AL ALMALAUREA

Connecting Universities, the Labour Market and Professionals

ALMALAUREA WORKING PAPERS no. 20

September 2011

The Type of Contract and Starting Wage and Wage Growth: The Evidence from New Graduates from Post-Secondary Schools in the Netherlands

by

Takuya Hasebe

The City University of New York

The **AlmaLaurea working paper series** is designed to make available to a wide readership selected works by AlmaLaurea staff or by outside, generally available in English or Italian. The series focuses on the study of the relationship between educational systems, society and economy, the quality of educational process, the demand and supply of education, the human capital accumulation, the structure and working of the labour markets, the assessment of educational policies.
Comments on this series are welcome and should be sent to pubblicazioni@almalaurea.it.

AlmaLaurea is a public consortium of Italian universities which, with the support of the Ministry of Education, meets the information needs of graduates, universities and the business community. AlmaLaurea has been set up in 1994 following an initiative of the Statistical Observatory of the University of Bologna. It supplies reliable and timely data on the effectiveness and efficiency of the higher education system to member universities' governing bodies, assessment units and committees responsible for teaching activities and career guidance.

AlmaLaurea:

■ facilitates and improves the hiring of young graduates in the labour markets both at the national and international level;
■ simplifies companies' search for personnel, reducing the gap between the demand for and supply of qualified labour (www.almalaurea.it/en/aziende/);
■ makes available online more than 1.5 million curricula (in Italian and English) of graduates, including those with a pluriannual work experience (www.almalaurea.it/en/);
■ ensures the optimization of human resources utilization through a steady updating of data on the careers of students holding a degree (www.almalaurea.it/en/lau/).

Each year AlmaLaurea plans two main conferences (www.almalaurea.it/en/informa/news) in which the results of the annual surveys on Graduates' Employment Conditions and Graduates' Profile are presented.

AlmaLaurea Inter-University Consortium | viale Masini 36 | 40126 Bologna (Italy)
Website: www.almalaurea.it | E-mail: pubblicazioni@almalaurea.it

---

The Type of Contract and Starting Wage and Wage Growth: The Evidence from New Graduates from Post-Secondary Schools in the Netherlands

by

Takuya Hasebe[*]

Abstract

This paper examines the impact of a type of employment contract on starting wage and short-term wage growth. I estimate the differences in starting wage and wage growth patterns between temporary and permanent workers by using a dataset from the Netherlands. The data contain new graduates from post-secondary schools in the Netherlands. As in the continental European countries, the use of temporary employment is common in the Netherlands, especially among young workers.

Those who just graduate from school have less experience in the labor market. It is rather difficult for an employer to find a qualified worker. Because of high firing costs for a permanent worker, an employer has to bear more costs if employing an under-qualified worker. To avoid this, an employer engages in a more intensive search processes when hiring a worker on a permanent worker, which increase search costs. If such costs are passed on to a permanent worker, the starting wage is expected to be lower for a permanent worker than a temporary worker. The empirical comparisons of the starting wage shows evidence of a lower starting wage, but this is not robust to differences in estimation structure.

The comparison of the wage growth between the two types of contract shows that wage growth is more suppressed for a temporary worker than for a permanent worker. Since the observations are those who have little job experience, training upon employment is important. As a matter of fact, almost all relevant observations receive training at the beginning, regardless of type of contract. Employers could recoup the costs of training by suppressing the wage growth relative to underlying productivity growth. An employer suppresses wage growth more for a temporary worker than a permanent worker as the shorter employment period of a temporary worker leaves the employer with less time to recoup the costs. The empirical results confirm this hypothesis, and these findings are robust.

The empirical strategy in this paper takes into consideration the fact that the type of contract is presumably determined endogenously even after controlling for observable individual characteristics. The empirical results indeed indicate that this selectivity issue is necessary to be considered.

[*] Ph.D. Program in Economics, The Graduate Center, The City University of New York; e-mail: thasebe@gc.cuny.edu

1. Introduction

Labor markets in continental European countries are often characterized as rigid compared to U.S. and U.K. It is ascribed to strict employment protection legislation in these countries. Legislation makes it costly for employers to dismiss employees, for example, by mandating high severance payments. When severance payments are high, employers are more reluctant not only to fire their workers, but also to hire new workers due to high firing costs in the future. Unemployment rates have been persistently high in European countries. In order to relax such rigid labor markets, governments have reformed labor market systems. One of the main policy reforms is to east the use of temporary contract of employment. The laws allow employers to dismiss a worker on a temporary (fixed-term) basis with negligible costs. Since employment protection of workers on a permanent (indefinite) basis remains relatively strict, employment on a temporary basis has become widespread in continental European countries. An employment contract on a temporary (fixed-term) basis is more common in continental European countries, where employment protection for a permanent (regular) contract worker is strict, than in United Kingdom and United States. Table 1 shows that an indicator of employment protection, which is reported by OECD, for several European countries, and the United States in 2005. The indicator that

Table 1: Strictness of Protection on Regular Workers and the Shares of Temporary Employment in several OECD countries in 2005

Country	Strictness of Employment Protection [a]	Share of Temporary Employment (%)	
		All Workers	Young Workers [b]
France	2.47	13.26	47.78
Germany	3.00	13.74	56.88
Italy	1.77	12.40	36.54
Netherlands	3.05	15.16	41.27
Portugal	4.17	19.45	44.78
Spain	2.46	33.26	65.29
United Kingdom	1.12	5.54	11.06
United States	0.17	4.21	8.07
OECD Countries	2.12	12.22	25.06

Source: OECD StatExtracts, http://stats.oecd.org

Notes: [a] The OECD indicator of employment protection on regular workers measures the procedures and costs involved in dismissing individuals employed on a regular basis. It is scaled from 0 (least restrictive) to 6 (most restrictive).
[b] Young workers are age of 15 to 24.

scales from 0 (least stringent) to 6 (most restrictive) measures strictness of regulation on individual dismissal of workers on regular contract. The measure reflects procedural inconveniences and costs of dismissals.[1] Table 1 also shows that the shares of temporary employment among all workers and young workers under 25 years old in 2005. While the indicator takes high values in continental Europe, the values are low in United States and United Kingdom. Indeed, these countries take the lowest and second lowest values among OECD countries, respectively. In general, the use of temporary

---

[1] See more detailed at the website of OECD, www.oecd.org/employment/protection.

employment contracts is more widespread in countries with strict regulation on regular workers. Moreover, temporary employment is typically prevalent among young workers. The share of temporary employment is higher among young workers than among all workers in all the countries. In Spain and Germany, more than a half of young workers are employed as temporary workers.

