

NBER WORKING PAPER SERIES

TEMPORARY HELP SERVICES EMPLOYMENT IN PORTUGAL, 1995-2000

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Working Paper 13582
<http://www.nber.org/papers/w13582>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
November 2007

This paper was prepared for the NBER Conference on Labor Market Intermediation, May 17-18, 2007. We thank David Autor, Jeff Smith, participants at the NBER conference and participants in a seminar held at IZA Bonn for most helpful comments. We are grateful to the Ministry of Employment, Statistics Department, Portugal, for access to the data. René Böheim acknowledges financial support from the Austrian National Bank, grant # 11090. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 13582
November 2007
JEL No. D21,J31,J40

ABSTRACT

Whereas there is widespread belief that workers in temporary help services (THS) are subject to poorer working conditions, in particular pay, than comparable workers in the rest of the economy, there is little evidence on whether that is driven by the sector per se or by the workers' characteristics. The first aim of this analysis is to quantify the wage penalty, if any, for workers in THS firms. Secondly, we analyze the wage profile of workers right before and after spells of THS. Linked employer-employee data for Portugal enable us to account for observable as well as unobservable worker quality. Our results show that workers in THS firms earn lower wages than their peers and that this difference is mostly due to the workers' characteristics. We estimate that workers in THS firms earn on average 9% less than comparable workers in the rest of the economy if we control for the workers' observable attributes only. This difference is reduced to about 1% when we control for unobservable characteristics as well. However, interesting differences emerge across groups. Younger workers, both men and women, earn higher wages in TAW than their peers in other firms, while the opposite holds for prime-age and older workers. Moreover, for young workers THS firms is not associated with a stigma effect that slows their wage progression after they work for THS, as opposed to prime-age and older workers, in particular males. Also before entering THS the wage trends are different. Prime-age and older workers, both male and female, see their wages deteriorate relative to their peers before entering THS, suggesting that adverse labor market conditions may motivate them to search for a THS job. On the contrary, for young workers we do not detect any pre-THS wage trend.

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1 Introduction

There is much anecdotal evidence of poor working conditions in agency work, but much less hard evidence. None of the research referred to can differentiate between factors related to agency work *per se* (as a form of employment) and those related to the job or the worker. ([Storrie, 2002](#), p56)

Employment in temporary help service (THS) firms has increased throughout Europe over the last decade. This development has prompted the European Commission to propose a directive to safeguard THS workers' working conditions. In 2002 it issued a proposal for a European Parliament and Council Directive on working conditions for THS workers ([EIRO, 2002](#); [European Commission, 2002](#)), which aims to ensure that temporary workers are not discriminated against, receiving at least as favorable a treatment as a regular comparable worker in the firm where (s)he is posted. The relevant dimensions are the basic working and employment conditions, including duration of working time, rest and holiday periods, time of work, and seniority.

This concern comes from widespread evidence that workers in THS firms face worse working conditions than comparable workers in the placement firm. Evidence in [Houseman \(2001\)](#) suggests that THS may be used to save on worker benefit costs, such as health insurance and pension contributions. These concerns extend to wage rates as there seems to be evidence of lower wages for THS workers.

Concern about workers in THS has also focused on whether they remain in low-paying, dead-end jobs or if they find, should they so desire, employment in a standard working career. High turnover involves a loss of firm-specific human capital, a decrease in productivity if production depends on continuous cooper-

ation of workers, and possibly less coverage by trade unions, factors that may contribute to poorer career prospects. On the contrary, THS could serve as a screening method (Autor, 2001; Houseman, 2001) at little cost for the firm, i.e. without a commitment about a future employment contract. Since THS work matches a worker typically with several firms, it can be seen as a job matching mechanism.

The discussion has thus concentrated on whether or not workers in THS employment earn lower wages and whether or not THS employment enables workers to start a better career. There are numerous studies for the US that find that THS workers receive lower wages than other workers, e.g., Segal and Sullivan (1997) who report an average wage difference of about 28% which is reduced to about three percent when observable and time-invariant unobservable characteristics are considered. (See also, amongst others, Blank (1998) or Nollen (1996).)

Workers may accept lower wages in THS firms because the employment in these firms allows a subsequent job match with better pay or more stable careers. Autor and Houseman (2005), using random placement assignments, do not find that THS work is associated with stable careers in post-THS employment. For welfare recipients, however, Heinrich, Mueser and Troske (2005) find that work in THS is associated with better outcomes than not working at all.

The evidence for European countries is mixed. For example, Forde and Slater (2005) report a wage penalty of about 11 percent for men and 6 percent for women in THS in contrast to comparable workers in the UK. Zijl, van den Berg and Heyma (2004) find for the Netherlands that THS work is associated with subsequent stable employment spells. Similarly, Amuedo-Dorantes, Malo and Muñoz-Bullón (2006), for Spain, Booth, Francesconi and Frank (2002), for the UK, and Ichino, Mealli and Nannicini (2006), for Italy, find that THS work is

associated with subsequent stable employment. However, [Kvasnicka \(2005\)](#) finds for Germany that THS work does not improve the subsequent careers of such workers, and [Antoni and Jahn \(2006\)](#) find that THS workers in Germany are increasingly found in repeated spells of THS work.

We use linked employer-employee data, obtained from the Ministry of Employment in Portugal, to analyze wages of workers in THS. These administrative data cover the universe of Portuguese workers in the private sector for the period 1995-2000. The panel dimension of these data allow us to control for worker and industry specific effects.

The purpose of the paper is twofold. We analyze, first of all, if THS workers earn lower wages than comparable workers in other sectors by estimating wage regressions. Because participation in THS work is not random, we control for workers' fixed-effects in our estimations, taking advantage of the longitudinal nature of the data. We perform the analysis separately for men and women as well as for younger and older workers, since these groups tend to fare differently in the labor market. (We also perform the analyzes on the pooled sample.) Secondly, we analyze workers wages before and after spells of THS. On the one hand, we want to assess if THS work leads to lower wages in subsequent employment, i.e. evidence of a stigma effect. On the other hand, we want to investigate if workers experienced a particular wage development before entering THS. For example, their wages could be deteriorating relative to similar workers, in which case the adverse labor market conditions would provide the motivation to search for a THS job.

