Efficiency wage models in the temporary labor market

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Master: Economics of Markets, Organizations and Policy

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Summary

The efficiency wage theory has the potential to offer firms an alternative for monitoring their employees. By claiming that a higher wage induces workers to work rather than shirk it suggests that employees can motivate themselves. Firms who have productive and motivated employees do not have to spend their means at supervisory activities.

Four different micro-economic foundations are the fundamentals of the efficiency wage theory: adverse selection, the gift exchange model, labor turnover costs and the shirking model. In this thesis the shirking version of the efficiency wage theory is used to test whether there is an efficiency wage explanation for the observed wage premiums paid by Dutch temporary labor agencies that employ students. Several proxies for supervisory intensity are used to test for a trade-off between wages and supervision. Next to variables that are already used in earlier studies, this thesis proposes a new quantification for supervisory intensity by measuring the duration of a contract workers' assignment.The longer the assignment, the higher the supervisory intensity is the expected relationship.

Above variable and the other used supervision indicators delivered ambiguous results throughout this research and provide by that a basis for further research.

1. **Introduction**

Workers effort is often hard to measure for employers. Though hard to measure, in an ideal situation a firm pay a worker precisely the wage that corresponds with his or her effort level and contract arrangements. In such case, a worker earns precisely the wage he/she is entitled to. A firm will occur no extra costs if a worker decides to shirk as the shirking time will be subtracted from the workers' wage. In a world that is less ideal, the possibilities to measure a workers' effort level are limited and contract arrangements rarely specify all situations that possibly can occur (Malcomson, 1981). Firms can only vary wages to a certain level and it is impractical to make a workers wage totally depended on the delivered effort level since it is often impossible to verify the precise production or effort level. This means that a firm occurs costs when a worker buys leisure by shirking on the job.

In order to get an idea of the delivered effort of their employees firms undertake costly supervision activities. A firm has several options to supervise employees. Most commonly, firms give some of their workers supervising tasks which mean that those workers can spend less time at the actual production process and more time at controlling activities (Leonard, 1987). In that case a firm needs to attract more workers and occur higher labor costs, in order to produce the same output. A relatively inexpensive way of supervising employees is the use of piece rates. With piece rates, employee and employer have a contractual arrangement that specify a certain wage to a certain output level. Although inexpensive, piece rates are often hard to implement. Most jobs have some aspects that are not directly linked to the production process, and in case of piece rates those indirect tasks will not be rewarded with extra wage and by that those tasks do not have the priority of workers. Therefore, piece rates are only suited in some jobs. Next to supervising, a firm can choose to punish a worker when he/she is caught shirking. Though the methods of (legal) punishment an employer has are limited; firms can fire an employee but cannot demand a direct cash fine or other sorts of fines. Therefore, when a worker is caught shirking a firm can choose to warn an employee or to fire him/her. If a firm choose to warn a shirking employee it gives a sign that shirking is tolerated, if a firm choose to fire a shirking employee it occur turn over costs. Both options have adverse effects for a firm, so avoiding shirking behavior and by that avoiding the situation that a firm has to warn or fire a worker is important for firms.

As a consequence, firms search for alternative devices to motivate and elicit the required productive behavior of workers (Shapiro and Stiglitz, 1984). According to the efficiency wage theory, employers can choose to pay workers a wage above their outside option or above the market level. By means of a higher wage, workers appreciate their jobs more and deliver a

higher effort level. In fact, it can lower a firms cost if it increases the wage payments. This, at first sight, puzzling statement can be explained with the efficiency wage theory. In short, the efficiency wage theory gives a worker two choices; work or shirk. A firm's goal is to motivate a worker intrinsically to choose for work rather than shirk. A higher wage can push a worker into the right direction because when a worker chooses to shirk he/she has some chance of getting caught shirking. In case of shirking, we assume that a worker will immediately be fired. When a worker is fired he/she loses his (high) wage and become unemployed. In that situation a worker has to start looking for a new job. In case his/her last employer paid a relatively high wage, the unemployed worker has a great chance of losing his relatively high payment with a new job. The loss of the wage premium can be seen as the penalty of shirking, this penalty increases when the wage increase or unemployment rises (Shapiro and Stiglitz, 1984). Workers who earn a relatively high wage are intrinsically motivated to keep their job and will shirk less; therefore high paying employers can spend less on supervising costs. So paying a wage above the market clearing level can elicits productive or quality enhancing behavior and can be profitable for firms. This implies a vast improvement as employers are spending a substantial amount of their budget on monitoring. According to the study of Weis (1980) for most firms the costs of supervising exceed the benefits.

Above reasoning can offer an explanation for wage differentials between firms, regions or industries. This thesis discusses the high wage premiums in the temporary labor market and offers the suggestion that at least part of those premiums can be explained with the efficiency wage theory. Although there is a collective labor agreement which specify a minimum wage level for this sector it is not a rarity that contract workers earn more than twice the minimum wage. Especially students who work part time for a temporary labor agency earn a high wage premium. At first sight, there seems to be no clear reasons for a wage premium in this industry. This thesis intent to explain those premiums with the help of the efficiency wage theory. One reason for the high wage premiums can be the expected relationship between wages and productivity. By testing the relationship between wages and supervision this thesis offers an indirect test for the expected positive relationship between wages and productivity. If high wages elicit productivity than high wage firms should spend fewer resources to supervision. To conduct above test, a dataset taken from the temporary labor industry in the Netherlands will be used. Only agencies that employ higher educated students and follow a specific collective labor agreement are incorporated in this dataset. Using such a narrow setting as the temporary labor market, offer the possibility to test the efficiency wage theory in a controlled environment.

After interviewing managers from temporary labor agencies several indicators for supervisory intensity were qualified. With the help of a questionnaire all temporary labor agencies that meet the criteria were approached to answer the question about supervisory intensity and wage levels. 32 agencies responded with a fully answered questionnaire. Whether there exist a tradeoff between wages and supervision will be tested with a regression analysis.

Before performing above regression analysis, this thesis will first give an overview of the efficiency wage theory by explaining the theory, the impact it has on unemployment and the various empirical studies that tested the shirking version of the efficiency wage model. It will offer a test for the shirking version of the efficiency wage model by testing the wage-supervision tradeoff in the temporary labor market. Before providing the model en data, first the temporary labor market will be discussed shortly in order to provide an overview of the rules, guidelines and the collective labor agreement of the temporary labor market. The next section discusses the efficiency wage theory and the four micro-economic foundations.

2. The Efficiency Wage Theory

Although economists know for a long period that there exist some sort of relationship between wages and productivity, the efficiency wage theory found her basis in the late seventies of the 20th century. With the articles of Shapiro and Stiglitz (1984) and Akerlof (1982) the efficiency wage theory developed to a theory that provided several reasons for the until than puzzling fact that some firms pay a wage in excess of the market clearing level without any clear competitive reasons. Why firms prefer to pay a wage higher than strictly necessary can be explained by four different models. All models have in common that total production costs can be lowered when wages are raised, though the mechanisms how vary from model to model. This thesis tests the efficiency wage model for the temporary labor market. In this industry, the wages paid to student employees are sometimes more than 100% higher than the minimum wage. The shirking version of the efficiency wage theory seems to be the most appropriate model to test whether there are efficiency wage reasons for the high wages in this industry. This chapter discusses the four different models and concludes with the reasons why the shirking version seems to be the most appropriate model to use in this study.

2.1 The Shirking Model

The most referenced and empirically tested version of the efficiency wage hypothesis is the 'shirking model' of Shapiro and Stiglitz (Shapiro and Stigliz, 1984). The shirking model explains why firms pay a wage above market clearing level by describing that a higher wage gives workers an incentive to work rather than shirk. In most jobs, workers effort level is hard to measure and employment contracts are rarely perfect. Next to that, monitoring employees is often too costly or too inaccurate (Shapiro and Stiglitz, 1984). Piece rates are seldom suited or the measurements on which they are based are often unverifiable by workers, creating a moral hazard problem (Yellen, 1984). This creates a situation that workers can choose their effort level, either they work hard or they shirk. In case they shirk on the job they actually purchase leisure (Cappelli and Chauvin, 1991) on the expend of the employer.

Workers who choose to shirk have some chance of getting caught shirking, with the penalty of being fired. This has been termed cheat-threat, because if there is a cost to being fired, the threat of being fired if caught shirking creates an incentive not to shirk. The higher the wage, the larger the penalty. In that case a worker will be unemployed and loses his wage premium in case of being fired.

In competitive markets, firms offer workers the market wage. By doing that there is no cheat-threat because workers can find another job at the same market wage in case of no unemployment. In this situation workers will choose to shirk based on the rational cheater model (Nagin et all 2002). Under these circumstances it pays for firms to raise its wages to reduce shirking. However, if it pays for one firm to raise wages it will pay for all firms and in equilibrium all firms pay the same wage. Unemployment serves as the cheat-threat or discipline device in such a situation (Shapiro and Stiglitz, 1984). The model formulated by Shapiro & Stiglitz, (1984) gives a simple representation of above reasoning. In that model a worker can either be employed or unemployed, if employed the worker has to make an effort decision. He can choose to work (e>0) and receive a wage (w) or he can choose to shirk (e=0). If a worker shirks, there is a probability q that he is caught and fired. Shapiro and Stiglitz argue in their model that a worker selects an effort level that maximizes his discounted utility stream. Therefore they compare two utility streams, the expected utility of an employed shirker and the expected utility of an employed non shirker.

Utility of an employed shirker (Ves):

$$Ves = w + (b + q)(Vu - Ves)$$

Utility of an employed non shirker (Ven):

$$Ven = w - e + b(Vu-Ven)$$

Where b is the probability that a worker is separated from his job due to exogenous reasons and Vu is the expected utility of an unemployed.

