also delegate the planning of the temporary workers to the TWA.

⁷At present, payrolling temp work is available in many countries. According to information from Randstad Holding, payrolling takes place in Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Greece, Hong Kong, Hungary, Italy, Luxembourg, Malaysia, Mexico, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Singapore, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States, and Uruguay.

The TWA is the legal employer of the temp payrolling workers, who can have consecutive temporary contracts for at maximum 5.5 years. The labour conditions are based on that of the temp staffing workers (ABU, 2019a).⁸ Compared with the TWA search workers, the fee to the TWA for a temp payrolling worker is lower, because the TWA has not incurred any costs of recruitment. The client firm is responsible for the assessment, reward, planning and supervision of the temp payrolling worker.

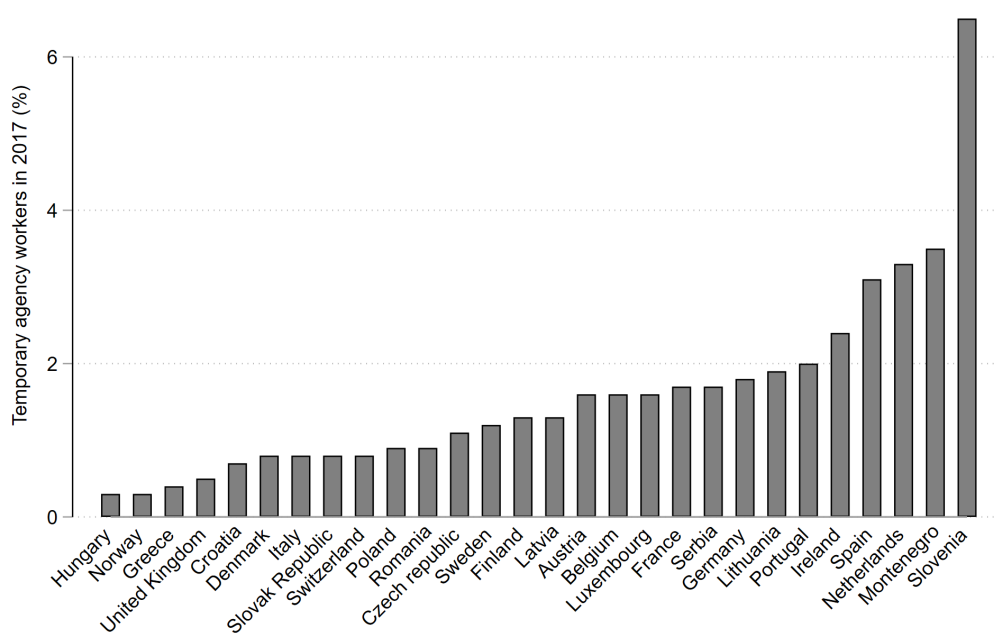


Fig. 1. Percentage of temp workers relative to total employment by EU country in 2017.

Source: Eurostat

The percentage of temp agency workers relative to the total work force varies substantially across the EU-countries in 2017 (see Figure 1). In the Netherlands, the percentage of temp staffing workers increased from 205 thousand (2.5 percent) in 2011 to 289 thousand (3.3 percent) in 2018 (See Figures 2 and 3). Obviously, the increase is related to the stage of the business cycle. There are fragmented statistics of the number of payrolling workers in the Netherlands. Estimates are 140 thousand workers in 2011, 194 thousand workers in 2015, and between 200 and 300 thousand workers in 2017 (Zwemmer, 2018; ABU, 2019b).

⁸Some providers of payrolling workers have an alternative labour agreement, which is similar to that of the ABU Collective Labour Agreement (ABU, 2019a).