Our empirical results suggest that THS workers earn about one per cent less than similar workers in other firms, once their observable and unobservable attributes are controlled for. However, disaggregation of the sample by age and

gender reveals interesting differences across groups of workers. Younger workers, both men and women, earn higher wages in THS firms than their peers in other firms. Prime-age workers, in particular men, earn a lower wage in THS firms than similar workers in other firms. Also interestingly, for young workers, THS is not associated with a stigma that slows their wage progression after they start to work in the THS sector. In contrast, for prime-age and older workers, in particular males, wage progression after entering THS is slower than for similar workers not engaged in THS. Before entering THS firms, prime-age workers, both men and women, see their wages deteriorate relative to their peers, suggesting that adverse labor market conditions might motivate them to search for a THS job. For young workers, we do not detect any pre-THS wage trend.

2 Background

2.1 The association between THS work and wages

The distinguishing feature of work for a THS firm is the tripartite nature of the relationship and the commercial nature of the contract signed between the THS firm and the placement firm, which sets it apart from a traditional labor contract between a worker and a firm. Even though a particular assignment of a worker is temporary, it is not the duration of the contract that characterizes this sector.

While there is widespread belief that THS workers earn lower wages than comparable workers, in particular in countries where labor legislation is not stringent or trade union coverage is low, there are also reasons, and evidence, that point to the opposite direction. THS workers may earn a higher wage that would compensate for the risk of a more variable income stream than comparable workers. It is also sometimes stressed that THS firms have difficulty recruiting workers

and need to offer favorable conditions to attract them. [Storrie \(2002\)](#) reports that at the the upper end of the pay scale, for instance in the health sector, THS workers seem to enjoy better pay and possibly better working conditions than regular workers. The wages in THS firms is thus an empirical issue which we will address in more detail below.

Some THS firms may choose to offer free general training instead of higher wages to attract more workers and to identify better quality workers ([Autor, 2001](#)). In general, the need to attract workers and the existence of economies of scale in the provision of some types of training have been pointed out as reasons why THS firms may provide more training than legally required. Such training could result in higher wages in post-THS employment.

On the contrary, [Storrie \(2002\)](#) reports evidence of circumvention of employment standards for THS workers, especially in terms of pay and working time regulations, and also evidence of other, illegal abuse. The short employment spells, possibly combined with low investment in human capital, and fewer workers' rights due to lower coverage by trade unions are typically factors that characterize poor career prospects.

2.2 Legal setting in Portugal

The market for THS is tightly regulated in Portugal.¹ Permission to operate as a THS firm is granted by the Ministry of Employment and Social Security. Candidates must show proof of a clean criminal record, previous compliance with labor law and tax and social security duties, technical capacity (i.e., a qualified director with experience of running human resources and supporting administra-

¹Decree-Law 358/89, Law 39/96, and Law 146/99.

tive staff), as well as a sound financial situation.² THS firms are allowed a wide range of activities, which include recruitment and selection of personnel, vocational orientation, training, consulting and human resources management. The operation of the firm is regularly monitored by the Bureau of Labor Inspection and it must present records of workers hired out to using firms every six months.

The work contract is signed between the THS firm and the worker. The formal employer is thus the THS, and not the user firm, and it is responsible in particular for paying the workers, fulfilling the employer's Social Security obligations, providing insurance against work-related accidents, and allocating a minimum of 1% of the total turnover to training. (The THS firm is legally forbidden to charge the worker for training provided.) The user firm is responsible for fulfilling regulations on health and security at the workplace.

The work contract between the worker and the THS can be open-ended or of limited duration. If open-ended, the worker is entitled to pay, even in periods when (s)he is not actually assigned to a using firm. The amount is specified by collective bargaining or, if the worker is not covered, two thirds of the national minimum wage.

Firms have to justify the need for temporary workers and a narrow set of reasons is permitted: to replace workers on leave; for seasonal work; in case of a temporary increase in product demand; to bridge recruitment gaps, while the process to fill a vacancy is taking place.

The contract between the THS firm and the using firm must also specify, among other things, the duration of the assignment (which depends on the reason for use of temporary work, with a maximum limit of six months to two years),

²A fund linked to the national minimum wage must be deposited, or a bank or insurance company guarantee presented, which is used for wage payments if the company does not pay its workers.

the description of tasks to be performed, the wage the using firm pays its workers who perform similar tasks, and the amount paid to the THS firm. A THS worker is entitled to the wage set by collective bargaining for THS work or the wage paid by the user firm to similar workers, whichever is higher. Because these rules aim at providing equal treatment for regular and THS workers, we would expect to see no, or a moderate, pay differential between THS and regular workers. Over 90% of the THS workers are covered by a collective bargaining contract, signed between trade unions and employer representatives.³

The regulations are monitored and enforced by the Bureau of Labor Inspection. However, situations of non-compliance with the law are frequently discussed in the press, where THS owners associations demand stricter controls by the Bureau, arguing that law-obeying firms are subject to unfair competition by firms that do not fulfill the law, especially the payment of taxes and Social Security contributions. Trade unions, on the other hand, claim that workers' rights are not always respected and also demand stricter monitoring. Finally, the Bureau of Labor Inspection claims that the firms in the sector are subject to close scrutiny and argues for higher legal sanctions to increase compliance.

Although the legalization and regulation of this type of work took place relatively early in comparison to other European countries, the use of THS is not as widespread in Portugal as in other European countries. In 1999, it comprised about 1% of total employment, below the European Union average of about 1.4%. In terms of growth, although employment in the sector more than doubled between 1995 and 1999, its growth has been modest when compared to most other European countries ([Storrie, 2002](#), p23).

³In Portugal, a contract signed between workers' and employers' representatives is often extended to the all workers in a sector or firm, irrespective of their union membership status.