To induce a worker not to shirk Ven must be higher than Ves (Ven>Ves). Shapiro and Stiglitz call this the No-Shirking Condition (NSC):

$$w \geq rVu + (r + b + q)e/$$

If the wage is high enough a worker will not shirk. The NSC has several implications according to Shapiro and Stiglitz:

The critical wage is higher than the required effort.

The critical wage is higher the higher the expected utility associated with being unemployed

The critical wage is higher the lower the probability of being detected shirking

The critical wage is higher the higher the exogenous quit rate b

Following above model one can also argue that firms can trade monitoring or supervision (q) with higher wages as a workers discipline device. The last conclusion is in line with the shirking version of the efficiency wage theory. This thesis offers an empirical test for above trade-off with the help of a dataset taking from the temporary labor market in the Netherlands.

2.2 Gift-Exchange Model

High paying organizations try to win the loyalty and goodwill of its employees in order to experience gains in productivity and efficiency. From a sociological point of view, the higher wages must be seen as a gift from the firm to the employee. The employee will return the favor by giving back a higher effort and productivity level.

Although empirical evidence for this model is scarce and hard to proof, there are various articles that together provide a solid basis for the gift exchange model. One of the first that recognized the power of a higher wage was Henry Ford. In 1914 he decided to double the wage of autoworkers. Ford considered this to be a cost saving strategy, due to lower employee turnover, better applicant pools, less frequent shirking and improved productivity (Raff & Summers, 1987). The objectives of Henry Ford where straight forward, paying twice the normal wage must deliver twice the normal work[1]. In a more recent study, Wiseman and Chatterjee (2003) undertook in their article a test of the gift exchange model by examining whether there exist a relationship between team performance and average team salary among Major League Baseball teams. Consistent with the Gift Exchange model they found that

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[1] Raff& Summers qouted in their article a production foreman (KLann) who claimed that "They called us in and said that since the workers were getting twice the wages, the management wanted twice as much work. On the assembly lines, we just simply turned up the speed of the lines".

higher paying teams experienced higher productivity in terms of average number of games won. Though a test for the gift-exchange model, this can also be seen as a test for the shirking model. Teams with a higher salary will shirk less and by that play more effective than lower wage teams.

From a more sociological point of view, Cappelli and Chauvin (1991) explained in their article the role of comparisons in job choice. A worker compares the input he delivers and the outcome he receives with input and output for jobs he/she choose as comparisons. In case a worker feels overcompensated he/she can improve productivity or effort. Similarly, in case of under compensation, he/she can choose to shirk or quit. Akerlof (1984) described in his article a laboratory study in which subjects who were made to feel overpaid increased their effort in comparisons with a control group. Continuing the same study for one more day delivered the remarkable result that the effort level of the overpaid group was back at same level as the control group. As a possible explanation Akerlof gives the possibility that higher paid workers choose new comparisons and rationalize away their initial higher wages. Gneezy and list (2006) found in their study more or less the same results. With the help of a field experiment they provided a test of the gift exchange hypothesis in an actual labor market. By creating two groups of participants, a high paying group and a low paying group, they tested the effort level of the two different groups. The high paying group provided significant more effort during the first 90 minutes of the test and after those 90 minutes the effort level between the groups was indistinguishable.

2.3 Adverse Selection Model

 The adverse selection model is based on the idea that ability and workers reservation wage are positively correlated. In that way, firms with higher wages will attract better qualified people and are in the position to turn down workers who are offering to work at a lower wage. At first glance it seems unnatural to turn down people that want to work for a lower wage but in situations of imperfect information the willingness to work for a lower wage raises the firms estimate that the worker is a so called lemon. To illustrate above reasoning Andrew Weis (1980) gives in his article an example of a company[2] that had the intention to lay off 10 percent of its workforce. As a reaction, the workers voted to take a 10 percent wage cut to stop the layoffs. The management of the company refused that offer for if the wages were cut, the best workers would quit. With this example Weiss wanted to make clear that a firm should

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[2] The Stanford Linear Accelerator Center

not be interested in choosing the minimum wage at which firms' demand for labor is satisfied but, rather, in choosing the wage that minimizes cost efficiency unit of labor. Therefore to avoid the consequences of a wage cut (best workers will quit) firms may choose to lay off workers instead of accepting a wage cut. Malcomson (1981) describes that due to imperfect information, imperfect contracts and bounded rationality workers ability is hard to measure. If this holds for a worker it certainly holds for an applicant. Therefore firms create a self-selection effect by turning down applicants that are willing to work for a lower wage.

2.4 Labor turnover model

Firms occur costs when workers quit their jobs, in order to reduce such turnover costs firms discourage workers to give up their jobs. One way of discouraging workers to quit their jobs is paying a higher wage. Workers will be more unwilling to quit their jobs in case they receive a wage that is higher than the market clearing level or if the unemployment level is relatively high. Salop (1973) describes in his article "A model of the Natural Rate of Unemployment" that workers may quit their current jobs to enter the unemployment pool in order to search among available vacancies for a more preferred position[3]. As turnover is costly to firms, firms try to discourage job quits by paying a higher wage than strictly necessary. Turnover is costly to firms in two ways; it creates direct costs because of the need to search for new employees and indirect costs since it lowers productivity. Schlicht (1978) claims that a firm which pay above the average will experience a less than average rate of labor turnover and incur lower direct and indirect labor turnover costs. He defines the rate of labor turnover as the ratio between annual job separations and the amount of employment. The higher the rate of turnover, the larger the fraction of inexperienced workers and the lower the overall productivity. Schlicht determines in his article an optimal wage level to avoid costly turnover.

2.5 Testing the shirking version of the efficiency wage theory

Al described models offer an explanation for the profitability of high wages: by reduced shirking, lower turnover costs, improvement of applicants or by creating loyalty. Taking in account the difficulties temporary labor agencies faces with supervising their employees at host locations the shirking version seems to be the most logic variant of the efficiency wage theory for explaining the relatively high wages in this industry. Adverse selection, turn-over costs and the gift-exchange model seems to have less explanatory power for the high wages in

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[3] Salop ignores in his article the possibility of on the job search

this sector. Due to the preferences of a student, adverse selection and turn-over costs are less of a problem for firms. Most students are overqualified for their temporary jobs as they mainly work in low-skilled jobs, and in addition to that, differences in ability of student employees are relatively small in comparison with differences in ability of more experienced workers. For that reasons, adverse selection seems to be a minor problem for temporary labor agencies. Turn-over costs are inevitable in this sector. When graduated, students quit their temporary jobs and start looking for a young professional function. This means that temporary labor agencies cannot change the time horizon of their employees and by that cannot lower turnover costs by paying a higher wage. The gift exchange model has less explanatory power because of the fact that temporary workers always work at host locations. As a result of this there is less social dynamics between employer and employee. Giving the assumption that the shirking version has the most explanatory power for the high wages in the temporary labor market, the remaining part of this thesis will mainly focus on that variant.

2.6 Efficiency wage and imperfect information

Important factors for the efficiency wage theory, and in particular for the shirking model and the adverse selection problem are the incompleteness of employment contracts and the problem of imperfect information. An ideal situation for a firm would be a situation where the actual wage paid to a worker depends precisely on the total individual production or that the agreed wage will be paid only if a particular level of production is achieved. In a situation like that a firm has no reason for paying efficiency wages in order to hire and motivate employees (Malcomson, 1981). Since there are no uncertainties in such a situation the model of Shapiro and Stiglitz would be complicated as a firm can precisely pay the wage (w) that corresponds with the exact effort level of the worker (e) so that there is no need for any wage premium. In general, most employments contracts between firms and its employees do not specify the productivity levels (Malcomson, 1981). The most important reason for this incompleteness of contracts is called bounded rationality (Simon, 1991). This implies in this situation that human beings are not able to write contracts that cover every single situation that may be relevant for worker and firm. Another reason is the difficulty firms have with objectively measuring productivity of individual workers. Objectivity is important in a way that both parties, firm and worker, can verify the actual productivity level. If only the firm can verify the productivity level a moral hazard problem could arise, the firm can deny a worker performed at the specified production level even if the worker did so and refuse to pay the wage that corresponds with the actual effort level of the honest worker. This can be seen as an

incentive problem between a principal and an agent (Gibbons, 2005) or the principal-agent model described by Foster and Wan (1984). If a firm does find a way to objectively measure actual individual production it generally means exceptionally high monitoring costs which may exceeds its actual benefits (Weiss, 1980).

Whether or not for above reasoning, most employment contracts only specify fully those conditions that can be easily monitored in an objective way (Malcomson, 1981). One of those easily monitored conditions is for instance the total amount of hours worked or the total days of vacation. Other conditions are usually vaguely described which gives room for shirking on the job. In order to reduce shirking firms are willing to pay a wage that is higher than the market clearing level and maybe higher than the wage he/she should receive in comparison with workers actual effort level.

Before hiring a worker, a firm faces another information difficulty. Firms seldom have perfect information about applicant's ability level because only applicants know their true level of ability. This indicates that applicants have private information (Riley, 2001). Firms try to reveal applicants true ability with signaling and screening (Katz, 1986). Applicants offering to work for less than the going wage place an upper bound on their ability level, raising the firms estimates that he is a lemon and optimally turn away those applicants (Yellen, 1984). By using such self selection devices firms can ease their adverse selection problem (Katz, 1986).