In this research, I use a dataset from the Netherland. Thus, I summarize the employment protection legislation in the Netherlands briefly. In the Netherlands, when dismissing an employee with a regular contract, an employer can choose either (1) termination via a prior permission from the administrative authority, or (2) judicial rescission of the contract. In the procedure (1), once the permit is obtained, the employer should notice the employee prior to the statutory minimum notice period, which depends on the tenure of the employee. In this procedure, there is no statutory severance payment. On the other hand, in the procedure (2), the court decision is effective immediately, but the court may determine severance pay, based on the tenure and the age of the worker: for example, one month's wages per year of tenure for a worker under 40 years old. Even though the procedure (1) is financially less onerous, it is administratively burdensome and it takes longer than the procedure (2). As for a temporary contract, there is no restriction on reasons of the use of the contract. A maximum number of successive contracts is three, and a maximum duration of successive contract is three years. A fourth renewal or a renewal after a period of three years will automatically be a regular contract.[2] As Table 1 shows, the employment on a temporary contract is widespread among the youth in the Netherlands like other European countries. The dataset in this paper particularly contains those belonging to this group. This paper examines the impact of a type of employment contract on starting wage and short-term wage growth of new graduates from post-secondary school in order to reveal employers' hiring practices and wage setting. I will estimate the differences in starting wages and wage growth patterns between temporary and permanent workers. In the following section, I summarize the literature relevant to this study. In Section 3, I state the hypotheses that are examined empirically in this paper, and the empirical model is outlined in Section 4. After describing the data used in Section 5, I discuss the results in Section 6. Then, Section 7 concludes.

2. The Related Literature

A temporary contract employment has attracted attention of researchers as well as policy-makers. Research topics range over several aspects of temporary contracts, and empirical evidence is available for several European countries. For example, the June 2002 issue of the *Economic Journal* is the symposium on temporary work. Blanchard and Landier (2002) examine the effect on job turnover with the evidence from France, Dolado et al. (2002) discuss the high persistence of temporary contract over periods in Spain, where the use of temporary contracts is remarkably frequent, and Holmlund and Storrie (2002) examine the cyclical behavior of temporary employment in Sweden. These papers discuss temporary work mainly from macroeconomic perspectives. Booth et al. (2002) focus on microeconomic aspects of temporary contracts. Their empirical evidence for the British data shows temporary workers are paid less and have lower levels of job satisfaction. In the empirical literature of labor adjustment costs, there are several findings of the differences in the costs to adjust workers with permanent contracts than those with temporary contracts. For example, using a dataset from France, Goux et al. (2001) find that it is much less costly to adjust temporary workers than permanent workers. It is also found that firing permanent workers is much more costly than hiring them. Abowd and Kramarz (2003) also use French data, which have direct measures of costs associated with hiring/firing employees, and find that compared with firing costs, hiring costs are lower, and hiring costs of

---

[2] Employment protection legislation is well-summarized at the website of ILO, www.ilo.org/dyn/terminate/termmain.home.

temporary workers are effectively zero. Similar evidence is found by Abowd and Michaud (2010) with an updated dataset. The finding of higher firing costs of permanent workers
are consistent with strict employment protection regulation in France. It is typical to discuss such results in connection with stringent employment protection in the literature of labor adjustment. On the other hand, there are relatively few discussions on the difference in hiring costs.

The purpose of this paper is, in particular, to reveal how hiring costs differ according to the type of contract. However, the data used in this paper do not contain direct information about hiring costs. Furthermore, the unit of observation in the data is an individual worker rather than a firm. Therefore, my attempt in this paper is to infer the difference in hiring costs by analyzing starting wage and wage growth.

As for the wage comparison between temporary and permanent workers, there are several empirical investigations. Some of them use an empirical approach similar to the one used in this paper, which will be discussed later. The general finding is that a permanent worker earns more than a temporary worker. Hagen (2002) finds that a wage differential is between 6% and 10% if selection is on observables, and it jumps to more than 20% once self-selection on both observable and unobservables, using the data from Germany. Brown and Sessions (2003) find that an hourly wage of a permanent worker is higher than that of a temporary worker by more than 10%. The most of this difference is attributed to the differences in the returns on individual characteristics. In contrast, Davia and Hernanz (2004) use two datasets from Spain and find that wage differences can be explained mostly by differences in the distribution of job and personal characteristics between the two types of contract. Elia (2010) discusses the effect of policy easing on the use of temporary contracts in Italy and finds that a wage differential has widened.

As for a wage growth, Booth et al. (2002) find that having experience of temporary jobs leads to slower wage growth for men, but women with such experience would catch up with those who have permanent jobs since the start of career in Britain. Using a panel dataset from Spain, Amuedo-Dorantes and Serrano-Padial (2007) find that whereas wage growth of permanent workers occurs through switching jobs, temporary workers experience wage growth on-the-job as well as switching jobs. Wage growth on-the-job may be due to the conversion of a temporary contract into a permanent one. Those who stay on the same job are those who pass a probationary and sorting process (Loh, 1994), and thus have higher ability. Boockmann and Hagen (2008) show evidence that the period of employment on a temporary contract works as sorting process in Germany.

These empirical studies pay more attention to the effect of a temporary contract on wage growth through career in labor markets. Moreover, the wage that is compared to estimate a wage differential is not at a specific time point of employment, which may be mainly because of the data structure. As opposed to this practice of the existing empirical literature, the data in this research enable us to examine starting wages specifically, instead of wages at any arbitrary point of employment. In addition, the data structure makes it possible to analyze wage growth within contract. Again, the goal of this paper is to reveal how hiring costs of a new employee differ according to the type of contract.