3 Data

The study is based on linked employer-employee data collected annually by the Ministry of Employment in Portugal. The data cover all firms with wage-earners in manufacturing and services in the private sector; because data provision is compulsory only for companies with wage-earners, the coverage of the agricultural sector is low. Public administration and domestic work are not covered. Reported data include the firm’s industry, location, employment, ownership (foreign, private or public) and sales, and the worker’s gender, age, occupation, schooling, date of admission into the company, monthly earnings, and duration of work. We use data from 1995 to 2000 since identification of THS work was not possible for earlier years.

The Portuguese Classification of Industries reports, under code 74500, firms in “labor recruitment and provision of personnel”.⁴ This is the definition we use to identify temporary help service firms and their workers.⁵ Given the relevance of the distinction between stocks and flows for this activity (with high worker turnover), it should be stressed that the data refer to the stock of workers at a reference week in October each year.⁶ Wage-earners aged 16 to 65 years were selected for analysis. We consider only the worker’s main job, defined as the job where the most hours were worked per month. Extensive checks have been performed to guarantee the accuracy of the data, using gender, date of birth, highest educational level and starting date in a company (details on the procedures followed to clean the panel can be found in [Cardoso \(2005\)](#).)

⁴This classification follows closely NACE, the Classification of Economic Activities in the European Community. Before 1995, a different industry classification, which did not assign a specific code to this activity, was used.

⁵This definition has the disadvantage that we cannot distinguish between managers and clerical staff that operate the THS and the workers who are hired out to using firms.

⁶Because of the timing of observations, we do not analyze the job tenure with THS firms because not all jobs of short duration are captured in the data.

The administrative nature of the data and the legal requirement for the firm to post the data in a space public to its workers contribute to its reliability. Workers are identified by a personal identifier, based on a transformation of the social security number, and it is thus possible to track them over time, as long as they work in the private sector. If they are missing from the database, the workers could be, among other situations, unemployed, inactive, employed in the public administration or self-employed without dependent workers and we cannot ascertain the employment status.

In the analyzes that follow, we will keep the whole population of workers who ever had a THS job, while limiting the data on workers who never had a THS job to a 10% sample, so as to keep computations manageable. For each worker sampled, all the available observations on his/her work history were kept for analysis. We report results on the overall sample, as well as separately for women and men of 16 to 25 years of age and for women and men of 26 to 65 years of age.

Gross hourly wages were computed and they were deflated using the Consumer Price Index (with the year 2000 as the base period). Wage outliers, i.e., hourly wages of less than half the first percentile or above 20 times percentile 99, have been dropped from the analysis.

4 Descriptive evidence on the labor force of THS firms and their career prospects

The number of firms and workers in the THS sector increased from 1995 to 2000 and we observe a rising share in overall employment, from 0.5% to 1%. (These figures are a lower bound on the overall number of THS workers as short spells are

underrepresented because of how the data are collected.) The number of firms, although increasing in absolute numbers, had a share of about 0.1% of all firms in the private sector. (A tabulation of the development over time is given in the Appendix, Table A.1.)

Table 1 provides the descriptive statistics of our estimating sample, by THS status. On average, THS workers had a wage lower than other workers, with a mean hourly wage difference of about 23%. We also see that the dispersion of wages is lower for THS workers, a finding also evident in Figure 1 where we plot the two wage distributions, pooling the observations from the six years. The graph shows that the distribution of wages for THS workers is more concentrated, with a higher peak and a thinner upper tail.

[Table 1 near here.]

[Figure 1 near here.]

We observe a similar percentage of women in THS firms as in other firms in the private sector (about 42%). THS workers are on average four years younger than workers in the rest of the private sector, who are on average 36 years old. THS workers are on average slightly better educated than other workers (about 50% of THS workers have 6 school years or less, compared to 61% in other sectors; nevertheless, there are fewer workers with a higher education diploma in THS firms than in other firms, i.e. four vs six percent). There are also more low-skilled and administrative workers in THS than in other firms. We see that workers in THS have short tenures with their firms, with 68% of THS workers having tenures of less than one year; in contrast, for all other workers the fraction of workers who have tenures of less than one year is 18%. The incidence of part-time is higher in THS firms than in the rest of the economy (25% vs 9%).

THS firms are concentrated in the Lisbon region (78%, as opposed to 42% for the remaining sectors).⁷

For 2000 only, data on the type of contract are available, indicating that 74% of THS workers have a fixed-term contract, which compares to 15% of the workers in the rest of the private sector.

5 Lower pay in THS firms?

The comparison of mean wages points to a substantial and significant wage difference between THS and regular workers, despite the stringent legal requirements. In this section, we investigate in more detail if such wage differences are still evident once we control for the firm and worker characteristics.

Table 2 reports the estimated coefficients (and robust standard errors) of wage regressions where we estimate the hourly wages of workers in the private sector. We use several empirical specifications for men and women who are 16 to 25 years of age and for men and women of ages 26 to 65. (The full estimation results are provided in the Appendix, where we also report estimation results for the complete sample.)

Specification 1 controls for location of the firm and age and education of the workers (and indicators for the year of observation). Specification 2 controls in addition for the workers' occupation, which is one of the following categories: senior managers, professionals or scientists; junior managers; administrative work-

⁷The agencies in Lisbon have on average a larger volume of business than companies in the rest of the economy and the share of the market held by the five largest firms, either in terms of employment or sales volume, has remain stable at about 33% (not shown in the Table). These figures are consistent with those reported in [Storrie \(2002\)](#) and they show Portugal as one of the countries where THS is least concentrated in Europe; only the UK and Germany have a lower market concentration.

ers; service and sales workers; farmers; skilled workers and craftsmen; machine operators, assembly workers; unskilled workers.

Because workers do not randomly choose to work for a THS firm, any observed wage difference between THS and other workers may be caused by personal characteristics not observed by us. We therefore estimate wage regressions where we control for worker unobservable quality by introducing worker fixed effects.⁸ The estimated coefficients from these estimations are presented in Columns 3 and 4 of Table 2, where specification 3 (specification 4) has the same set of controls as specification 1 (specification 2).

[Table 2 near here.]

The estimations show that younger women who work for a THS firm receive a higher wage than women who work for other firms. This is supported both by the OLS and the fixed-effects regressions. We estimate that they receive a wage which is about four to five percent higher than similar workers in other firms. For younger men, the results are not as pronounced as for young women, as young men earn on average a wage that is about one to two percent higher in THS firms than in other firms. All these estimated wage differences are statistically significant at an error level of five percent, or less.