2.7 Efficiency Wage and Unemployment

This section describes the relationship between the efficiency wage theory and involuntary unemployment. The main idea behind this relation is that if it pays for one firm to raise wages it pays for al firms. In that case all firms pay the same wage above the market level. Since this increases the costs of hiring labor, demand will drop with more unemployment as a consequence. If wages are in equilibrium equal, unemployment act as a workers discipline device and cheat-treat for shirking. The higher the unemployment rate the greater the reserve army and the incentive for workers not to shirk, since the time it take to find another job acts as a shirking penalty. In case of involuntary unemployment there are, by definition, people that want to work for less than the going market wage. Unemployed workers cannot bid for jobs by offering to work at lower wages for firms know that it will lower total production. According to the model of Shapiro and Stiglitz a lower wage create incentives for workers to shirk on the job. By that, a worker has no credible way of promising not to shirk. Implying that an increase in wage raises not only labor costs but also revenues per unit of labor

(Linbeck and Snower, 1987). Firms will set their wages at the most profitable wage level and demand for labor may fall short of aggregate supply. This provides an explanation why the labor market does not clear and the existence of involuntary unemployment. Lindbeck and Snower define involuntary unemployment as "A state in which there are workers without jobs, even though it is possible to find a wage, less than prevailing wages, which would induce them to work, provided that these workers could be employed under identical conditions of work as the incumbent workers".

According to the model of Shapiro and Stiglitz (1984) the utility of an employed non shirker (Ven) must be higher than the utility of an employed shirker (Ves). Offering involuntary unemployed workers a job for less than the prevailing wages would lower Ven. To induce a worker not to shirk the No-Shirking condition must be fulfilled (Ven>Ves), offering less than the prevailing wage could create a situation that Ven is no longer higher than Ves and by that workers cannot credibly promise not to shirk.

The efficiency wage theory and the micro-economic foundations explain through firms' imperfect information about productivity and ability level of their employees at least a part of the involuntary unemployment. Yellen (1984) used in his article a rudimentary model based on the efficiency wage theory for explaining involuntary unemployment. In this model, the wage a firm optimally chooses minimizes labor cost per efficiency unit. Each firm should optimally hire labor up to the point where its marginal product is equal to the real wage. Firms will not hire workers that prefer to work for a wage that is lower than the marginal product for the reason that any reduction in wage would lower the productivity of all employees ready on the job (Yellen, 1984).

However, the efficiency wage theory does not predict that the largest parts of the involuntary unemployment people are those who were fired for shirking. If the cheat-threat works effectively little or no shirking and firing will occur. The group of people that are involuntary unemployed consists of workers who quit jobs for personal reasons, who are new entrants to the labor market or who have been laid off by firms with declines in demand (Shapiro-Stiglitz, 1984) and (Yellen, 1984).

According to the shirking version of the efficiency wage theory, involuntary unemployment is an import factor for creating incentives not to shirk. There are however, other factors that affect the rate of involuntary unemployment and by that the cheat penalty. New entrants to the labor market increase unemployment and by that the penalty of being fired. A higher penalty induces higher effort at any wage and firms will lower their wages and hire more workers as a result. Employment taxes are another factor that influences the unemployment rate. A

reduction in employment taxes lowers labor costs for firms and reduces unemployment. If the rate of unemployment lowers, the cheat-threat also lowers, what means that firms have to raise their wages (Pissarides, 1997). Furthermore the sum of unemployment benefit influences the unemployment rate as well. According to the model of Shapiro and Stiglitz described earlier in this thesis the total utility of working must be at least as high as the total utility of shirking. If the unemployment benefit is high the expected utility of an unemployed individual is high. Therefore the penalty of being fired is low and to induce a worker not to shirk a higher wage must be paid. This results in a higher rate of unemployment (Shapiro and Stiglitz, 1984). The result of higher unemployment benefit is actually a higher unemployment rate in this model.

Guell (2000) illustrates in his article that the use of permanent employment contracts also influences unemployment. The use of permanent contracts in especially the European labor market decreases the flexibility of the labor market and is characterized with high firing costs and long dismissal conflicts. Firing costs and dismissal conflicts can be modeled in the basic shirking model of Shapiro and Stiglitz. Guell expands the model to some extend with the variable dC, where C is the severance payment and d is the probability that the court declares that the firing is unfair and, thus, the firm has to pay the severance payment. By this the utility of a non-shirker does not change. The utility of a shirker, however, does change with the factor q(Vu + dC). This means that the cost of shirking lowers because with probability d the shirker may be compensated with a severance payment. The reduced cost of shirking lowers the penalty which implies that firms must pay higher wages in order to give workers an incentive not to shirk. This means that the use of permanent contract by means of firing costs and severance payments reduce employment.

3 Testing the trade-off between Wages and Supervision, a literature study

This chapter provides an overview of the various studies that are dedicated to testing the shirking model of the efficiency wage theory. The shirking model leads to the prediction that wages should be low where monitoring possibilities are high. This implies that wages can be substituted for monitoring activities and that there exist a tradeoff between supervision and wages.

Firms look at employees as rational cheaters and respond to this by implementing monitoring or incentive pay to make shirking unprofitable (Nagin et all, 2002). The fundamental feature of the shirking model is the claim that higher wages induce employees not to shirk (Rebitzer, 1995) and that high wages are carrots that a firm use to persuade employees to elicit

productivity enhancing behavior (Shapiro and Stiglitz, 1984). Rebitzer (1995) suggest in his article the logical question to test empirically the shirking model: Does the setting of high wages influence the productivity (or quality) enhancing behaviors of employees? In the same article Rebitzer argues that the empirical investigations of above question are hard to implement. The major difficulty is separating the efficiency wage effect from the positive association between productivity and wages predicted by convention models (Rebitzer, 1995). Various literature offers an alternative for testing the effect of wage premiums on workers behavior (Cappeli and Chauvin, 1991; Rebitzer, 1995; Ewing and Payne, 1996). Instead of a direct test of the shirking model they offer an indirect test by testing the relationship between wages and supervision. If high wages elicit productivity enhancing behavior than high wage firms should spend fewer resources to supervision or other controlling activities (Rebitzer, 1995). Or as Leonard (1987) put it, the higher the wage premium, the lesser the resources spend on supervision. This means that equally skilled workers in the same occupation in different firms can earn a different wage due to the supervisory intensity. Firms that employ more supervisors per worker will offer lower wage premiums (Leonard, 1987; Krueger and Summers, 1988). Using the indirect method to test the tradeoff between wages and supervision is nearly as difficult as using the direct method. The measurement of monitoring intensity is much debated in previous literature. Until now there is no agreement among researchers which measurement to use. Many variables are used in past studies, some with better results than others, nevertheless the perfect measurement for supervision has not yet been found. One of the variables that past studies frequently used to measure supervisory intensity is the ratio of supervisors to supervised (Leonard, 1987). The results of this variable are ambiguous, Leonard (1987) found in his research among 200 high-technology firms no significant effects, Fitzroy and Kraft (1988) found similar results as Leonard by testing a sample of German metalworkers. Groshen and Krueger (1990) examined wages of nurses with the help of a supervisor-to staff-ratio and found supporting evidence for the efficiency wage theory. In their research the wages of nurses were negatively related to the extent of supervision. Another article that used the supervisor to staff ratio as a proxy for supervision is the study of Georgiadis (2006). He found supporting evidence for efficiency wages and the existence of a trade-off. Georgiadis tested the trade-off for three different skill categories (unskilled, semi-skilled and skilled) and found regarding the category unskilled evidence for a significant trade-off between wages and supervision. For the categories semi-skilled and skilled he found a negative, but insignificant, relationship between wages and supervision.

The supervisor to supervised ratio make no difference between supervisors whose only job is to supervise other employees and supervisors whose jobs partly consist of supervisory tasks and partly consist of production work (Rebitzer, 1995). This can be an explanation for the ambiguous results. To the solve this problem Kruse (1992) addressed in his study monitoring trough an employee reported measure of how often the supervisor checks upon her/his work. Kruse constructed for this study a supervision variable that measured the number of times per week a supervisor checks upon employees work. He found some supporting evidence; the times checked upon work bear a negative relationship to wages, although insignificant.

Instead of using a span of control measurement other researchers try to find direct measures of supervision. Identifying supervisory activities inside a firm asks for knowhow about the construction process and goals of the management of individual firms. This could be an explanation for the various different variables that are used and tried in past research. A variable that could prove to be a good proxy for supervision in one industry could be useless for a study in another industry.

A frequently used variable is the firm size of a firm or organization. Firm size measures the amount of employees in one firm, plant or location. Previous literature found a strong and positive relationship between wages and firm size (Leonard, 1987; Brown and Medoff, 1985; Krueger and Summers, 1987). Supervision of employees become more difficult in larger companies and plants, therefore wages must be higher to induce workers not to shirk (Ewing and Payne, 1991). Next to the supervising difficulties in larger firms, Brown and Medoff (1989) offer five other explanations for the positive relationship between employer size and wages in the article The Employer Size-Wage effect.

Krueger (1991) offers in his research another test of the efficiency wage model by testing the difference in compensation between company-owned and franchisee-owned fast food restaurants. The reasons for testing differences in compensations between above two is the notion that contractual arrangements give mangers of company-owned outlets less off an incentive to monitor and supervise employees. In his article Krueger stated that an owner-manager of a franchise has a stronger incentive to expend effort supervising and monitoring his workers than a manager of a company-owned outlet. This because the owner-manager receives the residual profits and so prefers lower wages. He found that employees of company-owned outlets earn higher wages than employees of franchised outlets.