3. The Hypotheses

The sources of hiring costs can be divided into two components: search costs and training costs. Search costs arise before making a contract of employment. They include the costs of advertising job openings, processing applications, and interviewing applicants. They can also include the opportunity costs from keeping positions vacant while searching. By its nature, it can be said that search costs are ex ante costs. On the other hand, training costs are ex post. At the beginning of employment, a new employee may not be as productive as required for a position because he or she is not familiar with the new work environment or because he or she does not have enough job experience. Therefore, a new

worker needs to have an orientation and training at the time of employment. The training activities are costly to firms. Oi (1962) develops the idea of labor as quasi-fixed factor of production due to these hiring costs. Although Oi (1962) discusses training activities mainly and assumes that only training can increase a worker's productivity, search activity is also associated with productivity of a worker in that chances of hiring a more productive worker. Search activities and training activities are closely related. Barron et al. (1997) develop a model of employer search strategy, where information is endogenously acquired. Their empirical work finds that employers search more intensively and extensively when filling positions that require greater skills in order to hire qualified workers. However, in this paper, I deal with search costs and training costs separately.

Search activities in hiring are more important in the labor market where it is costly to fire employees like those in the continental European countries. Due to strict employment protection, employers cannot easily dismiss a worker on a permanent contract even if he or she proves to be under-qualified. To avoid the costs of the mismatch (either high firing costs or the costs from keeping an under-qualified worker), employers are careful in hiring an employee on a permanent basis, and they engage in search activities more intensively. More intensive search activities are more costly for employers, that is, higher search costs. On the other hand, the costs of the mismatch are less in hiring an employee on a temporary basis. When a contract terminates as it is stipulated in advance, employers incur essentially no cost to make an employee leave a job. Thus, they search for a worker on a temporary worker, and their search costs are less compared with hiring a permanent worker. The implied hypothesis that I will test with the data is that due to higher search costs, a starting wage for a permanent worker is lower than that for a temporary worker, assuming that an employer passes the costs on to a worker to some extent.[3]

However, there is a competing hypothesis. Search activities can be considered as investment by an employer. Through more intensive search process, an employer finds a more productive worker. To keep this productive worker that can be seen as the outcome of investment from being enticed by another employer, an employer would offer him or her a higher starting wage than he or she would be offered by another employer. For a temporary worker, an employer does not search intensively, that is, investment is small. An employer does not have incentive to protect investment by offering a higher wage. It leads to a higher starting wage for a permanent worker than a temporary worker.

When thinking of training and its costs, it has been a common practice in economics to distinguish between general and specific training since the seminal work of Becker (1964). The standard theory states that an employer has no incentive to finance general training since it cannot reap the returns to training. They have to increase the wage paid to a worker as much as training enhances productivity of a worker. Otherwise, a worker moves to another employer who offers a wage equal to increased productivity. If training is specific, an employer and an employee would share the costs of training and the benefits from it. By its definition, specific training increase productivity only within a particular job, and thus, an employer does not have to increase wage by competing with other employers. Even though this distinction is of theoretical use, it is usually difficult to distinguish in empirical studies unless there is a very detailed dataset. Furthermore, as Acemoglu and Pischke (1999) discuss, employers can pay for general training if a labor market is frictional to switch jobs. Imperfect labor market compress the structure of wage in that productivity of a worker is different from the wage paid to the worker so that an employer can reap the returns to training even if it is general.

---

[3] The extent to which an employer passes the costs onto a worker may depend on bargaining between an employer and an employee. If a permanent worker has stronger bargaining power than a temporary worker, a prediction may be reversed so that a temporary faces a lower starting wage. Even though it is interesting to incorporate this point in developing a formal model in future, I simply assume that both types of workers have the same bargaining power in this paper.

Regardless of whether training is general or specific, an employer can finance training if it is possible to recoup the costs of training by suppressing wage growth relative to productivity growth. In this paper, I assume that an employer incurs direct costs of training at first. My interest is how wage growth patterns differ between a permanent worker and a temporary worker after having training.

However, it may be natural to suspect that a temporary worker is less likely to receive training. Indeed, there are empirical findings that a temporary worker has a lower probability of receiving firm-provided training (Arulampalam and Booth (1998) and Booth et al. (2002) for Britain, and Albert et al. (2005) for Spain). It may be true at a later period of employment. However, training discussed in this paper is particularly the one at the beginning of employment. Training is considered as one part of hiring process as in the discussion by Oi (1962). As a matter of fact, almost all of relevant observations (more than 99%) in the dataset, which is described below, receive training upon becoming employed, regardless of which type of contract. Since the observations are new graduates who have little, if any, job experience, this initial training is important.

The hypothesis to be tested is as follows. Provided that an employer bears the costs of training initially, the wage growth would be suppressed in order for an employer to compensate the costs. Since an employment period is shorter for a temporary worker, and therefore since the post-training period to recoup the costs is shorter, wage growth for a temporary worker is more suppressed than for a permanent worker. Summarizing the hypotheses to be tested empirically in short, a starting wage would be lower for a permanent worker than a temporary worker if higher search costs are passed on to, or it would be higher if an employer protects investment. Wage growth is more suppressed for a temporary worker than a permanent worker. The next section outlines the empirical strategy developed to test these hypotheses.

4. The Empirical Model

As discussed in the previous section, starting wages and wage growth are the variables of interest in this paper. Particularly, the empirical purpose is to compare these outcomes between permanent workers and temporary workers. However, the type of contract is presumably determined endogenously. Even after controlling for observable characteristics of each worker, there will be a correlation outcomes and a contract type due to characteristics such as ability and preference, which are unobservable by empirical researchers. This selectivity issue needs to be considered in estimation. Otherwise, an estimation result will be biased. To take this issue into account, I adopt the methodology that accounts for the selection on both observable and unobservable characteristics: a switching regression model (Heckman, 1978).