According to the OLS estimates, older women who work in THS firms earn about 12 percent less than similar women who work for other firms. This difference is dramatically reduced when we control for unobserved characteristics in the fixed-effects estimates. The results from the fixed-effects estimates point to a lower wage at around 1 percent, or less. For prime-age male workers, however, we obtain coefficients that indicate a much more severe difference between working

⁸Identification in this regressions of the impact of education on wages is feasible given that a share of the workforce is observed changing —increasing—its education level. These shares are 2%, 2%, 2%, and 1%, respectively for workers initially observed with 4, 6, 9, and 12 years of education.

for THS and other firms. We estimate, controlling for fixed characteristics, that these workers earn a wage which is about five percent lower than similar workers (if not controlling for the worker unobservable quality, that penalty would be between 16 and 23 percent).

6 Wages before and after working in THS firms

We proceed placing the spells of THS employment in the context of the workers' careers. The wages of those workers who chose to work for a THS firm could have been deteriorating relative to similar workers prior to entering a THS firm. This relative wage loss could have been their motivation to start a THS job. A second issue concerns the workers' careers once they start working for a THS firm and their wage progression thereafter. Two different hypotheses on the wage development upon entering the sector may be formulated. THS firms typically place workers in several firms and this improves their position to finding a good job match, possibly leading to being formally hired by a firm that already hired them through the THS firm. As such, a worker would have already accumulated some firm-specific human capital and we then expect the worker to have a comparable, if not faster, wage progression than other workers on leaving the THS firm. Alternatively, working for a THS might be interpreted as a signal of lower ability by employers and would result in fewer and/or worse job offers than other workers would receive. This kind of mechanism would lead to poorer employment prospects for former THS workers and their wages would be lower than those of otherwise similar workers.

In the vein of [Segal and Sullivan \(1998\)](#) and [Jacobson, LaLonde and Sullivan \(1993\)](#), we construct a set of dummy variables to capture the number of years

before or after the start of the THS spell. For each worker, the dummy variable D_t^k is 1 if the worker at time t is k years away from the start of the THS spell. Because our data cover 6 years, we have allowed k to range between -2 and 2, with a negative (positive) k indicating the time before (after) the start of a spell of THS employment. If the worker works for an THS firm at time t , the dummy variable D_t^0 is equivalent to a dummy variable on THS work, similar to the one used in the specifications above.⁹ We report results including controls for location, age, education and worker fixed effects, and the year of observation (with and without occupation included). For this part of the analysis, we dropped workers who had more than one spell of THS, which led to an exclusion of seven percent of workers who ever had a THS spell.

Table 3 reports the estimated coefficients for the indicator variables that control for employment episodes before and after the start of the THS spell. Focusing on the estimated coefficient on THS, the estimations confirm the previous results, i.e., young workers earn a higher wage in agencies than their peers. In contrast, older workers earn lower wages in THS firms than in other firms, with the difference being smaller for women than for men.

[Table 3 near here.]

Before entering THS, we observe that there are no differences in terms of wages for young workers between those who started to work in for a THS firm and those who did not. The motivation to enter THS seems to be different for younger than for older workers, because we estimate that older workers, both men and women, see their wages deteriorate relative to similar workers before

⁹We have also used dummy variables for the post-THS wages that indicate the time since the end of the THS employment. However, since most THS spells are of a short duration, the interpretation of our findings change little. These results are available at request from the authors.

starting to work in a THS firm, suggesting that adverse labor market conditions may motivate prime-age workers to search for a THS job.

After the start of the THS spell, we estimate that young female workers enjoy higher wages than their peers, at least for the two years we are able to investigate, a wage difference of some two to four percent. We do not find this pattern for young male THS workers. For them, post-THS wages are not significantly different from similar workers in other sectors, after accounting for worker unobservable quality. Older female workers are estimated to have about one percent lower wages than women who did not work for a THS firm, but the difference is smaller than in the years before the THS spell where it amounted to some three percent. Older male THS workers receive about four percent less than comparable workers before and after their THS spell.

7 Conclusion

Using unique linked employer-employee data from Portugal that cover the entire private sector we investigate whether or not workers in THS firms receive a lower wage than workers who work for other firms. Despite the extensive legal protection of THS workers, we observe a wage difference of about 23% for THS workers in the raw data. Once we control for standard human capital indicators, the differential is estimated to be 9%. The available data allow a more careful analysis in that we are able to control for unobservable workers' characteristics by using workers' fixed-effects in our estimations. Controlling for this type of factors, the wage penalty of THS workers is reduced to 1% to 2%, for the overall labor force.

However, interesting differences emerge across groups of workers: young and older, males and females. For young workers, working for a THS firm results in wages that are higher than other sectors. The difference is particularly high for women who earn about 4% to 5% higher wages in THS than elsewhere; for young men the difference is about 1%. In contrast, for older workers THS work is associated with a wage penalty, which is larger for males than for females.

The wage developments before starting to work for THS are clearly different for young and older workers, which may result in a different motivation to start working for a THS firm. Before entering a THS firm, prime-age workers see their wages deteriorate relative to similar workers, suggesting that adverse labor market conditions motivate them to search for a THS job. For younger workers, we cannot detect any pre-TWA wage trend.

The impact of THS employment on the subsequent career is different for young and older workers, too. For young females, wages are higher one and two years after starting to work for THS than for comparable women in other firms. For them, the training, networking or other skills provided by THS firms lead to a faster wage growth than for similar workers elsewhere in the economy. For young males, the results do not differ significantly between those who worked for a THS firm and those who did not. For older workers, we identify once again a detrimental impact of THS work since after the start of the THS spell, their wages remain significantly below those of similar workers not in THS, particularly for males.

The evidence collected lends support to attempts (namely by the European Commission) to safeguard the workers in THS firms and their subsequent career progression, in particular for prime-age and older workers. For young workers,

the evidence suggests that working for a THS firm can be an entry gate and stepping stone in the labor market.