Capelli and Chauvin (1991) studied in their article the relationship between the rates of employee discipline and wage premiums. As a measurement for shirking the authors used the rate at which workers were dismissed at each plant for disciplinary reasons. Using a plant-

level data set from a large manufacturing company the authors argue that they addressed many problems that earlier studies could not resolve. This is mainly caused by the following characteristics of the data: all plants are covered by the same union and are covered by the same labor agreements which standardizes all terms and conditions of employment, all data are for virtually identical jobs and wages in each plant are not set by productivity but they are set centrally at management level. The result of their study suggests that wage premiums are related with lower levels of disciplinary problems.

Arai (1994) used in his study two indicators as a proxy for supervision. Whether or not workers use a punch card at their job and whether or not workers have a flexible working time. The results of this research are rather ambiguous; for some sectors Aria found supporting evidence for the efficiency wage theory though for others sectors he found opposing effects.

The numerous earlier attempts to test the wage-supervision tradeoff are all hindered by the same problems, endogeneity arising from simultaneity, omitted variables and measurement errors (Groshen and Krueger, 1990; Rebitzer, 1995; Georgiadis 2008). Simultaneity arises because wages and supervision intensity are motivation devices which are set optimally and simultaneously to minimize costs per efficiency unit of labor (Goergiadis, 2001). Rebitzer (1995) argues in his article that unobserved features of human resource policies will be correlated with supervision and wages as well. The measurement errors are already discussed in this thesis; most studies only use supervisor to supervised ratio as a measurement for supervisory intensity. In the trade-off test that follows in this thesis, a data set is used that limits above problems to the minimum. Because of the collective labor agreement and the nature of the temporary labor market, above problems are expected to be less of a problem compared to other studies.

4 The temporary labor market and the efficiency wage theory
4.1 Introduction to the temporary labor market

In this section I provide a description of the temporary labor market in Europe and the Netherlands in particular in order to present some background information before formulating my hypothesis and model.

The temporary labor market in the European Union has increased rapidly since 2000 and the last five years in particular. User companies use temporary labor more and more for reasons of competitiveness, it allows them to respond to changing customer demand and to stay

flexible. Whereas the more traditional reason for the use of temporary labor is mainly replacing absent employees. The growth in use of temporary labor is driven by supply side factors as well as demand side factors. On the supply side, one of the most important factors is the growth in the labor force participation of people that need, or prefer, temporary work such as women and students. At the demand side, temporary labor enables firms to make easy correction in their workforce in order to react at changing customer demand and allows them to focus at their core business.

 According to a Dutch research (Instroomonderzoek feiten en cijfers over de uitzendkrachten, 2009) the flexibility rate in the Netherlands, the percentage of flexible workers, has risen from 3.3% in 1998 to 4.04% in 2008. The same research predicts a steady growth of the use of flexible labor until 2015. Those numbers demonstrate the importance of the temporary labor market in the Netherlands. In Europe, the temporary labor market accounts on average for 1.8% of the European total employment with more than 3.3 million temporary agency workers (daily full-time equivalent) in 2006 (Eurociett, 2007). In terms of job creation the temporary labor market was responsible for 7.5% of total job creation between 2003 and 2006 (Eurociett, 2007). Most of these jobs are additional and therefore do not substitute permanent employment. Surveys among European organizations indicate that substitutions risks are relatively low since the alternative of hiring temporary workers is resolving it internally by working overtime or with other mechanisms that increase pressure on permanent workers. By creating additional employment, the temporary labor market reduces unemployment and offer groups such as students, young mothers and unemployed people access to the labor market. Next to creating additional jobs, another key activity provided by temporary agencies is a wide range of human resource related services such as outplacement, training or HR-related administration. Temporary labor agencies try to become a business partner for firms by offering various human resource related services in order to create a stronger business relation. By focusing on HR tasks the industry helps to make the labor market more efficient and flexible and allowing companies to refocus on their core business.

Although every country in the European Union has a temporary labor force, the importance's of this sector as a share of the GDP and the regulation by law or collective bargaining vary from one country to another. Especially in the larger economies as France, Germany, Italy and the Netherlands temporary labor agencies employs large numbers of workers. The 6 largest European markets jointly accounted for 85% of the agency work market in the EU in 2006 (Arrowsmith, 2008).

4.2 Regulations, barriers and collective bargaining

Countries with a more developed temporary labor sector usually have strong regulation enforced by law or collective bargaining. This to prevent illegal activities as tax evasion, safety issues and social dumping[4]. Although there are some very good reasons to regulate the temporary labor market, lifting some groundless regulations and barriers could possibly create more room for growth for temporary agency work and the total contribution to the European economy. The industry is hampered by four main factors (More Work Opportunities for more People, 2007): unjustified regulatory restrictions, discriminatory measures, strong misperceptions and a limited cultural acceptance.

Some countries have sectoral bans (construction sector in Germany and Spain) or rules about the maximum length of assignment. In other countries there exists still a strong misperception about the industry's added value and a very low acceptance of temporary agency work. Mainly because of prejudices about the level of work and job satisfaction for temporary workers, countries and companies are reluctant to enhance temporary work.

 In order to remove the restrictions and misperceptions most countries have trade associations for temporary labor agencies or employers organizations that participate in collective bargaining and developing law. In the Netherlands there are two temporary agency employer associations that perform collective bargaining, the Algemene Bond Uitzendondernemingen (ABU) and the Nederlandse Bond voor Bemiddelings- en Uitzendondernemingen (NBBU). The ABU is by far the largest association and is since 2009 obliged for all temporary labor agencies, only agencies that already followed the NBBU before 2009 are free to choose between the ABU and the NBBU. By now, the ABU covers 90% of all temporary agency workers. The collective labor agreement that is bargained by the ABU describes into detail all the rules and guidelines temporary labor agencies have to follow in dealing with their employees and clients. The main goal of this collective labor agreement is to give temporary workers more stability and at least a payment and fringe benefits that are in congruence with the minimal guidelines of the CLA. Besides benefits for workers the CLA offers more flexibility to employers by extending the period workers can be hired at a flexible contract. The CLA offers flexibility and stability by focusing at the following topics: minimum wage; minimal fringe benefits (illness, holiday compensation, schooling money, etc) and a scheme for accumulation of employment rights. Temporary labor agencies are supervised by the

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[4] In terms of wage rates and employee benefits.

Stichting Naleving CAO voor Uitzendkrachten (SNCU) and in case of abuse the SNCU can administer penalties or other corrective mechanisms.

4.3 Role of temporary work agencies

Temporary agencies key activities are the organized supply of temporary workers and human resource related services. The largest temporary work agencies such as Manpower, Randstand and Addeco are true multinationals. Counting all the workers of Manpower it is often stated that Manpower is the largest employer of the world (Purcell et all, 2004)). Why would a company choose to make use of a temporary labor agency? By making use of temporary workers a company creates flexibility, cost savings, access to job specific skills and HR-related services. Because of the need to adapt their workforce to changes in the competitive environment they need a flexible workforce and in order to stay focused on their core business they use HR-related services. Temporary work agencies can help companies to keep a flexible and lean workforce in two ways. Due to the large pool of flexible workers temporary work agencies can draw on it is possibility to respond quick to changes in staff requirements (numbers) or they can quickly search for a scarce skills worker with the right profile and background (quality).

For every vacant position in a firm, employers can choose to hire labor externally (by means of a temporary labor agency) or internally using their own employees or selection process for new applicants. There are roughly two types of jobs that are appropriate for temporary labor agencies. The first are jobs where unique skills are needed for a relatively short period. The second types of jobs are jobs that do not need very must training or firm-specific knowledge. Both types requires different workers, the first are usually experts supplied by very specialist agencies that have a great knowledge of the sector. The second types are most of the time low-skilled workers supplied by agencies that have a broad client spectrum. In the latter case, price and flexibility are the key attributes sought by a client whereas in the first case quality is the most important factor.

In the Netherlands there are many temporary labor agencies that hire mainly semi to low-skilled workers. Those agencies all focus on jobs that do not need very specific knowledge and consequently they must compete on price and flexibility.

There is a tendency that more and more temporary labor agencies hire students instead of low-skilled workers to fulfill temporary jobs at their clients. Students have a lot of advantages over low-skilled workers; they are well educated, motivated and relatively cheap. In addition to

that, it takes less time to explain the job characteristics to a student than to a low skilled worker which make a student faster a productive employee. Since students are preparing themselves for another career they have a short time horizon which mean less accumulation of employment rights and less employer risks what make them even more attractive as an employee. Therefore students are in a strong position what results in the deterioration of the labor market position of lower educated workers. Temporary work agencies that are aware of this tendency do not only hire students because of the competitive advantage students' offer over low-skilled workers but also for the low risks they offer.

Approximately half of all Dutch students have a part-time job. Almost all of those part-time jobs are considered as low-skilled work (cbs.nl). This indicates the huge opportunities students offer as a workforce for temporary agency work. According to the ABU almost 47% of Dutch students are employees of a temporary labor agency and 57% of those students are following a higher education. Taking in account that most students are employed in low-skilled work means that the majority of them are highly over educated for their daily work tasks. The relatively low costs, the high education level and the low risks make students the ideal temporary workforce.