Specifically, the empirical model in this paper is as follows. For the analyses of both starting wage and wage growth, the model comprises a selection equation: for each observation i,

$$s_i = \begin{cases} 0 \text{ if } s_i^* \le 0 \\ 1 \text{ if } s_i^* > 0 \end{cases}, \quad (1)$$

The value of s_i indicates the selection of the type of contract: if it takes a value of 0, an observation i has a temporary contract, and permanent contract if 1. The variable s_i^* is the latent variable that determines the type of contract. It takes the form, $s_i^* = z_i'\gamma + v_i$, where z_i is the vector of explanatory variables affecting the choice of contract type. v_i is an unobservable disturbance term. For notational simplicity, I drop the subscript i for each observation from now on. For each type of contract, a starting wage equation can be formulized:

$$\begin{cases} w_0 = x'\beta_0 + \varepsilon_0 \\ w_1 = x'\beta_1 + \varepsilon_1 \end{cases} \quad (2)$$

where the subscript is the indicator of the type of contract corresponding to the outcome of the selection equation. The regressor vector x contains individual and job characteristics that affect the starting wage such as gender, size of firm, and industry of firm. ε_0 and ε_1 are unobservable disturbance terms. If the error disturbance term in the selection equation, v, is uncorrelated with the error disturbance terms from the wage equations, ε_0 and ε_1, self-selection is not an issue. These correlations can be tested when the model is estimated. Since each observation has only either type of contract, w_0 and w_1 are not observable at the same time for each observation. Therefore, the correlation between ε_0 and ε_1 cannot be estimated in general.

Similarly, a wage growth equation is formulized for each type of contract. However, there is an additional complication for the wage growth equation. Since the observations are basically those who just started working, a large proportion of observations experience no wage growth. Moreover, for some workers, wages have declined since the start of the current job. These observations lead to the following Tobit-type model:

$$\Delta w_s = \begin{cases} \Delta w_s^* & \text{if } \Delta w_s^* \leq 0 \\ 0 & \text{if } 0 < \Delta w_s^* \leq \alpha_s, \\ \Delta w_s^* - \alpha_s & \text{if } \alpha_s < \Delta w_s^* \end{cases} \quad (3)$$

where the subscript s again indicates the type of contract: $s = 0, 1$. Δw_s^* is a latent variable, which is specified by the linear form: $\Delta w_s^* = x_g'\theta_s + \zeta_s$, where ζ_s is a disturbance term. As in the case of the starting wage equations, If there is the correlation between v and the error from the wage growth equations, ζ_s, the selectivity should be taken care of. In addition to the individual characteristics in the vector x in the equation (2), the vector x_g contains job length of current job measured in months, and its square. A positive wage growth is observed only when the latent variable Δw_s^* exceeds the threshold parameter α_s, where it takes a positive value. When Δw_s^* are less than zero, it is observed as it is. When Δw_s^* is in between zero and α_s, a wage for the observation does not grow.

Under the assumption that the error disturbance terms in the equations (1), (2), and (3), are jointly normally distributed, the full model is consistently estimated by maximum likelihood.[4] This empirical approach requires exclusion restrictions (even though it is not a necessary condition for consistency). That is, at least one variable that enters into z, but not x and x_g is required. In this research, such variables are the dummy variables indicating whether an individual has a baby and whether he or she lives with his or her parents. I assume that these variables affect the choice of contract directly, but these variables have an indirect effect on a starting wage and wage growth only through the choice of contract. When a worker has a child, he or she tends to choose a permanent contract job to secure employment status. Conversely, a worker can have flexibility at early job career under parents' support. Other variables included in x and x_g are listed with descriptive statistics in the next section, where the data used in this paper are described. For the comparison of starting wages between types of contract, I will estimate the average treatment effect (ATE). In the context of this paper, a treatment means being employed on a permanent contract. ATE measures the expected gain from a permanent contract for a randomly chosen individual worker. With the framework of the empirical model in this paper, ATE can be estimated as:

---

[4]The detail of the estimation, that is, the likelihood function, is available upon request.

$$E(w_1 - w_0|X = x) = x'(\beta_1 - \beta_0), \qquad (4)$$

where β_0 and β_1 are the coefficient vectors to be estimated in the equation (2) (Heckman et al. 2003). It is evaluated at the mean of x over the sample. If higher search costs for a permanent worker are passed on to the worker's starting wage, the starting wage will, on average, be lower for a permanent worker relative to a temporary worker. This hypothesis leads to the expectation of a negative sign of ATE. On the contrary, the hypothesis of higher wager as investment protection expects a positive sign of ATE. In the analysis of wage growth, the threshold parameter is of main interest. If we interpret the latent variable Δw_s^* as unobservable productivity growth, then α_s is the difference between unobservable productivity growth and observed wage growth. It measures how much wage growth is suppressed relative to the underlying productivity growth. In other words, it measures the degree by which an employer reaps the benefits of a worker's productivity growth. A potential source of productivity growth is training upon employment. Given shorter period of employment, a wage for a temporary worker is to be more suppressed than for a permanent worker so that an employer can recoup the costs of training. The hypothesis is that the threshold parameter is larger for a temporary worker than a permanent worker: $\alpha_0 > \alpha_1$.