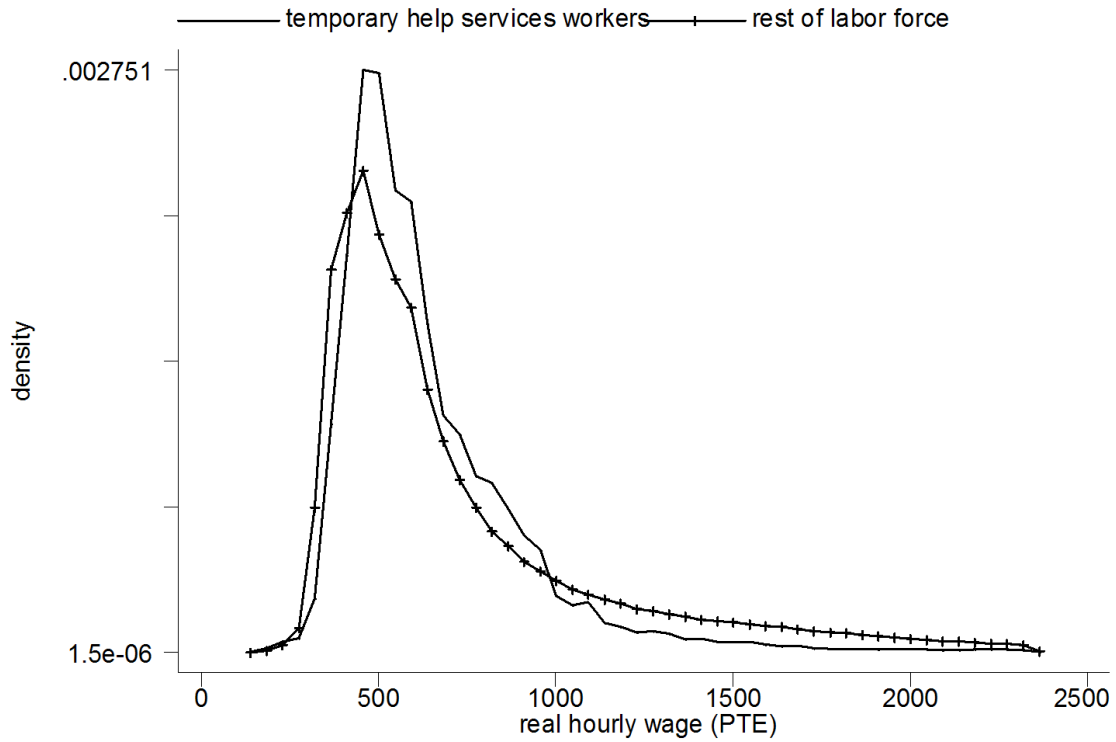
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Figures and Tables

Figure 1: Wage distribution for THS and other workers, 1995–2000.



Source: MTSS, 1995–2000, Portugal, own calculations. Wages above the 99th percentile are not plotted.

Table 1: Descriptive statistics.

Variable	THS workers		"Regular" workers	
	Mean	Std. Dev.	Mean	Std. Dev.
Hourly wage (log)	6.416	(0.390)	6.519	(0.563)
Hourly wage (PTE)	673.784	(458.229)	831.341	(829.515)
Female	0.416		0.421	
Lisbon	0.777		0.418	
<i>Education</i>				
4 yrs	0.304		0.378	
6 yrs	0.207		0.232	
9 yrs	0.185		0.148	
12 yrs	0.253		0.161	
16 yrs	0.040		0.061	
Age	31.514	(10.383)	35.879	(11.142)
<i>Occupation</i>				
profes., scientists	0.009		0.031	
middle manag.	0.044		0.097	
administrative workers	0.257		0.159	
service and sales workers	0.104		0.134	
farmers	0.005		0.003	
skilled workers and craftsmen	0.275		0.266	
machine operators, assembly workers	0.100		0.132	
unskilled workers	0.198		0.153	
<i>Tenure</i>				
< 1 year	0.680		0.177	
1 ≤ tenure < 2 years	0.125		0.115	
2 ≤ tenure < 3 years	0.052		0.083	
Part-time	0.246		0.085	
<i>Available for 2000 only:</i>				
Fixed-term contract	0.736		0.145	
N	83022		1074162	

Table 2: Estimated wage differences for THS and regular workers.

	OLS		Fixed-effects	
	(1)	(2)	(3)	(4)
	Coefficient	Coefficient	Coefficient	Coefficient
	(SE)	(SE)	(SE)	(SE)
<i>16–25 years of age</i>				
Women	.077 (.003)***	.052 (.003)***	.050 (.005)***	.039 (.006)***
Obs.	118914	103076	118914	103076
Men	.027 (.003)***	.021 (.003)***	.019 (.005)***	.013 (.006)**
Obs.	134774	112916	134774	112916
<i>26–65 years of age</i>				
Women	-.135 (.003)***	-.118 (.003)***	-.006 (.004)*	-.010 (.004)**
Obs.	367492	346779	367492	346779
Men	-.226 (.003)***	-.164 (.003)***	-.058 (.004)***	-.054 (.004)***
Obs.	536004	512917	536004	512917

Note: Specifications 1 and 2 are based on pooled OLS wage regressions and specifications 3 and 4 are fixed-effects panel wage regressions. All specifications control for location of the firm, age and education of the workers, and the year of observation. Specifications 2 and 4 control in addition for the workers' occupation. The full set of estimation results are provided in the Appendix. Robust standard errors. Estimations based on MTSS, 1995-2000, Portugal. Asterisks indicate statistical significance at the following levels: *** 1%; ** 5%; * 10%.

Table 3: Estimated wage differences before and after start of THS work.