5   Data Analyses

5.1 Discussing the dataset

As stated before, testing the tradeoff between wages and supervision is a troublesome task. Finding a good proxy for supervisory intensity proved to be hard given the results of earlier studies. Next to that, there are some other factors that can influence the results of an efficiency wage study. Capelli and Chauvin (1991 mentioned in their study three different factors that can plague econometric tests of the shirking model: Exogenous factors that influence workers productivity, management's personnel policies on shirking and discipline issues and firms wage setting policies. This data set has the potential to overcome most of those problems. Many exogenous factors that can influence workers productivity are standardized by means of the collective labor agreement. Fringe benefits, employment rights and many other factors are regulated true the ABU collective labor agreement. This implies that al temporary workers have more or less the same secondary benefits. All data are for higher educated students of the age of 18 and 20. This means that the differences in ability can be neglected. Most assignments that are fulfilled by students are low-skilled jobs, which indicate that the characteristics of the needed workers do not much differ. Therefore,

exogenous factors that influence productivity are limited in this dataset. With regards to the second issue; management policies on shirking and discipline issues, this dataset has the potential to overcome those problems as well. Although contract workers perform their assignment at a host employer, the temporary labor agency is responsible for supervising their personnel. Shirking issues are solved by the temporary labor agency and by that cannot differ much between different agencies since all agencies are obliged to obey at least the rules of the collective labor agreement. Every worker has the same employment rights and in case of firing, the collective labor agreement offers the terms and correct reasons that can justify firing a worker. This means that each worker should be treated in more or less the same way in case he/she is caught shirking. The last issue, wage setting policies cannot be solved with this dataset. The collective labor agreement offers a minimum wage level which is depended of workers age, however most agencies pay a wage that is higher than the minimum wage level. Wage setting policies vary between temporary labor agencies. Some could have very clear labor policies and make their wage depended on the age of the worker, other agencies can pay a wage that is depended on the kind of assignment a worker should perform. Therefore, according to Cappeli and Chauvin, this study could be hindered by the different wage setting policies of the temporary labor agencies that are incorporated in this research.

5.2 Hypothesis testing

This thesis propose an empirical test of the shirking model by testing the tradeoff between supervision and wages with a data set taken from the Dutch temporary labor agencies that follow the "ABU CAO voor uitzendkrachten". Only agencies that employ students are taken into account in this data set. In total, there are 55 temporary labor agencies that fulfill above requirements. Those agencies all received a questionnaire and a guidance letter by means of an email which can be found in appendix 1 and 2. The used questionnaire is created in collaboration with managers of temporary labor agencies and the ABU and is only used for the purpose of this thesis. By that, various means of supervision that are most commonly used in the temporary labor sector could be specified. After several contact moments with the selected agencies, 32 agencies answered the questionnaire fully, which is approximately 60% of the total population in the Netherlands. The respondents answered questions about supervisory intensity and wage levels of employees. The wage levels are specified into four different categories, a distinction is made between age and education level, as the minimum wage level depends on the age of the employee and a higher education level could be an

explanation for a higher wage. The age categories are divided into two categories, one for 18 year old employees and one for 20 year old employees. Each wage category has a different minimum wage level; the minimum wage level for an 18 year old employee should be at least 45.5% of the minimal wage and a 20 year old should earn at least 61.5% of the minimal wage. This means that an 18 year old must earn 3.74 euro per hour and a 20 year old 5.31 euro per hour according to the collective labor agreement. The education levels are split into two categories as well; one category for HBO students and one for WO students. This means that the used wage level categories are: HBO18, HBO20, WO18 and WO20.

The characteristics of the used data set deliver opportunities to overcome many problems that earlier studies with different data sets frustrated. By selecting only temporary labor agencies that follow the rules and guidelines of the ABU collective labor agreement I made sure that all temporary labor agencies have at least the same minimum wage policies and secondary benefits. The employment rights of workers covered in this data set are exactly the same and workers capacities do not differ much since all workers are still students. One last remark that can be made about the characteristics of the data set is the notion that hiring standards are more or less the same for all agencies that are taking into account. Most temporary labor agencies that employ students follow roughly the same policies when it comes to hiring new employees. As explained before, most students are overeducated for their daily work tasks. This means that most of the time one or two short selection interviews are sufficient to hire a new employee.

By my notion this is the first study that tests the wage-supervision tradeoff in such a controlled and narrow environment. As a result of this controlled environment, several comments about the advantages of this data set can be made. Payments above the minimum CLA wage can be seen as a wage premium that increases the shirking penalty. The minimum wage for a twenty year old student is 5.31 euro per hour. All payments above 5.31 are according to the efficiency wage theory incentives to work rather than shirk. Since all workers are still higher educated students their abilities are not much different, therefore wage differentials cannot, or at least only for a small account, be explained by differences in capabilities. Moreover, most students are overqualified for their jobs what makes their abilities less relevant.

This indicates that at least some of the differences in student wages should be explained by the efficiency wage theory. I expect, in line with the efficiency wage theory, a negative relation between wages and supervision. This should mean that high paying temporary labor agencies spend less time at supervision activities. Temporary labor agencies that occur

problems supervising there contract workers could overcome those problems by paying a wage premium. This leads to the following hypotheses and corresponding questions in the used questionnaire:

Hypothesis 1: There is a negative relationship between wages and supervision.

As explained before, instead of testing the tradeoff between wages and productivity this thesis follows most empirical literature by using an indirect test for measuring the tradeoff by testing the tradeoff between supervision and wages.

Finding good proxies for supervisory intensity is troublesome. The characteristics of the temporary labor market are not helpful in this case. Supervising a temporary contract worker is not the first object a host firm wants to spend his monitoring resources at and if he chooses to supervise his contract employee it would not be very carefully. Therefore, any supervisory actions of the host employer are excluded from this research and I assume that the ultimate boss of the contract worker, the temporary labor agency, is responsible for all the monitoring activities. Temporary labor agencies have the possibility to hire and fire contract workers what make them responsible for supervision. Nevertheless, monitoring contract workers is a difficult task for temporary labor agencies. Workers are located at various host firms, which makes supervising a time consuming and impractical activity. In a typical temporary labor agency, there is one location manager, several account managers and various sales & recruitment personnel. The location manager is normally responsible for all business activities at a particular location, the account managers are responsible for a group of clients and by that responsible for all contract workers that have an assignment at one of those clients; the sales & recruitment personnel are in charge of searching for good contract workers and matching them with assignments at host locations. Most supervising activities are likely to come from account managers as account managers will be responsible when a client is discontent with the performance of a contract worker.

 In this research I use several independent variables to measure supervisory intensity. Some variables are based on earlier research and one of the variables is as far as I know not used before as a proxy for supervisory intensity. Each variable used in this study will be discussed separately. Next to discussing the separate variables, the corresponding questions in the questionnaire will be discussed as well.

Independent Variable 1: Times checked upon work.

This variable is first used by Kruse (1992). In his research, Kruse used the times that employees are checked upon work by their supervisor/boss as a measurement for supervisory intensity. Creating a variable based on the number of times an employee is checked per week with a dummy variable if the employee answered constantly, Kruse found evidence for the efficiency wage theory and the existence of a trade-off between wage and supervision. The more times a supervisor checks upon an employee the higher the chance of getting caught shirking. Firms with a high check rate pay a lower wage than firms with a lower check rate. In this particular setting, employees can be checked upon work by two different authorities. The host firm can check their temporary employee and the temporary labor agency can check their contract worker as well. For this research, only the times checked upon work by the temporary labor office are measured. In the temporary labor industry it is common use for account managers to visits contract workers at host locations to check whether the contract workers perform as arranged. Therefore, the amounts of visits to a contract worker at a host location are used in this research as indicator for the times an employee is checked upon work. In line with the efficiency wage theory the wage should be lower, the more often an employee is checked upon work. This variable will be represented as visits in the regression model.

For this study another variable is used that is also in line with the research of Kruse. Instead of measuring the amount of visits to an employee at a host location this variable measures the hours spend on controlling activities by an account manager. Controlling hours are directly related to supervision activities and I expect to find a negative relationship between wages and controlling hours. The differences between visits and controlling hours are straight forward. Controlling hours measures all the hours an account manager spends on monitoring and controlling activities, this includes visits to host location but also email and phone calls to host employers, whereas the variable visits only measure the actual visits to a host location. To gather the necessary data to test whether times checked upon work influences the wage level, two different questions are asked in the questionnaire; how many times per month visits a responsible account manager an employee at his/her work? And how many hours a week spend an account manager at controlling activities; phone calls to employers, visits to host locations etc.?

Hypothesis 1a: There is a negative relationship between wages and times checked upon work

Hypothesis 1b: There is a negative relationship between wages and controlling hours

Independent Variable 2: Supervisor to supervised ratio.

Leonard (1987) examined the wage-supervision tradeoff using a supervisor to supervised ratio as a measurement for supervision. In his research, Leonard found no significant evidence in favor for this tradeoff. Research (Groshen and Krueger, 1990 and Georgiadis, 1996) based on the variable constructed by Leonard found on the other hand positive evidence for a wage supervision tradeoff. The reason for adding this measurement for supervision is the straight forward relation between the supervisor to supervised ratio and monitoring possibilities. More workers with supervisory tasks will create more and better possibilities to monitor workers with production related tasks. In most of the earlier studies, the ratio is constructed by counting the amount of employees with supervisory tasks and the amount of employees with only production related tasks (Leonard, 1987). In this study the ratio is constructed by counting the amount of employees for which one account manager is responsible. I expect to find a negative relationship between the amount of account managers and wages.

In order to test the influence of the supervisor to supervised ratio the variable AMresponsible is constructed. The question corresponding with this variable is: For how many employees is one account manager responsible? With the answers to this question I construct a variable that measures the total group of employees for which one account manager is responsible.

Hypothesis 1c: There is a negative relationship between the supervising to supervised ratio and wages.