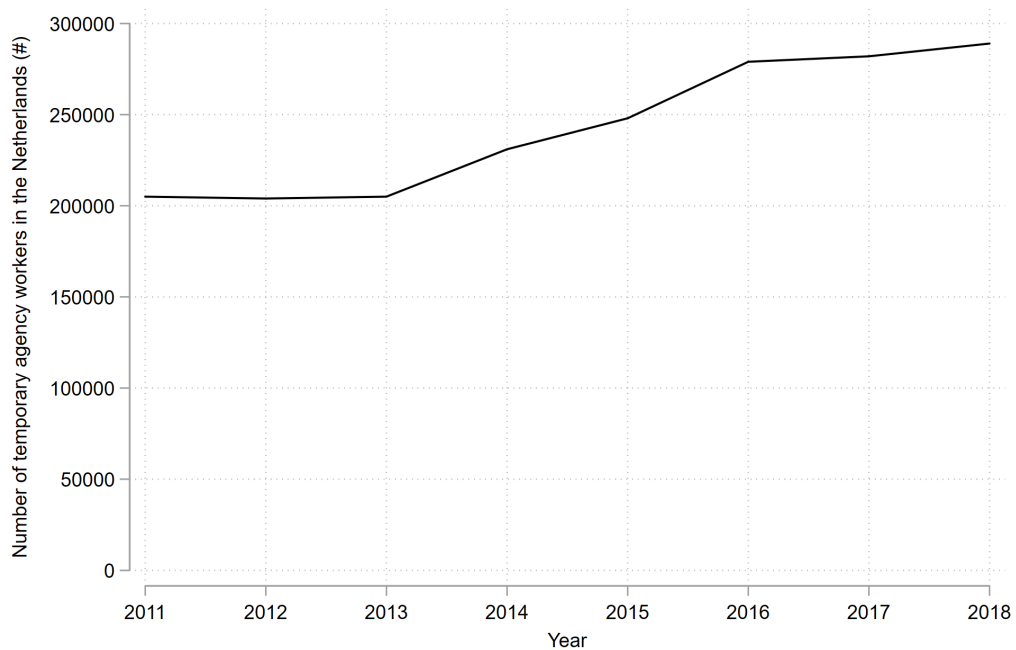


Fig. 2. Total number of temp workers in the Netherlands.
Source: Statistics Netherlands

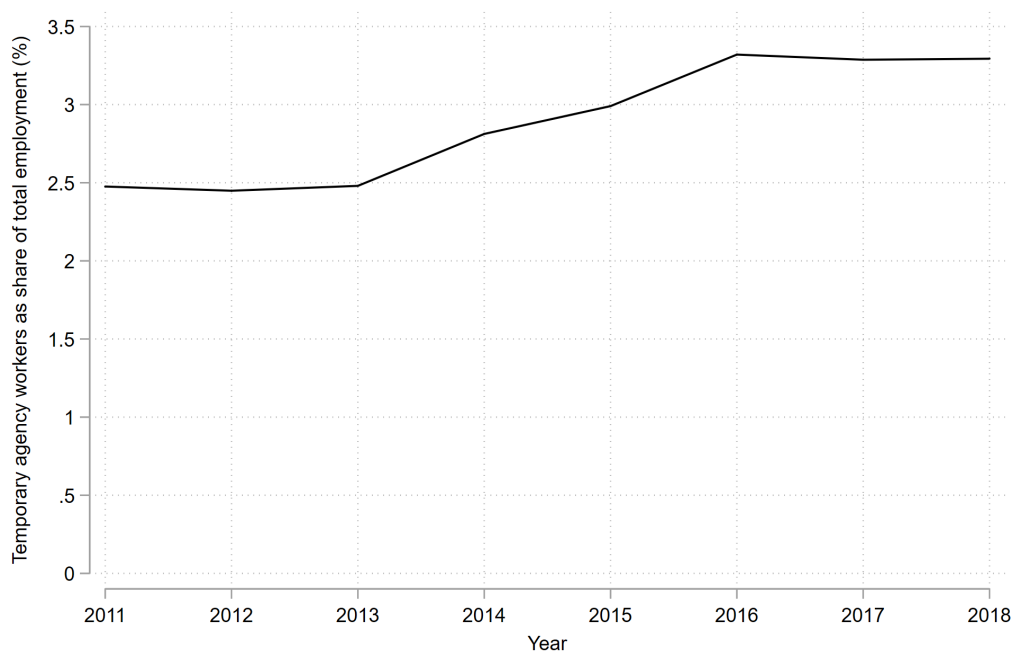


Fig. 3. Percentage of temp workers relative to total employment in the Netherlands.
Source: Statistics Netherlands

4. Data

For our empirical investigation, we made use of information from Randstad Group Netherlands. Randstad is the largest company for HR services worldwide. Randstad Group Netherlands is the leading company in the Netherlands with a market share of about 15-20 percent, and consists of the business divisions “Randstad NL”, “Tempo-Team” and “Yacht”. We use information of the business divisions Randstad and Tempo-Team. Yacht is excluded, because it is relatively small, with a specific focus on higher-educated temp workers.