	Age: 16–25		Age: 26–65				
	Women		Women		Men		
	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	
2 yrs before start THS spell	-.008 (.011)	-.005 (.013)	.001 (.010)	.005 (.012)	-.032 (.008)***	-.031 (.008)***	-.008 (.007)
1 yr before start THS spell	-.017 (.011)	-.013 (.013)	-.013 (.011)	-.010 (.012)	-.037 (.008)***	-.029 (.009)***	-.038 (.008)***
THS work	.059 (.008)***	.053 (.009)***	.028 (.008)***	.022 (.009)**	-.014 (.005)***	-.014 (.005)***	-.065 (.005)***
1 yr after start of THS spell	.034 (.009)***	.036 (.010)***	.023 (.009)***	.012 (.010)	-.009 (.005)*	-.007 (.005)	-.035 (.005)***
2 yrs after start of THS spell	.015 (.010)	.017 (.010)*	-.001 (.009)	-.005 (.010)	-.013 (.005)**	-.013 (.006)**	-.037 (.006)***
Occupation	—	yes	—	yes	—	yes	—
Obs.	117732	102058	133097	111502	364573	344148	530175
Adjusted R ²	.675	.683	.646	.655	.873	.876	.873
							507626
							.874

Note: All specifications control for location of the firm, age, education and worker fixed effects, and the year of observation. The full set of estimation results are provided in the Appendix. Robust standard errors. Estimations based on MTSS, 1995-2000, Portugal. Asterisks indicate statistical significance at the following levels: *** 1%; ** 5%; * 10%.

Appendix

Table A.1: THS firms and workers in Portugal, 1995–2000.

	Firms (percent of all private sector)	Workers
1995	148 (0.10)	7,637 (0.46)
1996	158 (0.10)	9,415 (0.57)
1997	184 (0.11)	13,072 (0.74)
1998	203 (0.11)	15,634 (0.86)
1999	223 (0.11)	17,179 (0.89)
2000	243 (0.11)	20,085 (1.00)

Note: Own calculations based on MTSS, 1995-2000, Portugal.

Table A.2: Wage regressions, all workers.

	(1)	(2)	(3)	(4)
	Coefficient	Coefficient	Coefficient	Coefficient
	(SE)	(SE)	(SE)	(SE)
THS work	-.122 (.001)***	-.097 (.002)***	-.012 (.002)***	-.016 (.002)***
Lisbon	.164 (.0008)***	.165 (.0008)***	.039 (.002)***	.040 (.002)***
Female	-.241 (.0008)***	-.207 (.0008)***	—	—
Educ: 4 yrs.	.115 (.002)***	.073 (.002)***	-.035 (.010)***	-.039 (.010)***
Educ: 6 yrs.	.281 (.003)***	.190 (.003)***	-.035 (.010)***	-.043 (.011)***
Educ: 9 yrs.	.478 (.003)***	.313 (.003)***	-.019 (.011)*	-.031 (.011)***
Educ: 12 yrs.	.650 (.003)***	.398 (.003)***	.006 (.011)	-.004 (.011)
Educ: 16 yrs.	1.272 (.003)***	.766 (.004)***	.156 (.013)***	.132 (.014)***
Age	.050 (.0002)***	.039 (.0002)***	.080 (.0006)***	.072 (.0006)***
Age sq.	-.0004 (2.97e-06)***	-.0003 (2.96e-06)***	-.0005 (7.30e-06)***	-.0005 (7.70e-06)***
Const.	4.999 (.005)***	5.927 (.007)***	4.410 (.015)***	4.678 (.017)***
Occupation (8 dummies)	—	yes	—	yes
Worker fixed effects	—	—	yes	yes
Obs.	1157184	1075688	1157184	1075688
R ²	.457	.516	.858	.862

Note: Adjusted R² reported for the fixed-effects regressions. Robust standard errors in parenthesis. Asterisks indicate statistical significance at the following levels: *** 1%; ** 5%; * 10%. All regressions control for year of observation. Estimations based on MTSS, 1995-2000, Portugal.

Table A.3: Wage regressions, women 16–25.

	(1)	(2)	(3)	(4)
	Coefficient	Coefficient	Coefficient	Coefficient
	(SE)	(SE)	(SE)	(SE)
THS work	.077 (.003)***	.052 (.003)***	.050 (.005)***	.039 (.006)***
Lisbon	.108 (.002)***	.109 (.002)***	.019 (.007)***	.022 (.008)***
Educ: 4 yrs.	-.00008 (.016)	-.010 (.018)	-.167 (.110)	-.226 (.122)*
Educ: 6 yrs.	.052 (.016)***	.036 (.018)**	-.153 (.108)	-.220 (.120)*
Educ: 9 yrs.	.129 (.016)***	.095 (.018)***	-.146 (.107)	-.217 (.120)*
Educ: 12 yrs.	.263 (.016)***	.190 (.018)***	-.118 (.108)	-.185 (.120)
Educ: 16 yrs.	.718 (.017)***	.508 (.019)***	.036 (.109)	-.057 (.122)
Age	.053 (.007)***	.012 (.008)	.141 (.009)***	.075 (.011)***
Age sq.	-.0006 (.0002)***	.0002 (.0002)	-.002 (.0002)***	-.0005 (.0003)**
Const.	5.096 (.074)***	5.965 (.089)***	4.165 (.150)***	5.129 (.179)***
Occupation (8 dummies)	—	yes	—	yes
Worker fixed effects	—	—	yes	yes
Obs.	118914	103076	118914	103076
R ²	.34	.374	.673	.681

Note: Adjusted R² reported for the fixed-effects regressions. Robust standard errors in parenthesis. Asterisks indicate statistical significance at the following levels: *** 1%; ** 5%; * 10%. All regressions control for year of observation. Estimations based on MTSS, 1995-2000, Portugal.

Table A.4: Wage regressions, men 16–25.