Independent Variable 3: Duration of assignment

In this research I construct a new variable for supervisory intensity since all other variables used in previous studies proved to be doubtful. Next to that, supervision activities are highly depended on the characteristic of a specific industry. There are two reasons for adding this variable. First, in the temporary labor market one way of supervising personnel is by means of feedback of a host employer. Usually, after finishing an assignment a host employer fills in an evaluation form and by that gives feedback about employee's achievements. Instead by means of an official evaluation form such feedback can also be provided during a short phone call or email. A short duration of an assignment (assignments of one day are very common in the temporary labor sector) implicates direct feedback of the host employer to the temporary labor

agency. In case an assignment ends at the end of the first day[5] a host employer can directly comment on the quality of the host employees and the temporary labor agency can use this feedback directly. Employees know that they are judged based on the work they delivered that specific day and that therefore the chance of getting caught shirking is high. Monitoring possibilities are in such case high and, according to the efficiency wage theory, wages should be relatively low. The second reason for adding this variable is the influence of shirking on the total satisfaction level of an assignment. The longer the assignment, the smaller the chance of getting caught shirking. Since workers are judged on the basis of several weeks or months of work and not on the total output of one day. An hour of shirking shall most likely not influence the final result of a long assignment and by that go unnoticed, whereas an hour of shirking at a one day assignment has a great influence on the total outcome of an assignment and therefore has an impact on the feedback of an employer. Supervision possibilities by means of feedback of a host employer will drop as the duration as of an assignment becomes longer.

Therefore, I expect that the wage premium increases along with time horizon of the assignment. The corresponding question with this variable is: What is the average duration of an assignment? The variable duration is measured in weeks; therefore a one day assignment will be scored with 0.2 and an assignment of one week with 1.

Hypothesis 1d: There is a positive relationship between the duration of an assignment and wages.

Independent variable 4: Ownership

In line with the research of Krueger (1991), this thesis tests the influence of ownership at the wage supervision tradeoff. According to the research of Krueger there should be a difference between a company with a director that is also the owner and a company that has a director that is not the owner. Krueger found evidence for a negative relation between ownership and wages. This means that companies with a director who is also owner of the company pay lower wages. Since an owner is entitled to the residual profit he/she has more reasons to monitor employees than a manager as wages can be lower when monitoring intensity is higher. Therefore, I expect to find a negative relation between ownership and wages in this research.

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[5] Common in Horeca or promotion work

To test if it makes a difference whether the director is only director or also the owner of the firm on wages the dummy variable ownership will be constructed. The dummy variable equals 1 if the director is also the owner and 0 if the director and the owner are two different persons.

Hypothesis 1e: There is a negative relationship between ownership and wages**.**

Independent variable 5: Firm Size

Various authors (Kruse, 1992; Leonard, 1987; Brown and Medoff, 1985; Krueger and Summers, 1987) found a positive effect of firm size on supervision. Supervision of employees becomes more difficult in larger companies and plants, therefore wages must be higher to induce workers not to shirk. In this study I use firm size measured by the numbers of employees as proxy for supervisory intensity and expect to find a positive relation between wages and firm size. This variable is represented by firm size in the regression model.

Hypothesis 1f: There is a positive relationship between firm size and wages.

Independent variable 6: Incentive pay

Lazear (2000) described in his article the influence of incentive pay on performance. Average output and ability should rise when a firm decided to use incentive pay. In this research I use the payment of bonuses as a variable for incentive pay. If a worker is somehow entitled to a bonus, productivity will rise according to the research of Lazear and firms can spend fewer resources on monitoring costs. In line with the efficiency wage theory there should be a negative effect between incentive pay and wages. In the model this variable is called incentive pay. In order to make a proxy for this variable I asked the following question: Do employees receive some sort of performance pay. With the help of a dummy this variable is constructed, the dummy equals 1 if there is some sort of performance pay and 0 if there is no performance pay.

 Hypothesis 1g: There is a negative relationship between incentive pay and wages.

Controlling variables

A students wage can be influenced by many factors; most importantly it can be influenced by age and education level. The minimum wage level is influenced by the age of the worker and

a higher education level often means a higher wage. In order to control for this observations, four different wage categories, HBO18, HBO20, WO18 and WO20, are used.

Another factor that can influence the wage level is tenure. In case an agency makes use of seniority wages, the wage level of an employee can rise without any clear reason other than the tenure of a worker. I expect to find a positive relation between tenure and wages. By asking for the average tenure in weeks of a student the variable tenure is constructed. This variables measures the amount of weeks a student is under contract at the same temporary labor agency

Hypothesis 1h: There is a positive relationship between tenure and wages.

Furthermore, whether a temporary labor agency is part of a concern can influences the wage level as well. Usually, concerns with more locations make use of standardized wage policies. Whereas a smaller stand alone temporary agency can easier make an exception and pay a higher wage in case there is a reason for (special assignment at a host location, a very good employee, etc.). My assumption is that temporary agencies that are part of a bigger concern pay a lower wage in comparison with stand alone agencies. The following question is asked in order to construct this variable: Does your temporary labor agency belong to a concern? This control variable equals 1 if the temporary labor agency is not part of a concern and equals 0 if it is a concern.

Hypothesis 1i: Stand alone agencies pay a higher wage in comparison with agencies that are part of a concern.

The last controlling variable that will be used in this model is the variable sector and is used as an indicator for in which sector a temporary worker is employed. This variable is based on the question: If you offer functions to temporary workers in different sectors, which sector has the highest pay level? Respondents that have functions in only one sector answered this question with no, other respondents could choose from the following sectors: Production & call center; promotion & catering and finance & administration.

The reason for adding this control variable is the expectation that the wage level could be influenced by the sector in which a temporary worker performs his or hers assignment. My assumption is that assignments in the production sector pay less than assignments in the finance & administration sector. Promotion and catering function are expected to pay an

average wage. The reasons for these assumptions are partly based on observations from the temporary labor market and partly based on the efficiency wage theory. Finance functions are less controllable for supervisors as total output can vary due to complicated finance issues. Production and promotion function are much easier controllable since output level will vary less, or if there is a variation the reasons for that variation are typically more obvious. In that way, supervising is an easier task for production or promotion functions. According to the shirking version of the efficiency wage theory wages should be higher when supervision of employees is difficult and so wages should be higher in the finance & administrative sector. In order to incorporate this variable into the model the dummy variables dummy_promotion, dummy_production and dummy_finance are created.

As dependent variable this thesis uses the hourly wage paid to a student with at least a higher education background working for a temporary labor agency that follows the ABU-CAO. This dependent variable is constructed by asking for the wage per hour for two different education levels and for two different ages. The wage is the total wage per hour exclusive of any sort of bonus payments or other forms of extra wage.

Before starting with the analysis, one remarkable observation can be made. The averages wage paid to student employees is much higher than the minimum wage level that temporary labor agencies are required to pay (HBO 18 years: 7.85; HBO 20 years: 8.90; WO 18 years: 8.15 and WO 20 years 9.09). Taking in account that the minimum wage for an 18 year old employee amounts 3.74 per hour and the minimum wage for a 20 year old 5.31 you can conclude that a 20 year old earns on average 78% more wage than strictly necessary and an 18 year old employee earns more than twice the strictly necessary wage. Why do temporary labor agencies choose to pay wages that are much higher than they have to pay according to the minimum? Clearly, there must be some reason why firms are happy to pay their employees more than twice the wage they should pay according to the collective labor agreement. Possibly the efficiency wage theory can offer an explanation for this fact.

Another remark must be made about the supervisor to supervised ratio in this model; the results of the questionnaire vary enormously. Some account managers are responsible for all employees; others are responsible for none of the employees. My assumption is that this difference is only partly caused by differences in supervision activities, the larger part could be explained by deviations in function profiles between temporary labor agencies. The responsibilities of account managers and other employees can vary between firms; it is likely to assume that one firm uses an account manager as the responsible person whereas other

firms use the division leader or director as responsible person. For this reason, this variable appears to be unreliable and is excluded from this study.

Above variables incorporated in a model results in the following regression formula:

$$\text{wage} = \alpha + \beta\text{duration} + \beta\text{ownership} + \beta\text{firmsize} + \beta\text{performancepay} + \beta\text{visits}$$
$$+ \beta\text{concern} + \beta\text{servicetime} + \beta\text{Dummy}_{\text{promotion}} + \beta\text{Dummy}_{\text{production}}$$
$$+ \beta\text{Dummy}_{\text{finance}} + \in i$$

In the following section a table with descriptive statistics of all used variables will be discussed. This to create a basic insight in the mean, minimum and maximum of the different variables. In the following table the statistics can be found.

5.3 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Firm size	31	1,00	2500,00	337,0323	568,69661
Tenure	31	5,00	104,00	40,3226	28,12992
Duration	31	,20	52,00	11,1484	13,47590
Incentive pay	31	,00	1,00	,4516	,50588
control_hours	31	,00	30,00	13,0323	7,52101
Visits	30	,00	4,00	,9253	,80986
Concern	31	,00	1,00	,2581	,44480
Owner	31	,00	1,00	,2903	,46141
Average_wage	31	4,60	12,50	8,8592	1,56845
dummy_Production	31	,00	1,00	,0645	,24973
Dummy_promotion	31	,00	1,00	,1290	,34078
Dummy_Finance	31	,00	1,00	,6452	,48637
HBO18	31	3,91	12,00	8,2526	1,67604
HBO20	31	5,29	12,00	9,1381	1,48899
wo18	31	3,91	13,00	8,5377	1,77345
wo20	31	5,29	13,00	9,5084	1,58614
Valid N (listwise)	30				

Table 1 descriptive statistics

According to the statistics in above table, several remarks can be made. The amount of employees a temporary labor agency employs, represented by firm size, varies from 1 to 2.500. The agency that employs only one student can be a beginning firm that just started business or a firm that focuses on high school students and by that sometimes hire an older student. The firm that employs 2.500 students must be one of the largest temporary labor agencies in the Netherlands with several locations in different cities. With an average amount of 337 employees and 31 respondents, 10.447 temporary workers are represented in this research. As can be checked, those workers work on average 40 weeks for the same temporary labor agency, what at first sight seems to be a long period. Due to the fact that most temporary agencies keep their employees after finishing their assignment at a host employer in their labor force for a certain period of time even if there is no job for them for whatever reason can be an explanation for the relatively long period of service. Looking at the wage variables, some remarkable facts can be noted. The maximum wage of an HBO student is one euro lower than the wage paid to a WO student. Although firms are obliged to pay an older worker more wage than a younger worker, age makes no differences in this dataset. This leads to the assumption that the level of education is more important than age for temporary labor agencies. Next to that, the differences between the lowest wage level (still .20 euro cent higher than the minimum wage) and the highest wage level is notable high. In most cases, the high paying firm pays almost three times the wage of a low paying firm.