5. The Data
The dataset used in this research derives from a survey, *Studies & Werk*, by SEO Economic Research commissioned by Elsevier. Every year since 1996, SEO has surveyed a new cohort of graduates from post-secondary schools in the Netherlands about their education, employment situation, and transition from school to work. In the Netherlands, post-secondary education is divided into two levels: higher professional education (HBO) and university education (WO). HBO-education aims at preparation for specific professions and provides students with vocational skills. WO-education is more academically oriented, and is somewhat more intellectual than HBO-education. Approximately 45,000 students graduate from HBO schools and 25,000 students from WO schools in 2009.[5] Among the cohort of 2009 in the dataset, around 4,300 respondents obtained degrees from HBO, and 3,700 obtained from WO although the coverage rate differs more or less by year. This paper uses the cohorts of the survey year from 2005 to 2009. However, in the estimation, the year in which each observation starts his or her current job is more important than the survey year to control the year effect on the starting wage and wage growth. Those who started their current job earlier than 2003 or in 2009 are excluded from the sample since there are not enough observations from these years. Moreover, those who had started their current jobs before graduation are omitted. On average, respondents answer the survey questionnaire after twenty months from graduation. The observations in the data have little, if any, experience in labor markets. Therefore, they are basically those who need to be trained at the beginning of employment. As a matter of fact, the dataset shows that the training incidence is more than 99%, regardless of their type of employment contract.[6] For the empirical purpose, I drop observations who did not receive training. As for a type of contract, temporary contracts include those who are employed through temporary work agencies. Self-employed workers are excluded from the sample. The starting hourly wage is calculated from a gross monthly wage and contracted hours of work at the time when starting a current job. Similarly, a current hourly wage is calculated from a gross monthly wage and

---

[5] The figures are according to Statistics Netherlands (the central bureau of statistics), http://www.cbs.nl/en.
[6] The survey asks a question: "Was additional training within the company necessary for your position in your current job?" It should be noted that this is the measure of training incidence. The amount of training received by each worker may differ by the type of contract.

contracted hours of work at the time of the survey. Then, the wage growth rate is measured as the difference between the log of the current hourly wage and the log of the starting hourly wage.

Table 2: The Summary Statistics

	Full Sample	Permanent	Temporary
Share of Type of Contract		42.75	57.25
Starting Wage	12.9167	12.9397	12.8932
	(2.5565)	(2.5201)	(2.5933)
Wage Growth	0.0992	0.1266	0.0710
	(0.1255)	(0.1243)	(0.1204)
Share that wage growth is			
positive	71.48	84.17	58.45
zero	21.38	10.27	32.78
negative	7.14	5.56	8.77
Job Length in months	12.50	15.03	10.60
	(6.52)	(5.77)	(6.40)
Age at starting a current job	24.68	24.37	24.91
	(2.24)	(2.22)	(2.22)
Grade	7.23	7.19	7.26
	(0.55)	(0.53)	(0.56)
Gender			
Male	43.09	46.81	40.31
Female	56.91	53.19	59.69
Diploma			
HBO	45.78	50.71	42.11
WO	54.22	49.29	57.89
Firm Size (the number of employees)			
less than 100	37.31	37.21	37.38
100 to 499	22.83	22.60	23.01
500 or more	39.86	40.19	39.61
Native	94.57	94.81	94.40
Handicap	9.95	8.96	10.69
Child	3.11	3.46	2.86
Home	15.01	15.66	14.52
Number of Observations	21,529	9,203	12,326
	[10,863]	[5,503]	[5,360]

Note: The figures in the round parentheses are standard deviations. The numbers in the square parentheses are the number of observations whose wage information is available. For the qualitative variables, the figures are percentages among the relevant samples.

Figure 1: The Distribution of Staring Wage
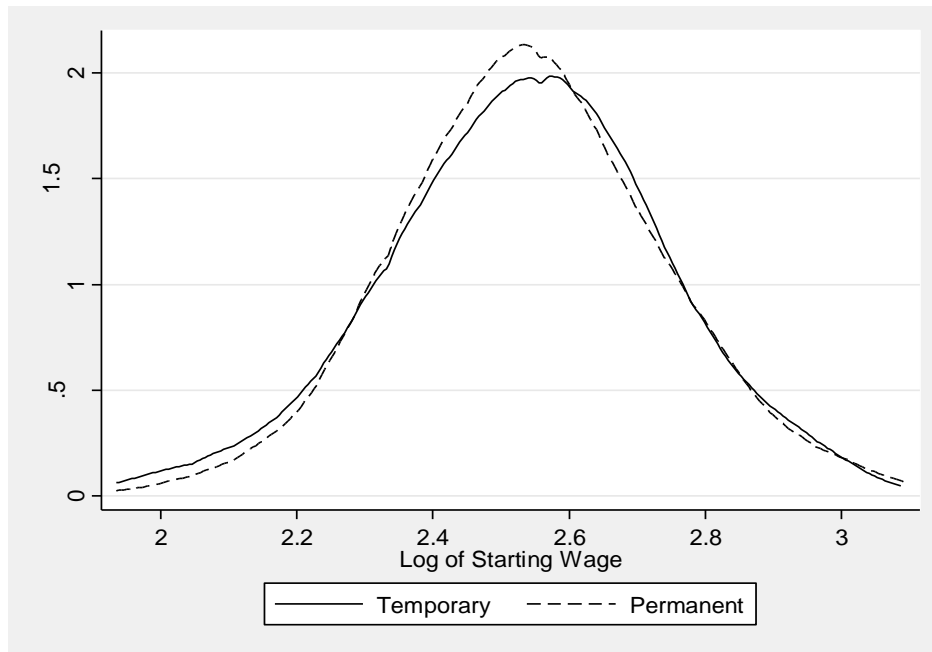
Since the data are retrospective and self-reported, it may suffer from measurement errors to some extent. Besides, the respondent rate is only about 50%.[7] As its nature of self-reported survey, the data are associated with some noise. To eliminate outliers, I discard the observations whose starting wage or wage growth is greater than 99 percentile or less than 1 percentile of the samples.

The survey asks the year and month that a respondent started working for his or her current job. Since the year and month to which he or she responds the survey are also available, it is possible to measure the length of the current job in months. Since a maximum duration of a temporary contract employment is three years, I exclude respondents whose job length is more than thirty six months. The job length on a current job is about 12.5 months, on average.

Table 2 presents the descriptive statistics of basic variables after dropping the observations missing one or more variables used in the estimation. In the sample, the share of temporary contract workers is larger than that of permanent workers.

Starting wages for both types of contract are similar. Indeed, the (unconditional) means of starting wages between permanent and temporary workers are not statistically significant different. Figure 1 shows the distribution of log of starting wages by type of contract. Although the distribution of temporary workers' starting wage has fatter left tail, it shows the pattern similar to the distribution of permanent workers' starting wage.