We used information over the period 2013 to 2017. For each individual, we selected the first placement over the period under observation. This selection is important as over 50 percent of the temporary workers have only one temporary job through TWA search, and otherwise there will be a selection bias based on an occupation-specific likelihood of multiple placements per individual. For example, workers in the Hotel and Catering Industry are characterised by many placements, whereas most workers in other occupations only have one placement. There are some further selections. We removed all individuals with an age below 23 or above 60; workers employed at the address of the headquarters of Randstad in Diemen were removed; workers who work less than 3 days were removed; workers who live outside the Netherlands are removed; workers who have a commuting distance over 200 km (as the crow flies), over 250 km (by road using TomTom data), are removed; workers who have a commuting time over 250 minutes (by road using TomTom data) are removed.

We used information of 300,071 workers. See Table 1 for the summary statistics. Commuting distance is defined as the TomTom distance when driving between home (4-digit zip code) and the workplace (4-digit zip code). We also used other measures of commuting, including commuting time from place of home to place of work, as well as the commuting distance as the crow flies. Our analysis is robust to the use of these alternative measures. The average distance is 26.6 kilometres. The hourly wage is defined as the annual wage relative to the annual number of hours of work for the first placement. The average wage is 12.1 euro. 45 percent of the workers are female. A substantial part of the temp workers is low educated (57 percent) or average educated (38 percent); 5 percent are high educated. The temporary workers are on average 35 years old. 88 percent of the workers are of Dutch nationality. 16 percent have a partner (which can be prone to measurement error). In terms of the type of contract, there are temp staffing workers (51 percent), temp seconded workers (40 percent), and temp payrolling workers (9 percent).

Table 1

Randstad sample summary statistics.

Statistic	Mean	St. error	Min	Pctl(25)	Median	Pctl(75)	Max
Commuting dist Crow (km)	19.929	27.683	0	4.419	10.345	22.651	199.888
Commuting dist TomTom (km)	26.626	35.111	0	5.991	14.881	30.982	249.858
Hourly wage (euro)	12.128	3.323	1.010	10.055	11.232	13.248	50.000
Hourly wage (log)	2.467	0.229	0.010	2.308	2.419	2.584	3.912
Female (=1)	0.448	0.497	0	0	0	1	1
Low-educated (=1)	0.576	0.494	0	0	1	1	1
Average-educated (=1)	0.375	0.484	0	0	0	1	1
High-educated (=1)	0.049	0.216	0	0	0	0	1
Age (years)	35.206	10.307	23.000	26.247	31.860	43.427	59.997
Dutch (=1)	0.882	0.323	0	1	1	1	1
Partner (=1)	0.155	0.362	0	0	0	0	1
Staffing (=1)	0.514	0.500	0	0	1	1	1
Secondment (=1)	0.407	0.491	0	0	0	1	1
Payrolling (=1)	0.079	0.269	0	0	0	0	1
Tempo-Team (=1)	0.394	0.489	0	0	0	1	1

Notes: The time period under observation is from 2013 to 2017. The sample consists of one observation per worker. $N=300,071$

Next, we consider the averages of commute and the hourly wage for females and the three groups of temporary workers (see Table 2).⁹ The differences for commuting distance are substantial. The difference between the average commuting distance for staffing and seconded temporary labour are minor (25-28 km), whereas the average distance for temporary payrolling jobs is substantially different between males (40.2 km) and females (32 km). Table 2 shows that there are hardly any differences in the average hourly wage between males and females for the different types of contract.

Table 2

Commuting distance TomTom and hourly wage statistics by gender and type of contract.

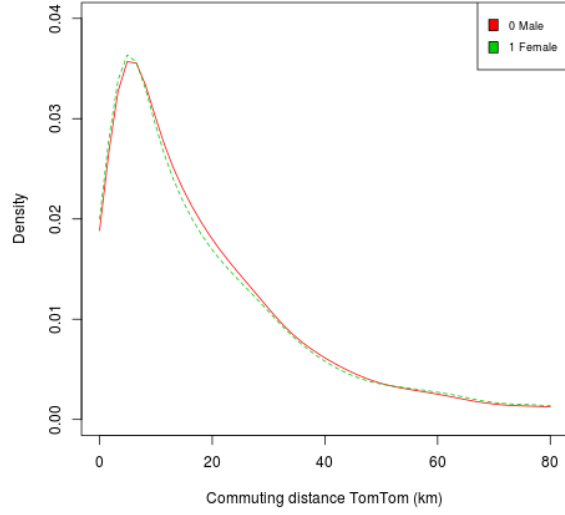
Gender	Type of contract	Mean commuting distance in km (St. error)	Mean hourly wage in euro (St. error)	N
Female	Staffing	28.1 (37.4)	12.0 (2.9)	70,952
	Secondment	24.8 (33.1)	11.9 (3.1)	49,722
	Payrolling	32.0 (41.3)	15.1 (3.6)	13,760
Male	Staffing	25.5 (33.6)	11.8 (2.6)	83,294
	Secondment	24.9 (31.4)	11.9 (2.8)	72,482
	Payrolling	40.2 (49.6)	15.0 (6.8)	9,861