	(1)	(2)	(3)	(4)
	Coefficient	Coefficient	Coefficient	Coefficient
	(SE)	(SE)	(SE)	(SE)
THS work	.027 (.003)***	.021 (.003)***	.019 (.005)***	.013 (.006)**
Lisbon	.124 (.002)***	.123 (.002)***	.046 (.007)***	.050 (.008)***
Educ: 4 yrs.	.020 (.011)*	.015 (.012)	-.009 (.034)	-.018 (.041)
Educ: 6 yrs.	.069 (.010)***	.059 (.011)***	-.004 (.034)	-.017 (.041)
Educ: 9 yrs.	.140 (.011)***	.120 (.012)***	.021 (.034)	.013 (.042)
Educ: 12 yrs.	.254 (.011)***	.199 (.012)***	.044 (.035)	.038 (.043)
Educ: 16 yrs.	.728 (.013)***	.512 (.015)***	.190 (.042)***	.158 (.049)***
Age	.131 (.007)***	.079 (.008)***	.220 (.009)***	.142 (.012)***
Age sq.	-.002 (.0002)***	-.001 (.0002)***	-.003 (.0002)***	-.002 (.0003)***
Const.	4.213 (.074)***	5.152 (.090)***	3.057 (.108)***	4.141 (.145)***
Occupation (8 dummies)	—	yes	—	yes
Worker fixed effects	—	—	yes	yes
Obs.	134774	112916	134774	112916
R ²	.28	.301	.642	.652

Note: Adjusted R² reported for the fixed-effects regressions. Robust standard errors in parenthesis. Asterisks indicate statistical significance at the following levels: *** 1%; ** 5%; * 10%. All regressions control for year of observation. Estimations based on MTSS, 1995-2000, Portugal.

Table A.5: Wage regression, women 26–65.

	(1)	(2)	(3)	(4)
	Coefficient	Coefficient	Coefficient	Coefficient
	(SE)	(SE)	(SE)	(SE)
THS work	-.135 (.003)***	-.118 (.003)***	-.006 (.004)*	-.010 (.004)**
Lisbon	.153 (.001)***	.149 (.001)***	.032 (.004)***	.031 (.004)***
Educ: 4 yrs.	.054 (.004)***	.025 (.004)***	-.021 (.015)	-.021 (.015)
Educ: 6 yrs.	.205 (.004)***	.125 (.004)***	-.022 (.016)	-.025 (.016)
Educ: 9 yrs.	.454 (.004)***	.263 (.004)***	-.020 (.016)	-.020 (.017)
Educ: 12 yrs.	.638 (.004)***	.348 (.005)***	.003 (.017)	.007 (.018)
Educ: 16 yrs.	1.250 (.005)***	.703 (.006)***	.100 (.022)***	.097 (.023)***
Age	.049 (.0006)***	.039 (.0006)***	.058 (.001)***	.057 (.001)***
Age sq.	-.0005 (7.44e-06)***	-.0004 (7.15e-06)***	-.0003 (.00002)***	-.0003 (.00002)***
Const.	4.837 (.013)***	5.784 (.015)***	4.682 (.029)***	4.810 (.031)***
Occupation (8 dummies)	—	yes	—	yes
Worker fixed effects	—	—	yes	yes
Obs.	367492	346779	367492	346779
R ²	.451	.528	.872	.875

Note: Adjusted R² reported for the fixed-effects regressions. Robust standard errors in parenthesis. Asterisks indicate statistical significance at the following levels: *** 1%; ** 5%; * 10%. All regressions control for year of observation. Estimations based on MTSS, 1995-2000, Portugal.

Table A.6: Wage regression, men 26–65.

	(1)	(2)	(3)	(4)
	Coefficient	Coefficient	Coefficient	Coefficient
	(SE)	(SE)	(SE)	(SE)
THS work	-.226 (.003)***	-.164 (.003)***	-.058 (.004)***	-.054 (.004)***
Lisbon	.191 (.001)***	.188 (.001)***	.035 (.004)***	.040 (.004)***
Educ: 4 yrs.	.147 (.003)***	.087 (.003)***	-.039 (.014)***	-.043 (.014)***
Educ: 6 yrs.	.319 (.004)***	.206 (.004)***	-.044 (.014)***	-.048 (.015)***
Educ: 9 yrs.	.561 (.004)***	.348 (.004)***	-.041 (.015)***	-.048 (.016)***
Educ: 12 yrs.	.759 (.004)***	.459 (.004)***	-.022 (.016)	-.028 (.017)*
Educ: 16 yrs.	1.369 (.005)***	.849 (.006)***	.123 (.021)***	.105 (.022)***
Age	.066 (.0005)***	.054 (.0005)***	.068 (.001)***	.065 (.001)***
Age sq.	-.0006 (6.21e-06)***	-.0005 (5.94e-06)***	-.0004 (1.00e-05)***	-.0004 (1.00e-05)***
Const.	4.591 (.011)***	5.546 (.012)***	4.635 (.026)***	4.783 (.028)***
Occupation (8 dummies)	—	yes	—	yes
Worker fixed effects	—	—	yes	yes
Obs.	536004	512917	536004	512917
R ²	.422	.488	.870	.872

Note: Adjusted R² reported for the fixed-effects regressions. Robust standard errors in parenthesis. Asterisks indicate statistical significance at the following levels: *** 1%; ** 5%; * 10%. All regressions control for year of observation. Estimations based on MTSS, 1995-2000, Portugal.

Table A.7: Wage regression with additional regressors, all workers.

	(1) Coefficient (SE)	(2) Coefficient (SE)
2 yrs before start THS spell	-.018 (.004)***	-.014 (.004)***
1 yr before start THS spell	-.038 (.004)***	-.034 (.004)***
Year of start of THS spell	-.017 (.003)***	-.019 (.003)***
1 yr after start of THS spell	-.008 (.003)***	-.010 (.003)***
2 yrs after start of THS spell	-.016 (.003)***	-.016 (.003)***
Lisbon	.039 (.002)***	.040 (.003)***
Educ: 4 yrs.	-.034 (.010)***	-.036 (.010)***
Educ: 6 yrs.	-.035 (.010)***	-.042 (.011)***
Educ: 9 yrs.	-.018 (.011)*	-.029 (.011)***
Educ: 12 yrs.	.007 (.011)	-.001 (.011)
Educ: 16 yrs.	.158 (.013)***	.135 (.014)***
Age	.080 (.0006)***	.073 (.0006)***
Age sq.	-.0005 (7.32e-06)***	-.0005 (7.72e-06)***
Const.	4.407 (.015)***	4.669 (.017)***
Occupation (8 dummies)	—	yes
Obs.	1145577	1065334
Adjusted R ²	.860	.864

Note: Robust standard errors in parenthesis. Asterisks indicate statistical significance at the following levels: *** 1%; ** 5%; * 10%. All regressions control for year of observation and worker fixed effects. Estimations based on MTSS, 1995-2000, Portugal.