There can be several reasons for these differences; as discussed before, firms pay more wages to students that have a job in an administrative function. The dummy variable finance has a mean of 0.64. This means that 64% of the temporary labor agencies answered that jobs in the finance & administration sector have the highest paying level which is in line with my initial assumptions. This can be due to higher turnover costs, less supervision options, the difficulty level of the job or other factors. With this model I try to explain at least part of those wage differentials with the shirking version of the efficiency wage theory. What is clear from this statistics: it pays for a student to search for a job with a high wage level.

Looking at the variable controle_hours, I can conclude that on average an account manager spends 13 hours per week on supervising tasks. This variable can be biased by the fact that supervising tasks in some firms are only executed by account managers where in other firms other employees are as well responsible for supervising. This can explain the respondent that claims to spend zero hours at supervision per week. On the other hand, it can just as well be the case that this firm has other supervising mechanisms. The variable duration measures the average time in weeks that a worker is employed at the same host location and working at the

same assignment. This varies from one day to one year with an average of almost eleven weeks. This variation can be explained by the different jobs temporary labor agencies offer. Most jobs in catering are only for the duration of one day where as administrative jobs have often a much longer time horizon. The amount of visits on the job is measured with the variable visits. This varies from zero to four each month with an average of almost one. Clearly, some firms do not visit their employers at their host employer and some firms visit host locations almost every week. The reasons why a temporary labor agency decides to visits a host's location can be infinite. It can be for commercial reasons, for supervising reasons or for other less obvious reasons. Occasionally, a host employer can forbid the temporary labor agency to visit the host location. In that case the amounts of visits cannot be determined by the temporary labor agency. Some last remarks can be made about the use of incentive pays. According to the variable incentive pay almost 42% of the respondents use some sort of incentive pay. Whether this variable influences by the wage level will be examined later.

5.4 Correlation analysis

In order to get an idea of the linear relationship between two variables a correlation analysis is conducted. This analysis provides a measure for the relative strength of the linear relationship between two variables and can vary between -1 and 1. When the measure is equal to -1 there exists a perfect negative relationship between two variables, in case the measure is equal to 1 there is a perfect positive relationship between two variables and when it is equal to 0, there is no correlation. The stronger the relationship between two variables, positive or negative, the more the two variables moves together in the same or opposite direction.

The correlation matrix can be found on the following page in table 2 and will be discussed below.

This correlation analyses provide some useful insights in the relationship between two variables, some relationships are straightforward others are less obvious and expected. Looking at the correlation between wage and the three variables (duration, visits and control_hours) that measure in a direct way supervision activities, several remarks can be made. A positive relation is found between average wage and duration. When the duration of an assignment become longer, the average wage rises as well. This positive relation is in line with the initial hypothesis about the relationship between wages and duration of an assignment. On the contrary, the positive correlation between average wage and visits is against initial assumptions. Visits and wage move in the same direction, indicating that more visits imply a higher average wage for a contract worker. If the amount of visits is an

indicator for supervision than, in line with the efficiency wage theory, a negative relation is expected. The correlation between average wage and control_hours is neutral.

The correlation between incentive pay and average wage is another interesting observation. According to this correlation table, incentive pay does not directly mean a lower wage. One would expect that the payment of some sort of incentive pay would be corrected with a lower wage. Although small, there is a positive correlation between wages and incentive pay which indicates that there is no correction of wages in case of incentive pay.

The correlations between average wage and the dummy variables used in this research as indicator for the sector in which the contract workers perform their assignments are used as a control measurement. I assume that independent of age, education level and supervisory intensity; the wage level is influenced by the sector in which a worker performs his/her assignment. Looking at the correlation between wage and the dummy variable promotion one see a strong, negative correlation. Moreover, the correlation between dummy_promotion and incentive pay is negative as well. This indicates that workers in the promotion branch have a lower wage and less often right at some sort of incentive pay. The opposite is true for dummy_administration, it has a positive correlation with average wage and incentive pay. The production branch has almost no correlation with wages and a negative correlation with incentive pay. Summarizing, contract workers in the administration branch earn a higher wage and have more often right at some sort of incentive pay. Workers in the promotion branch earn the lowest wage and have less chance at incentive pay.

Looking at the correlation between the independent variables, several remarks can be made. Between duration and tenure exists a relatively strong and positive relationship. Meaning that in case of a longer assignment at a host employer the total length of the relationship between worker and employer is longer as well. A very strong positive relationship exists between concern and owner. This relationship could be expected as the chance that a director of a temporary labor agency that is not part of a bigger concern is also the owner is higher than the chance that a director of a temporary labor agency which is part of a concern is also the owner.

The reasons for the relationships between incentive pay and the sector dummy variables are less obvious. As can be checked, there is a negative correlation between the dummy variables for production and promotion and incentive pay. This means that workers in the production sector and promotion sector have a lower chance of receiving some sort of incentive pay. On the other hand, there is a positive although weak, correlation between the dummy finance and incentive pay. Meaning that in the finance & administration sector incentive pay is more of a

habit than in the other two sectors. This can be caused by less controllable output of employees with finance functions.

A few other interesting observations can be made about the incentive pay variable. With both the variables duration and owner, there is a moderate positive relationship. This means that if the duration of an assignment increases the chance that a worker receives some sort of incentive pay also increases. The same goes for the relation with ownership, when the director of an agency is also the owner the chance at some sort of incentive pay increases.

Correlations

Statistics=Pearson Correlation

	Average wage	Visits	Duration	Control hours	Firm size	Tenure	Incentive pay	Concern	Owner	Dummy Production	Dummy promotion	Dummy Finance
AverageWage	1	,302	,313	-,068	-,073	,208	,179	-,085	-,044	,096	-,386*	,296
Visits	,302	1	,124	,042	-,069	-,047	,227	-,216	-,115	,059	,040	-,041
Duration	,313	,124	1	-,015	-,233	,255	,231	-,123	-,038	,541**	-,285	,046
controlhours	-,068	,042	-,015	1	-,025	-,034	,047	-,144	-,132	,026	-,102	,096
Firm size	-,073	-,069	-,233	-,025	1	,152	,218	-,023	-,215	-,150	-,098	-,114
Tenure	,208	-,047	,255	-,034	,152	1	,231	-,024	,267	,115	,109	-,218
Incentive pay	,179	,227	,231	,047	,218	,231	1	,009	,221	-,228	-,333	,108
Concern	-,085	-,216	-,123	-,144	-,023	-,024	,009	1	,778**	-,162	,184	,014
Owner	-,044	-,115	-,038	-,132	-,215	,267	,221	,778**	1	-,174	,153	,062
dummy_Production	,096	,059	,541**	,026	-,150	,115	-,228	-,162	-,174	1	-,098	-,357*
Dummy_promotion	-,386*	,040	-,285	-,102	-,098	,109	-,333	,184	,153	-,098	1	-,522**
Dummy_Finance	,296	-,041	,046	,096	-,114	-,218	,108	,014	,062	-,357*	-,522**	1

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2, correlations large model

In table 3 the correlations between the four wage categories are presented. This to give an indication of the relationships between the different wage scales. All categories are strong and positively correlated. Although the differences are not large, all categories have the strongest correlations with the wo18 category. This indicate that the wage paid to an 18 year old WO student is most in congruence with the average students' wage. Due to the differences in age and education level between the four categories, it could be expected that either wo18 or HBO 20 should be the wage level that is closed to the average wage level of the four categories. Another important conclusion that can be drawn from table 3 is that some agencies pay all categories more than other agencies. Meaning that if an 18 year old HBO student earns a relatively high wage a 20 year old WO student will earn a relatively high wage as well. The

other way is also true, if an 18 year old earn a relatively low wage than a 20 year old student will earn also a relatively low wage. These conclusions are based on the fact that the wage categories have almost a perfect positive correlation.

The observation that some agencies pay all wages categories a relatively high wage and some pay all categories a relatively low wages could be caused by the efficiency wage theory. In that case the high wage agencies are motivating their personnel intrinsically with a higher wage and the low wage firms are controlling their personnel with monitoring activity. In the following sections these assumptions are further investigated with the help of several regression analyses.

Correlations		HBO18	HBO20	wo18	wo20
HBO18	Pearson Correlation	1	,918[**]	,978[**]	,844[**]
	Sig. (2-tailed)		,000	,000	,000
	N	32	32	32	32
HBO20	Pearson Correlation	,918[**]	1	,939[**]	,900[**]
	Sig. (2-tailed)	,000		,000	,000
	N	32	32	32	32
wo18	Pearson Correlation	,978[**]	,939[**]	1	,909[**]
	Sig. (2-tailed)	,000	,000		,000
	N	32	32	32	32
wo20	Pearson Correlation	,844[**]	,900[**]	,909[**]	1
	Sig. (2-tailed)	,000	,000	,000	
	N	32	32	32	32

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3, correlations wage levels

5.5 Residual testing

Before starting with the regression analysis and drawing any conclusions based on this regression, several assumptions must be true. In this section I will check whether the assumptions of the regression model are satisfied for this particular data set. With the help of analysis of the residuals a test for homescedastischity, linearity and normal distribution will be conducted. In order to test each wage category separately, four different normality tests are used. Those tests can be found in appendix 3. A fifth test, for which the variable average wage is used, will be discussed in this chapter. Before running above tests, first an outlier's analysis is performed. For all wage categories, including the fifth category average wage, respondent 22 is marked as an outlier (only variables outside two standard deviations are considered as an

outlier). Respondent 22 only employs 2 students and the wage level for each category is very low. The average wage level of respondent 22 amounts Euro 4.60, the average wage level of all respondents together amount Euro 8.72. Due to the very low amount of employees and the low wage level respondent 22 is excluded from this research.