Notes: Standard errors are provided in parentheses. The time period under observation is from 2013 to 2017. $N=300,071$

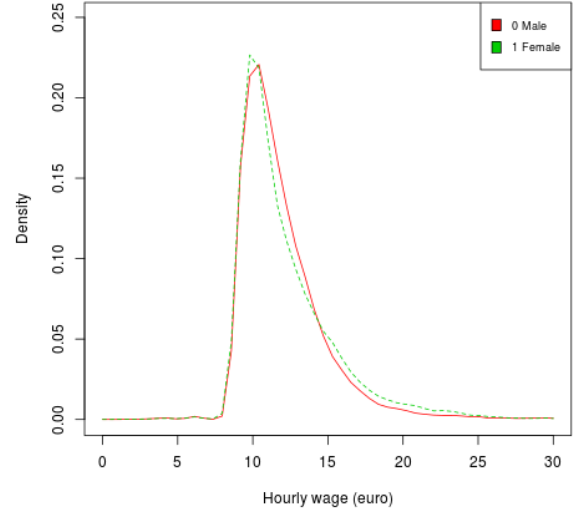
Figure 4a gives the distribution of the commuting distance for males and females separately. Figure 4b depicts the distribution of the hourly wage for males and females separately. In ad-

⁹Job tenure patterns of temp seconded workers are very similar to those of temp payrolling workers. These patterns are available upon request.

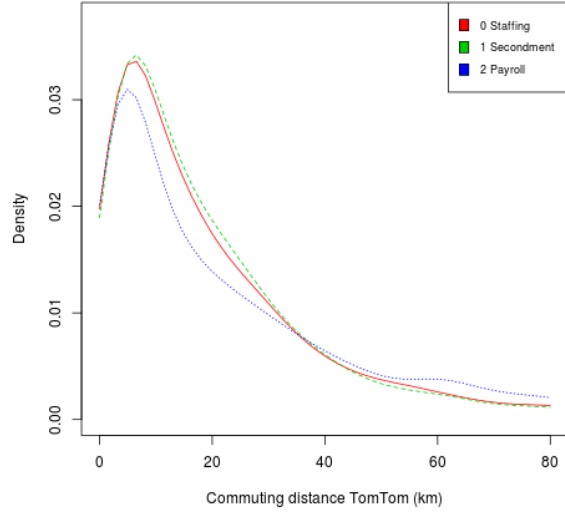
dition, the commuting distance and hourly wage for the three types of labour contract (staffing, secondment and payrolling) are provided in Figures 4c and 4d.



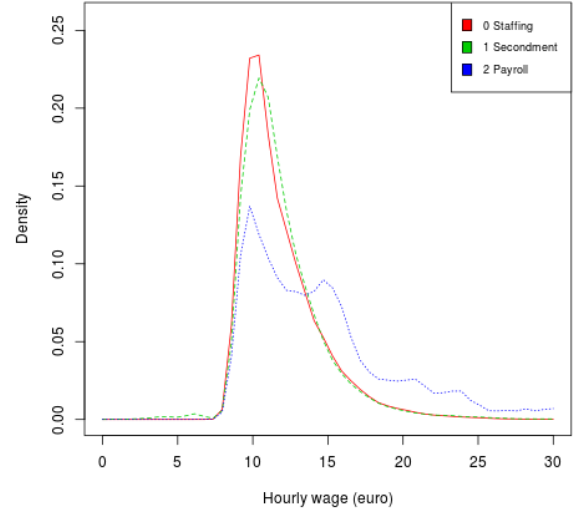
(a) Commuting distance by gender



(b) Hourly wage by gender



(c) Commuting distance by type of contract



(d) Hourly wage by type of contract

Fig. 4. Distribution plots of the commuting distance and hourly wage by gender and type of contract. *Notes:* Graphs 4a and 4c, and Graphs 4b and 4d, represent the kernel density plots for commuting distance TomTom in kilometres and hourly wage in euro, respectively. The density plots are provided by gender (Graphs 4a and 4b) and type of contract (Graphs 4c and 4d). $N=300,071$