On the other hand, the wage growth patterns are remarkably different between temporary and permanent workers. The average wage growth for permanent workers is almost twice as large as that for temporary workers. It is partly because the shares of zero wage growth are much different. Whereas about 10% of permanent workers have not experienced wage growth, more than 30% of temporary

---

[7] Those whose starting wage and wage growth are missing but other variables are available contribute to the likelihood of the selection.

workers are paid the same hourly wages as their starting wages at the time of the survey. This point is reflected in Figure 2 that shows the distributions of wage growth by type of contract. Furthermore,

Figure 2: The Distribution of Wage Growth
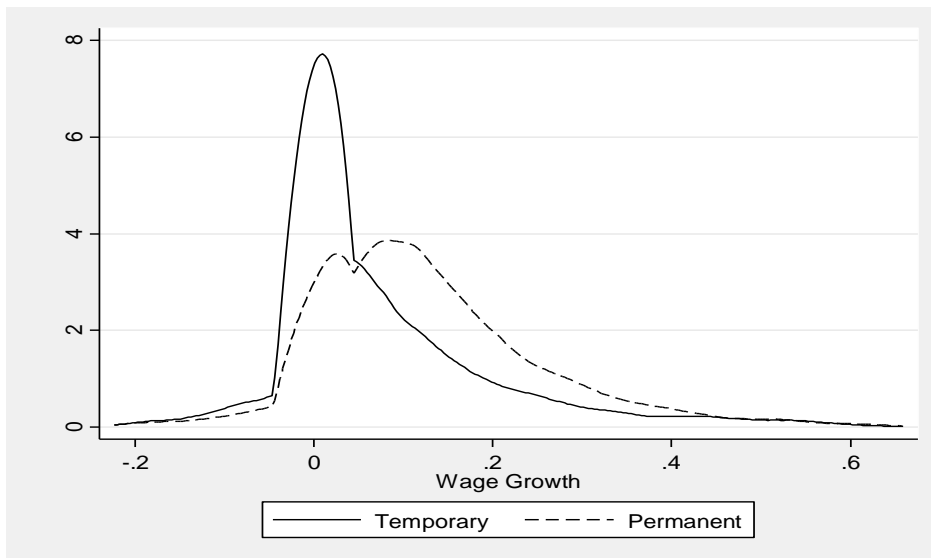
there is a small but not trivial portion of workers whose wages declined since the beginning of employment. The share of these workers is a little higher among temporary workers than permanent workers.

The difference in the wage growth patterns may be due to the difference in job length. The mean of job length of permanent workers is around 15 months while that of temporary workers is about 11 months. The fact that more temporary workers face zero wage growth may be because temporary workers have been employed at their current job shorter than permanent workers, on average. In the estimation, it is important to control for job length.

As for other descriptive variables, there seem similarities between the two types of workers in ages, grades at tertiary school, which are equivalent to GDP and scaled from 0 to 10, and sizes of employers. On the other hand, there seem differences in gender and diploma of workers. Male workers are more likely to have a permanent contract compared with female workers, and workers with HBO diploma are more likely to have a permanent contract.

Using these date, the empirical model outlined in the previous section is estimated. The next section presents and discusses the results of the estimation.

6. The Results

Table 3 shows the estimated results. First of all, all the correlations between the error in the selection equation and the error in each outcome equation are statistically significant. This result indicates that the selection issue is important. Both of exclusion restriction variables have statistically significant effect on the choice of type of contract and as expected. Having a child or children makes a worker find a secured job, so that it has a positive sign. Living at home with parents is an opposite case. Parental support may cover less secured temporary position. Male workers are more likely to hold a permanent worker. This result is consistent with the finding by Booth et al. (2002).

Table 3: The Estimated Results

Independent Variables	Selection Equation	Starting Wage Equation		Wage Growth Equation	
		Permanent	Temporary	Permanent	Temporary
Has a child/children	0.2167				
	(0.0481)***				
Live with parents	-0.0959				
	(0.0231)***				
Job Length				0.0046	0.0072
				(0.0012)***	(0.0013)***
(Job Length)^2 /100				0.0113	0.0101
				(0.0040)***	(0.0058)*
Male	0.1269	0.0485	0.0269	0.0144	-0.0032
	(0.0197)***	(0.0049)***	(0.0051)***	(0.0038)***	(0.0047)
Diploma (reference category: HBO)					
WO	-0.1255	0.1277	0.1241	-0.0054	0.0058
	(0.0209)***	(0.0052)***	(0.0054)***	(0.0041)	(0.0050)
Firm Size (reference category: 1~99)					
100 ~ 499	0.0155	0.0111	0.0341	-0.0026	-0.0098
	(0.0239)	(0.0060)*	(0.0062)***	(0.0047)	(0.0056)*
500 ~ ∞	0.0103	0.0418	0.0388	-0.0096	-0.0114
	(0.0213)	(0.0053)***	(0.0058)***	(0.0041)**	(0.0052)**
Constant	2.2623	2.0567	1.8023	0.0997	0.0813
	(0.1818)***	(0.0502)***	(0.0687)***	(0.0412)**	(0.0729)
The Parameters					
The standard deviation of error: σ		0.1763	0.1569	0.1291	0.1573
		(0.0034)***	(0.0022)***	(0.0019)***	(0.0028)***
The correlation between selection: ρ		0.6751	-0.5279	0.3691	-0.3644
		(0.0237)***	(0.0243)***	(0.0385)***	(0.0687)***
		-0.0589	-0.1354		
The correlation between starting wage and wage growth		(0.0090)***	(0.0246)***		
The threshold parameter: α				0.0860	0.1926
				(0.0036)***	(0.0050)***
Log Likelihood	-5,596.77				
Number of Observations	21,529				

Note: Standard errors are in the parentheses. ***, **, and * indicate statistical significance at the 1% level, 5% level, and 10% level, respectively. The estimation is conducted by maximum likelihood estimation routine in STATA. The standard errors are calculated numerically. The full report of the estimation results is available upon request. In addition to the independent variables listed here, each equation includes the age at the start of job, the grade at tertiary school, the dummy for the native, the dummy for the handicapped, the regional dummies, the dummies for job sectors, and the year dummies.