Table A.8: Wage regression with additional regressors, women 16–25.

	(1)	(2)
	Coefficient	Coefficient
	(SE)	(SE)
2 yrs before start THS spell	-.008 (.011)	-.005 (.013)
1 yr before start THS spell	-.017 (.011)	-.013 (.013)
Year of start of THS spell	.059 (.008)***	.053 (.009)***
1 yr after start of THS spell	.034 (.009)***	.036 (.010)***
2 yrs after start of THS spell	.015 (.010)	.017 (.010)*
Lisbon	.019 (.007)***	.022 (.008)***
Educ: 4 yrs.	-.169 (.111)	-.227 (.123)*
Educ: 6 yrs.	-.157 (.108)	-.224 (.120)*
Educ: 9 yrs.	-.152 (.108)	-.222 (.120)*
Educ: 12 yrs.	-.124 (.108)	-.189 (.121)
Educ: 16 yrs.	.030 (.109)	-.059 (.122)
Age	.141 (.009)***	.074 (.011)***
Age sq.	-.002 (.0002)***	-.0005 (.0003)*
Const.	4.171 (.150)***	5.138 (.179)***
Occupation (8 dummies)	—	yes
Obs.	117732	102058
Adjusted R ²	.675	.683

Note: Robust standard errors in parenthesis. Asterisks indicate statistical significance at the following levels: *** 1%; ** 5%; * 10%. All regressions control for year of observation and worker fixed effects. Estimations based on MTSS, 1995-2000, Portugal.

Table A.9: Wage regression with additional regressors, men 16–25.

	(1)	(2)
	Coefficient	Coefficient
	(SE)	(SE)
2 yrs before start THS spell	.001 (.010)	.005 (.012)
1 yr before start THS spell	-.013 (.011)	-.010 (.012)
Year of start of THS spell	.028 (.008)***	.022 (.009)**
1 yr after start of THS spell	.023 (.009)***	.012 (.010)
2 yrs after start of THS spell	-.001 (.009)	-.005 (.010)
Lisbon	.047 (.007)***	.050 (.008)***
Educ: 4 yrs.	-.009 (.034)	-.018 (.042)
Educ: 6 yrs.	-.006 (.034)	-.019 (.042)
Educ: 9 yrs.	.019 (.035)	.013 (.042)
Educ: 12 yrs.	.043 (.036)	.038 (.043)
Educ: 16 yrs.	.189 (.043)***	.160 (.050)***
Age	.219 (.010)***	.141 (.012)***
Age sq.	-.003 (.0002)***	-.002 (.0003)***
Const.	3.069 (.109)***	4.151 (.146)***
Occupation (8 dummies)	—	yes
Obs.	133097	111502
Adjusted R ²	.646	.655

Note: Robust standard errors in parenthesis. Asterisks indicate statistical significance at the following levels: *** 1%; ** 5%; * 10%. All regressions control for year of observation and worker fixed effects. Estimations based on MTSS, 1995-2000, Portugal.

Table A.10: Wage regression with additional regressors, women 26–65.

	(1) Coefficient (SE)	(2) Coefficient (SE)
2 yrs before start THS spell	-.032 (.008)***	-.031 (.008)***
1 yr before start THS spell	-.037 (.008)***	-.029 (.009)***
Year of start of THS spell	-.014 (.005)***	-.014 (.005)***
1 yr after start of THS spell	-.009 (.005)*	-.007 (.005)
2 yrs after start of THS spell	-.013 (.005)**	-.013 (.006)**
Lisbon	.031 (.004)***	.029 (.004)***
Educ: 4 yrs.	-.020 (.015)	-.021 (.015)
Educ: 6 yrs.	-.022 (.016)	-.025 (.016)
Educ: 9 yrs.	-.022 (.016)	-.022 (.017)
Educ: 12 yrs.	.001 (.017)	.005 (.018)
Educ: 16 yrs.	.098 (.022)***	.094 (.023)***
Age	.058 (.001)***	.057 (.001)***
Age sq.	-.0003 (.00002)***	-.0003 (.00002)***
Const.	4.695 (.029)***	4.815 (.031)***
Occupation (8 dummies)	—	yes
Obs.	364573	344148
Adjusted R ²	.873	.876

Note: Robust standard errors in parenthesis. Asterisks indicate statistical significance at the following levels: *** 1%; ** 5%; * 10%. All regressions control for year of observation and worker fixed effects. Estimations based on MTSS, 1995-2000, Portugal.

Table A.11: Wage Regression with additional regressors, men 26–65.

	(1)	(2)
	Coefficient	Coefficient
	(SE)	(SE)
2 yrs before start THS spell	-.008 (.007)	-.006 (.007)
1 yr before start THS spell	-.038 (.008)***	-.037 (.008)***
Year of start of THS spell	-.065 (.005)***	-.059 (.005)***
1 yr after start of THS spell	-.035 (.005)***	-.036 (.006)***
2 yrs after start of THS spell	-.037 (.006)***	-.037 (.006)***
Lisbon	.035 (.004)***	.040 (.004)***
Educ: 4 yrs.	-.041 (.014)***	-.042 (.014)***
Educ: 6 yrs.	-.046 (.014)***	-.047 (.015)***
Educ: 9 yrs.	-.040 (.015)***	-.045 (.016)***
Educ: 12 yrs.	-.021 (.016)	-.025 (.017)
Educ: 16 yrs.	.126 (.022)***	.110 (.022)***
Age	.068 (.001)***	.066 (.001)***
Age sq.	-.0004 (1.00e-05)***	-.0004 (1.00e-05)***
Const.	4.629 (.026)***	4.772 (.028)***
Occupation (8 dummies)	—	yes
Obs.	530175	507626
Adjusted R ²	.873	.874

Note: Robust standard errors in parenthesis. Asterisks indicate statistical significance at the following levels: *** 1%; ** 5%; * 10%. All regressions control for year of observation and worker fixed effects. Estimations based on MTSS, 1995-2000, Portugal.