5. Empirical Results

We present the estimates of two reduced-form equations for Y . Y stands for both the hourly wage and the commuting distance. We assume that conditional on observables, the staffing jobs, secondment jobs and payrolling jobs are comparable. First, we consider the linear regression equation

$$\log(Y_{it}) = \alpha_0 + \alpha_1 \text{Female}_i + \alpha_2 \text{DStaff}_{it} + \alpha_3 \text{DSec}_{it} + \gamma' X_{it} + \delta_t + u_{it} \quad (1)$$

$$i = 1, \dots, N; t = 2013, \dots, 2017$$

where *Female* is a zero-one indicator variable that equals one for a female worker; the zero-one indicator *DStaff* is one for the temporary staffing workers; the zero-one indicator *DSec* is one for the temporary seconded workers; X is a vector of control variables, which includes zero-one indicators for average-educated workers, high-educated workers, Dutch born, having a partner, Randstad business division, occupation, age, municipality and the number of annual placements at the client firm. δ represents the zero-one indicators for calendar month and calendar year of the job placement. u is an idiosyncratic error term. Subscript i refers to the person and t to year.

Table 3 reports the OLS estimates of equation (1), for which the estimated standard errors are clustered by client firm. The gender gap is 3.1 percent for the hourly wage, whereas it is 10.7 percent for commute. Compared to the temp payrolling workers, the hourly wage is 9.9 percent lower for temp staffing workers and 7.5 percent lower for seconded workers. Moreover, relative to the temp payrolling workers, commute is 13.2 percent lower for temp staffing workers and 18.4 percent lower for temp seconded workers. These findings show that both the hourly wage and the commuting distance are higher for the payrolling workers, confirming hypothesis 1.¹⁰

¹⁰Interaction terms between type of contract and year indicates that the seconded workers have a 5.5 percent lower wage in 2014 and the temp staffing workers have a 5.7 percent higher wage in 2016 (relative to these groups in 2013). For the commuting distance, we do observe a pattern across time. Compared to 2014, in 2017 the distance is 32.6 percent and 24.7 percent higher for the temp staffing workers and temp seconded workers, respectively. It suggests that the tightening of the labour market resulted in larger commuting distances. These results are available upon request.

Table 3

OLS regressions of hourly wage and commute on worker characteristics (Eq. (1)).

	Dependent variable:	
	Hourly wage (log)	Commuting distance TomTom (log)
	(1)	(2)
Female	−0.031*** (0.003)	−0.107*** (0.011)
Average-educated	0.067*** (0.008)	0.256*** (0.030)
High-educated	0.227*** (0.010)	0.361*** (0.038)
Dutch	0.018*** (0.005)	−0.027* (0.015)
Partner	0.016*** (0.002)	−0.008 (0.007)
Staffing	−0.099*** (0.012)	−0.132*** (0.049)
Secondment	−0.075*** (0.013)	−0.184*** (0.055)
Tempo-Team	−0.021*** (0.007)	−0.013 (0.022)
Year 2014	−0.007* (0.004)	0.031** (0.015)
Year 2015	0.004 (0.006)	0.054*** (0.019)
Year 2016	0.016*** (0.006)	0.090*** (0.019)
Year 2017	0.030*** (0.006)	0.080*** (0.021)
Constant	2.520*** (0.025)	2.861*** (0.122)
Number of parameters	437	437
Number of observations	300,071	300,071
R ²	0.342	0.114

Notes: *p<0.1; **p<0.05; ***p<0.01. Clustered standard errors by client firm are in parentheses. Indicator variables are included for age (7 categories), occupation (16), annual placements at client firm (10), home municipality (381) and calendar month (11).

Next, we include interaction terms between gender and type of contract as well as interaction terms between education and type of contract. We assume that selection into type of contract between males and females is the same.¹¹ The empirical model is

$$\begin{aligned}
\log(Y_{it}) = & \beta_0 + \beta_1 \text{Female}_i + \beta_2 \text{DStaff}_{it} + \beta_3 \text{DSec}_{it} + \beta_4 \text{Female}_i \times \text{DStaff}_{it} \\
& + \beta_5 \text{Female}_i \times \text{DSec}_{it} + \beta_6 \text{AverEduc}_{it} + \beta_7 \text{HighEduc}_{it} \\
& + \beta_8 \text{AverEduc}_{it} \times \text{DStaff}_{it} + \beta_9 \text{AverEduc}_{it} \times \text{DSec}_{it} \\
& + \beta_{10} \text{HighEduc}_{it} \times \text{DStaff}_{it} + \beta_{11} \text{HighEduc}_{it} \times \text{DSec}_{it} \\
& + \gamma' X_{it} + \delta_t + v_{it}
\end{aligned} \tag{2}$$