Female who choose whether to engage in home production or market production may want to retain career flexibility by holding a temporary post. Having an HBO diploma is more likely to lead to a permanent job position. Because of the goal of HBO education that provides specific vocational skills, a graduate from HBO school follows a specific career path. On the other hand, a graduate from WO school tries to keep flexibility at an early career rather than having decided a specific job.

6.1 The Wage Growth

Before discussing the difference in starting wages, I will discuss the wage growth first. In the wage growth equation, job length and its square term are included as explanatory variables. The estimated coefficients show that as the latent productivity growth is faster as job length increases, and it is increasingly faster as job length increases as the positive values of the coefficient indicate.[8] The effect of job length is larger for a temporary worker than a permanent worker. Statistically, the Wald test rejects the null hypothesis that these coefficients are the same across the two equations, at any conventional level of significance. A faster productivity for a temporary worker may be explained as more effort by the worker in order to renew a contract or convert into a permanent contract.[9]

The estimates of main interest are the threshold parameters in the wage growth. As expected by the hypothesis, the value of the threshold parameter is greater for a temporary worker than a permanent worker: α_0 is more than twice as large as α_1. The difference is found to be statistically significant by the Wald test. The wage of a temporary worker is less likely to increase, and even when it grows, it is more compressed than the wage of a permanent worker. This finding is in favor of the hypothesis developed as above. An employer recoups the costs of initial training by suppressing the wage growth.

Having a higher diploma, namely WO, does not affect the wage growth at both temporary and permanent contracts. A male worker would face faster wage growth than a female worker if he or she has a permanent contract. On the other hand, there is no such gender difference if a worker is employed on a temporary contract. An employer may train a male worker more and let him acquire more experience than a female worker, which leads to faster growth for a male worker, because a female may leave a job for home production with a higher probability. As for a temporary contract, an employer does not treat a worker differently by gender because both workers will leave a job in rather specific future.

With regard to gender difference, I conduct the same estimation by separating the sample between males and females as a part of robustness checks. As Booth et al. (2002) point out and the other literature documents, there are the difference in labor market outcomes by gender. The likelihood ratio test indicates that all the coefficients estimated in the model are statistically different jointly. However, the results show the similar finding from the estimation pooling males and females together. The threshold parameters for a male worker, α_0 and α_1, are 0.2080 and 0.0987, respectively. For a female worker, these parameters are 0.1820 and 0.0792. As in the case of the pooled estimation, the ratio of the parameters is more than 2 for both males and females.

Furthermore, the analysis so far uses the wage measured per hour. Employers can change hourly wage of employees not only by changing a monthly wage, but also by changing the number of contracted hours of work. Employer may increase the hour of work instead of cutting the wage for those who are found to be less productive. Because of this possible adjustment of working hours, a change in hourly wage is supposed to reflect an underlying

---

[8] Note that even though the coefficients on the squared terms are statistically significant, the actual effect is essentially small since the square term is divided by 100.

[9] The evidence that temporary worker put more effort at work is documented by, for example, Engellandt and Riphahn (2005).

Table 4: Average Treatment Effect (ATE) of a Permanent Contract on Starting Wage

| Overall | Year of Starting a Current Job | | | | | |
	2003	2004	2005	2006	2007	2008
-0.0269	-0.0657	-0.0343	-0.0027	-0.0219	0.0048	-0.0850
(0.0107)**	(0.0533)	(0.0116)***	(0.0102)	(0.0105)**	(0.0103)	(0.0155)***

Note: Standard errors are in the parenthesis. ***, **, and * indicate statistical significance at the 1% level, 5% level, and 10% level, respectively. ATE's are evaluated at the means of the overall sample, and the means of the observations in each year. The standard errors are calculated by the delta method evaluated at the corresponding means.

productivity change better than a change in monthly wage. As a robustness check, I also estimate the model using monthly wages and monthly wage growth. The main finding of the difference in the threshold parameters is robust to this change. The threshold parameters for a temporary worker α_0 and for a permanent worker α_1 are 0.2369 and 0.1238, respectively. Compared with the values from the estimation with hourly wages, the values are now little larger. It may be because that an employer adjusts labor costs flexibly by hours of work.

The overall findings for the wage growth are as the hypothesis expects. The wage growth patterns are different between temporary and permanent workers. The wage growth is more suppressed for a temporary worker.

6.2 The Starting Wage

In the starting wage equations, a male worker receives a higher starting wage than a female worker, regardless of which type of contract. The size of the effect is higher if a worker is employed on a permanent contract. Unlike the wage growth equations, a higher diploma results in a higher starting wage at both temporary and permanent jobs, and its magnitude is about the same between the two types of contract. Furthermore, larger firms tend to pay higher starting wages for their workers.

The interest of this paper is not the differences in each coefficient between both of the starting equations, but in the total difference that arises from those differences. As shown above, it measures the average treatment effect (ATE): the effect of having a permanent contract. Table 4 shows the ATE's. The ATE's are evaluated at not only the mean of the whole observations, but also the means of the sample in each year from 2003 to 2008, in order to reveal how the effects vary over the years. Search activities are presumably related to the business conditions. Therefore, there may be the fluctuations of the ATE's over the years.

First of all, the ATE calculated from the overall sample is negative. It is statistically significantly different from zero at the 5% level. The negative sign is in favor of the hypothesis that higher search costs for a permanent worker are passed on to. However, the effect is small. The starting wage for a temporary worker is higher than that for a permanent worker by only slightly less than 3%. Moreover, the effects are not stable over the years. The effects in 2003, 2005, and 2007 are not statistically significant, and it takes a positive value in 2007 though it is insignificant.

If the estimation is conducted with monthly wage, the ATE from the overall sample turns to be statistically insignificant. When the estimation is separated by gender, the ATE is not statistically significant for males, while it is statistically significant for females. The effect for a female worker is -0.0558. As in the case of the pooled estimation, the ATE's are varying over the year though the effects in some effects are statistically insignificant.