Table 4 gives the parameter estimates based on equation (2). Column (1) shows that the gender pay gap is similar for staffing workers, seconded workers and payrolling workers, as the interaction terms between gender and type of contract are insignificant. Importantly, column (2) shows that relative to the temp payrolling workers, the gender commute gap is 11.6 percentage points smaller for temp staffing workers and 10.1 percentage points smaller for temp seconded workers. These estimates imply a reduction of the gender commute gap from about 20 percent with individual search to 10 percent with TWA search for both types of contract. With respect to hypothesis 2, the parameter estimates indicate that the gender pay gap does not differ between the different types of contracts. However, the gender commute gap is substantially reduced for the temp staffing and seconded workers. See Appendix B for separate regressions of the gender wage and commute gap by contract type.

¹¹See Appendix A for additional summary statistics by gender and contract type, which show that the number of female and male temp workers in the three different contract types is comparable.

Table 4

OLS regressions on worker characteristics and interaction terms between gender and type of job (Eq. (2)).

	Dependent variable:	
	Hourly wage (log)	Commuting distance TomTom (log)
	(1)	(2)
Female	−0.026* (0.015)	−0.205*** (0.044)
Staffing	−0.048*** (0.014)	0.126** (0.062)
Secondment	−0.011 (0.015)	0.090 (0.065)
Average-educated	0.135*** (0.019)	0.680*** (0.085)
High-educated	0.259*** (0.025)	0.604*** (0.080)
Female × Staffing	−0.002 (0.015)	0.116** (0.046)
Female × Secondment	−0.009 (0.015)	0.101** (0.048)
Average-educated × Staffing	−0.060*** (0.017)	−0.424*** (0.081)
Average-educated × Secondment	−0.091*** (0.021)	−0.463*** (0.096)
High-educated × Staffing	−0.048* (0.025)	−0.301*** (0.083)
High-educated × Secondment	−0.007 (0.028)	−0.141* (0.082)
Constant	2.464*** (0.027)	2.584*** (0.128)
Number of parameters	443	443
Observations	300,071	300,071
R ²	0.344	0.116

Notes: *p<0.1; **p<0.05; ***p<0.01. Clustered standard errors by client firm are in parentheses. Indicator variables are included for Dutch, Partner, Tempo-Team, age (7), occupation (16), annual placements at client firm (10), home municipality (381), calendar month (11) and calendar year (4).

6. Conclusion

In this paper, we have examined the importance of TWAs for matching workers to client firms in the Dutch labour market. Specifically, we focused on the role of TWA search compared to individual search in temporary worker's wages and commutes, and in the gender gaps in these labour-market outcomes. As a comparison group for staffing workers whose matches are formed based on TWA search, we used unique data on payrolling workers whose job matches are formed based on individual search although they are also employed at the TWA. There are two main empirical outcomes.

First, compared with the payrolling workers, temporary staffing workers have on average a 13 to 18 percent lower commute and a 8 to 10 percent lower hourly wage. This finding is consistent with a compensating differentials model, as reducing spatial frictions with TWA search lowers workers' wages and commutes. Second, the gender pay gap is limited for temp staffing workers as well as for the temp payrolling workers, and equals about 3 percent. However, the gender commuting gap is about 10 to 12 percentage points smaller for staffing workers compared to the payrolling workers. Importantly, these findings are inconsistent with a compensating differentials model, as we find that the gender commute gap becomes more narrow with TWA search whereas the gender pay gap remains unchanged. In this regard, male temporary workers benefit relatively much in terms of TWA's search efficiency, improving the male worker's commuting distance. Thereby, TWA search reduces search frictions, contributing to establishing equal labour-market opportunities for females and males.

We would like to emphasize that our findings should be interpreted as statistical associations, since the estimates are not based on randomized controlled experiments. The analysis of this paper is against the backdrop that female workers' preferences for short commutes may hinder labour-market careers. The short commutes imply a smaller labour markets, suggesting it may contribute to the development of a gender pay gap as well as a limited resilience in the labour market. Interestingly, in the context of temporary agency jobs, we do not find that a narrower commute gap is associated with a narrower wage gap. However, in the long-run female workers' preferences for short commutes may widen the gender pay gap, as there is a more limited set of jobs on which females will apply.

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Appendix A Additional Summary Statistics

Table A.1

Staffing workers summary statistics.

Statistic	<i>N</i>	Mean	St. error	Min	Pctl(25)	Median	Pctl(75)	Max
Commuting dist Crow (km)	154,246	19.940	27.781	0	4.382	10.291	22.711	199.836
Commuting dist TomTom (km)	154,246	26.689	35.413	0	5.889	14.775	31.081	249.858
Hourly wage (euro)	154,246	11.847	2.739	7.911	9.975	11.070	13.016	47.080
Hourly wage (log)	154,246	2.450	0.202	2.068	2.300	2.404	2.566	3.852
Female (=1)	154,246	0.460	0.498	0	0	0	1	1
Low-educated (=1)	154,246	0.600	0.490	0	0	1	1	1
Average-educated (=1)	154,246	0.369	0.483	0	0	0	1	1
High-educated (=1)	154,246	0.031	0.173	0	0	0	0	1
Age (years)	154,246	35.360	10.367	23.000	26.214	32.121	43.822	59.997
Dutch (=1)	154,246	0.911	0.285	0	1	1	1	1
Partner (=1)	154,246	0.169	0.375	0	0	0	0	1
Tempo-Team (=1, RNL otherwise)	154,246	0.406	0.491	0	0	0	1	1

Notes: The time period under observation is from 2013 to 2017. The sample consists of one observation per worker at maximum.

Table A.2

Seconded workers summary statistics.

Statistic	<i>N</i>	Mean	St. error	Min	Pctl(25)	Median	Pctl(75)	Max
Commuting dist Crow (km)	122,204	18.520	25.410	0	4.484	10.115	21.340	199.888
Commuting dist TomTom (km)	122,204	24.847	32.130	0	6.191	14.594	29.236	249.858
Hourly wage (euro)	122,204	11.922	2.941	1.010	10.080	11.246	12.997	50.000
Hourly wage (log)	122,204	2.453	0.220	0.010	2.311	2.420	2.565	3.912
Female (=1)	122,204	0.407	0.491	0	0	0	1	1
Low-educated (=1)	122,204	0.627	0.484	0	0	1	1	1
Average-educated (=1)	122,204	0.336	0.472	0	0	0	1	1
High-educated (=1)	122,204	0.036	0.187	0	0	0	0	1
Age (years)	122,204	34.960	10.146	23.000	26.334	31.568	42.693	59.997
Dutch (=1)	122,204	0.834	0.372	0	1	1	1	1
Partner (=1)	122,204	0.146	0.353	0	0	0	0	1
Tempo-Team (=1, RNL otherwise)	122,204	0.409	0.492	0	0	0	1	1

Notes: The time period under observation is from 2013 to 2017. The sample consists of one observation per worker at maximum.

Table A.3

Payrolling workers summary statistics.

Statistic	<i>N</i>	Mean	St. error	Min	Pctl(25)	Median	Pctl(75)	Max
Commuting dist Crow (km)	23,621	27.141	35.958	0	4.316	12.931	33.161	199.785
Commuting dist TomTom (km)	23,621	35.418	45.134	0	5.771	17.987	44.014	249.858
Hourly wage (euro)	23,621	15.034	6.116	6.320	10.706	13.550	16.760	50.000
Hourly wage (log)	23,621	2.647	0.339	1.844	2.371	2.606	2.819	3.912
Female (=1)	23,621	0.583	0.493	0	0	1	1	1
Low-educated (=1)	23,621	0.153	0.360	0	0	0	0	1
Average-educated (=1)	23,621	0.616	0.486	0	0	1	1	1
High-educated (=1)	23,621	0.232	0.422	0	0	0	0	1
Age (years)	23,621	35.466	10.706	23.000	26.044	31.827	44.271	59.995
Dutch (=1)	23,621	0.944	0.230	0	1	1	1	1
Partner (=1)	23,621	0.107	0.309	0	0	0	0	1
Tempo-Team (=1, RNL otherwise)	23,621	0.229	0.420	0	0	0	0	1

Notes: The time period under observation is from 2013 to 2017. The sample consists of one observation per worker at maximum.**Table A.4**

Commuting distance TomTom and hourly wage statistics by gender and type of contract.