The findings on the starting wage is basically in favor of the hypothesis that the starting wage paid to a permanent worker is lowered to compensate higher search costs to find a qualified worker. Even though it is not examined in this paper, educational backgrounds of new graduates may affect employer's search activities. For example, if an employer is looking for a computer engineer, search for candidates is limited to those who study computer science or other relevant majors at school. It clearly reduces search costs compared with searching and seeing all new graduates as candidates.

7. The Concluding Remarks
In this paper, I examine the differences in the wage structures between temporary workers and permanent workers. The empirical finding from the dataset from the Netherlands is that a permanent worker receives a lower wage at the starting point of employment, but the wage growth during the employment is faster for a permanent worker. A temporary worker's wage growth is more suppressed despite the starting wage is slightly higher.

The difference in wage growth pattern may be explained as follows. Since the employment period of a temporary worker is shorter, an employer tries to recoup the cost of initial training investment by suppressing the wage growth relative to the underlying productivity growth. For a permanent worker, an employer spreads the costs over a longer employment periods so that the wage growth suppression is smaller. This finding is robust to the estimation of monthly wage growth, and the estimations separating the sample by gender.

The hypothesis that results in a higher starting wage for a temporary worker is related to the intensity of search activities by an employer. Since it is costly to fire a mismatched worker if employed on a permanent contract, an employer becomes more cautious and searches for a worker more intensively when hiring a worker on a permanent basis. This results in higher search costs. A lower starting wage for a permanent worker may be because higher search costs are passed on to the worker. However, the finding is not as robust as the finding on wage growth. The mechanism in the setting starting wage seems more complicated than hypothesized in this paper. As an improvement in this research, it is necessary to develop a more rigorous theoretical model on the starting wage difference between temporary and permanent workers.

In addition to the theoretical development, the research can be improved empirically. In the maximum likelihood estimation, the simple distributional assumption is made. The recent development of econometric techniques can relax such assumption. Since the empirical strategy in this paper relies on the distribution assumption, more flexible assumptions can lead to the different results.

References

Abowd, J. M., and Kramarz, F. (2003): The Costs of Hiring and Separations. In: Labor Economics, 10, 449-530.

Abowd, J. M., and Michaud, M. L. (2010): The Shape of Hiring and Separation Costs in France. In: Labour Economics, 17, 27-37.

Acemoglu, D., and Pischke, J. S. (1999): The Structure of Wages and Investments in General Training. In: The Journal of Political Economy, 107, 539-572.

Albert, C., Garca-Serrano, C., and Hernanz, V. (2005): Firm-provided Training and Temporary Contracts. In: Spanish Economic Review, 7, 67-88.

Amuedo-Dorantes, C., and Serrano-Padial, R. (2007): Wage Growth Implications of Fixed-Term Employment: An Analysis by Contract Duration and Job Mobility. In: Labour Economics, 14, 829-847.

Arulampalam, W., and Booth, A. (1998): Training and Labour Market Flexibility: Is There a Trade-Off? In: British Journal of Industrial Relations, 36, 521-536.

Barron, J., Berger, M., and Black, D. (1997): Employer Search, Training, and Vacancy Duration. In: Economic Inquiry, 35, 167-192.

Becker, G. (1964): Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education. 1st Edition. Chicago.

Blanchard, O., and Landier, A. (2002): The Perverse Effects of Partial Labour Market Reform: Fixed-Term Contracts in France. In: The Economic Journal, 112, 214-244.

Boockmann, B., and Hagen, T. (2008): Fixed-term Contracts as Sorting Mechanisms: Evidence from Job Durations in West Germany. In: Labour Economics, 15, 984-1005.

Booth, A. L., Francesconi, M., and Frank, J. (2002): Temporary Jobs: Stepping Stones or Dead Ends? In: The Economic Journal, 112, 189-213.

Brencic, V. (2009): Employers' Hiring Practices, Employment Protection, and Costly Search: A Vacancy-level Analysis. In: Labour Economics, 16, 461-479.

Brown, S., and Sessions, J. (2003): Earnings, Education, and Fixed-term Contracts. In: Scottish Journal of Political Economy, 50, 492-506.

Davia, M., and Hernanz, V. (2004): Temporary Employment and Segmentation in the Spanish Labour Market: An Empirical Analysis through the Study of Wage Differentials. In: Spanish Economic Review, 6, 291-318.

Dolado, J., Garcia-Serrano, C., and Jimeno, J. (2002): Drawing Lessons from the Boom of Temporary Jobs in Spain. In: The Economic Journal, 112, 270-295.

Elia, L. (2010): Temporary/Permanent Workers' Wage Gap: A Brand-new From of Wage Inequality? In: Labour, 24, 178-200.

Engellandt, A., and Riphahn, R. (2005): Temporary Contracts and Employee Effort. In: Labour Economics, 12, 281-299.

Goux, D., Maurin, E., and Pauchet, M. (2001): Fixed-term Contracts and the Dynamics of Labour Demand. In: European Economic Review, 45, 533-552.

Hagen, T. (2002): Do Temporary Workers Receive Risk Premiums? Assessing the Wage Effects of Fixed-term Contracts in West Germany by a Matching Estimator Compared with Parametric Approaches. In: Labour, 16, 667-705.

Heckman, J. (1979): Sample Selection Bias as a Specification Error. In: Econometrica 47, 153-161.

Heckman, J., Tobias, J. L., and Vytlacil, E. (2003): Simple Estimators for Treatment Parameters in a Latent-variable Framework. In: The Review of Economics and Statistics, 85, 748-755.

Holmlund, B., and Storrie, D. (2002): Temporary Work in Turbulent Times: The Swedish Experience. In: The Economic Journal, 112, 245-269.

Loh, E.S. (1994): Employment Probation as a Sorting Mechanism. In: Industrial and Labor Relations Review, 47, 471-486

Oi, W.Y. (1962): Labor as a Quasi-Fixed Factor. In: The Journal of Political Economy, 70, 538-555.