Statistic	<i>N</i>	Mean	St. error	Min	Pctl(25)	Median	Pctl(75)	Max
Female staffing commute (km)	70,952	28.080	37.395	0	5.925	15.070	32.392	249.554
Female secondment commute (km)	49,722	24.838	33.099	0	5.808	14.139	28.873	249.342
Female payrolling commute (km)	13,760	32.025	41.268	0	5.437	16.518	39.687	249.342
Male staffing commute (km)	83,294	25.504	33.588	0	5.843	14.588	30.039	249.858
Male secondment commute (km)	72,482	24.853	31.448	0	6.425	14.944	29.466	249.858
Male payrolling commute (km)	9,861	40.152	49.649	0	6.209	20.320	51.689	249.858
Female staffing hourly wage (euro)	70,952	11.950	2.931	8.540	9.944	11.030	13.160	46.345
Female secondment hourly wage (euro)	49,722	11.932	3.107	1.010	10.010	11.176	12.976	50.000
Female payrolling hourly wage (euro)	13,760	15.093	5.603	8.460	11.000	14.116	17.060	50.000
Male staffing hourly wage (euro)	83,294	11.760	2.560	7.911	10.014	11.090	12.870	47.080
Male secondment hourly wage (euro)	72,482	11.915	2.821	1.500	10.150	11.310	13.008	50.000
Male payrolling hourly wage (euro)	9,861	14.952	6.767	6.320	10.430	12.874	16.266	50.000

Notes: The time period under observation is from 2013 to 2017. The sample consists of one observation per worker at maximum.

Appendix B Additional Regressions

Table B.1

OLS regressions of hourly wage on worker characteristics by type of contract.

	Hourly wage (log)		
	Staffing workers	Seconded workers	Payrolling workers
	(1)	(2)	(3)
Female	−0.032*** (0.003)	−0.029*** (0.004)	−0.029*** (0.009)
Average-educated	0.059*** (0.010)	0.081*** (0.013)	0.087*** (0.028)
High-educated	0.207*** (0.011)	0.251*** (0.019)	0.230*** (0.030)
Dutch	0.015*** (0.003)	0.021*** (0.007)	0.056*** (0.015)
Partner	0.015*** (0.001)	0.018*** (0.002)	0.003 (0.012)
Tempo-Team	−0.027*** (0.005)	−0.005 (0.013)	−0.072*** (0.027)
Year 2014	0.001 (0.004)	−0.033*** (0.008)	0.005 (0.011)
Year 2015	0.026*** (0.005)	−0.029*** (0.009)	−0.006 (0.019)
Year 2016	0.028*** (0.005)	−0.002 (0.009)	−0.031 (0.019)
Year 2017	0.041*** (0.005)	0.009 (0.009)	0.004 (0.020)
Constant	2.440*** (0.030)	2.460*** (0.033)	2.383*** (0.067)
Number of parameters	435	434	434
Number of observations	154,246	122,204	23,621
R ²	0.361	0.314	0.422

Notes: *p<0.1; **p<0.05; ***p<0.01. Clustered standard errors by client firm are in parentheses. See Tables 3 and 4 for additional notes.

Table B.2

OLS regressions of commuting distance TomTom on worker characteristics by type of contract.

	Commuting distance TomTom (log)		
	Staffing workers	Seconded workers	Payrolling workers
	(1)	(2)	(3)
Female	−0.111*** (0.012)	−0.092*** (0.016)	−0.146*** (0.026)
Average-educated	0.172*** (0.038)	0.285*** (0.063)	0.431*** (0.099)
High-educated	0.285*** (0.045)	0.460*** (0.069)	0.519*** (0.108)
Dutch	0.001 (0.015)	−0.060*** (0.022)	−0.013 (0.070)
Partner	−0.025*** (0.008)	−0.004 (0.012)	0.030 (0.031)
Tempo-Team	−0.044** (0.022)	0.032 (0.031)	−0.157** (0.066)
Year 2014	0.011 (0.017)	0.088*** (0.026)	0.056 (0.037)
Year 2015	0.070*** (0.019)	0.037 (0.030)	0.121*** (0.046)
Year 2016	0.118*** (0.022)	0.072** (0.031)	0.115* (0.061)
Year 2017	0.125*** (0.027)	0.043 (0.030)	−0.045 (0.071)
Constant	2.714*** (0.174)	3.053*** (0.123)	2.056*** (0.362)
Number of parameters	435	434	434
Number of observations	154,246	122,204	23,621
R ²	0.133	0.144	0.231

Notes: *p<0.1; **p<0.05; ***p<0.01. Clustered standard errors by client firm are in parentheses. See Tables 3 and 4 for additional notes.