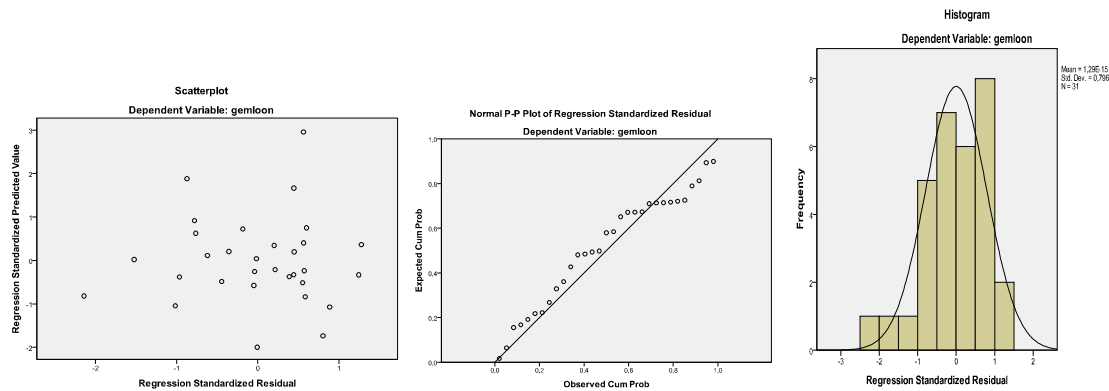In the next table the results of above tests are presented.

Table 4, residual analyses

Examining the normal probability plot, the distribution histogram and the scatterplot several remarks can be made. In the scatterplot the dots should be randomly distributed with no pattern in order to assume homescedastischity. When examining above scatterplot one can see that the dots are reasonably randomly distributed. A remark can be made that a modest increase of the spread of residuals can be observed. The normal probability plot can be used to check whether the sample is normally distributed. The dots in the table should be around or on the diagonal in order to assume normality. The results of this plot are slightly more positively skewed than normal. Taking in account the small sample size above plot can be regarded as normal. The distribution histogram follow approximately a normal distribution, again the small sample size can cause a little distortion of the ideal results.

To check whether a model that make use of a logarithmic transformation deliver results that are more in line with a normal distribution in comparison with above results, above tests are performed for the following regression equitation.

$$lnwage \ = \ \alpha + \ \beta amresponsible + \ \beta duration + \ \beta ownership + \ \beta firmsize \\ + \ \beta performancepay + \ \beta visits + \ \beta concern + \ \beta servicetime + \in i$$

In appendix 4 can be checked that the results of the residual analyses of the logarithmic model do not deliver better results. Therefore, this model without the transformation is used for the regression analyses.

6 Regression analysis

6.1 Small Model

In the following section five different regression analyses are discussed. One for each separate wage category and one that uses the average wage as depended variable. Before presenting a regression model in which all variables are incorporated, a smaller model will be discussed in which only visits, duration and control_hours are used. These variables are selected for the small model because of their direct and obvious link with supervisory intensity. Where the other variables are mainly span of control measurements or indirect measurements for supervision, these variables measure supervision in the most direct way as possible.

For each variable both the individual effect as the group effect is tested on the depended wage variables; the results are presented in the following tables.

	Model 1			model 2			model 3			model 4		
	Beta	std. Error	Sign.	Beta	std. Error	Sign,	Beta	std. Error	Sign,	Beta	std. Error	Sign,
Duration	0,346	0,022	0,057							0,277	0,019	0,127
control hours				0,01	0,041	0,959				-0,046	0,034	0,793
visits							0,369	0,324	0,045	0,337	0,324	0,066
R2	0,12			0			0,136			0,215		
Adjusted R2	0,089			0,034			0,105			0,124		
N	31			31			31			31		
Depended variable: HBO18												

	Model 1			model 2			model 3			model 4		
	Beta	std. Error	Sign.	Beta	std. Error	Sign,	Beta	std. Error	Sign,	Beta	std. Error	Sign,
Duration	0,388	0,019	0,031							0,339	0,017	0,068
control hours				0,033	0,037	0,862				-0,011	0,031	0,949
visits							0,285	0,297	0,127	0,243	0,292	0,184
R2	0,151			0,001			0,081			0,194		
Adjusted R2	0,121			-0,033			0,048			0,101		
N	31			31			31			31		
Depended variable: HBO20												

	Model 1			model 2			model 3			model 4		
	Beta	std. Error	Sign.	Beta	std. Error	Sign,	Beta	std. Error	Sign,	Beta	std. Error	Sign,
Duration	0,372	0,023	0,039							0,307	0,02	0,088
control hours				-0,011	0,044	0,953				-0,069	0,036	0,691
visits							0,369	0,342	0,045	0,335	0,338	0,064
R2	0,139			0			0,136			0,235		
Adjusted R2	0,109			-0,034			0,105			0,147		
N	31			31			31			31		
Depended variable: WO18												

	Model 1			model 2			model 3			model 4		
	Beta	std. Error	Sign.	Beta	std. Error	Sign,	Beta	std. Error	Sign,	Beta	std. Error	Sign,
Duration	0,383	0,02	0,033							0,341	0,019	0,069
control hours				0,076	0,039	0,686				0,04	0,033	0,825
visits							0,246	0,317	0,19	0,2	0,312	0,277
R2	0,147			0,006			0,06			0,175		
Adjusted R2	0,117			-0,029			0,027			0,08		
N	31			31			31			31		
Depended variable WO20												

	Model 1			model 2			model 3			model 4		
	Beta	std. Error	Sign.	Beta	std. Error	Sign,	Beta	std. Error	Sign,	Beta	std. Error	Sign,
Duration	0,02	0,387	0,032							0,331	0,018	0,069
control hours				0,026	0,039	0,888				-0,025	0,031	0,887
visits							0,337	0,303	0,068	0,297	0,297	0,102
R2	0,15			0,001			0,114			0,221		
Adjusted R2	0,12			-0,034			0,082			0,135		
N	31			31			31			31		
Depended variable average wage												

Table 5, regression analyses small model

The three independent variables delivered consistent results throughout the regressions with the different wage variables as depended variable. The individual regression results of the variable duration delivered in each regression a significant positive effect (beta varies between .277 and .388) at wages, which supports the hypothesis that a longer assignment is associated with a higher wage. When duration increases with one (duration is measured in weeks), the wage of a contract worker rises with beta. Only in the first model with HBO18 as depended variable, the variable duration delivered insignificant results in the total model. The variable Control_hours delivered for each wage category insignificant results, indicating that there is no evidence for the influence of the amount of control_hours spends by account manager at students' wage levels. Regarding the variable visits a few remarks can be made, in half of the cases it has a significant influence at the wage categories. Although significant, the positive beta (varies between .200 and .337) is opposite earlier assumptions and the hypothesis that there exist a negative relationship between visits and wages based on the assumption that visits is one way of supervising employees. If visits are one way of supervising than more visits should mean a lower wages according to the efficiency wage theory.

 Both the variables visits and control_hours measure more or less the same sort of supervision activities. Control_hours is measured as the amounts of hours spend on supervising activities per week and visits are measured as the amount of visits to a contract worker on location per month. Clearly at least part of those control hours are used to visit contract workers. Looking at the correlation between those two variables we see a positive, however weaker than expected, relationship between visits and control_hours. Due to the positive beta of visits and the insignificancy of control_hours I assume that visits are not used for supervision activities but for other purposes.

 Looking at the R2 of the models, though low for every model, I can conclude that the models for 18 year old employees have more explanatory power than the models for 20 years old employees. Whether this is a coincidence I cannot explain. But one way of explaining this observation is with the help of the adverse selection theory. The chance that an 18 year old

employee is a relatively new employee (hired in the same year the student turns 18) is greater than the chance that a 20 year old employee is a new employee. The reason for this is the fact that most students start their study at the age of 18 and in the same year start working for a temporary labor agency. In addition to that, it is also more likely that an 18 year old has no other relevant work experience. Therefore the temporary labor agency has no reference about the quality of such worker which makes the change on selecting a lemon higher. For a 20 year old student other factors but the efficiency wage theory can influences their wage, for instance seniority wages or references of earlier employers. This makes the model for a 20 year old less powerful.

In table 6 the control variables are added to the small model with as depended variable the average wage level. This in order to see the effect of the control variables at the regression output.

	Model 1			model 2			model 3			model 4		
	Beta	std. Error	Sign.	Beta	std. Error	Sign,	Beta	std. Error	Sign,	Beta	std. Error	Sign,
Duration	.251	.025	.254							0,248	0,024	0,299
control hours				-0,003	0,036	0,987				-0,026	0,032	0,886
visits							0,383	0,298	0,039	0,35	0,308	0,066
Dummy_production	.052	1,431	0,82	0,198	1,206	0,312	0,207	1,065	0,303	0,062	1,313	0,799
Dummy_promotion	-0,242	0,959	0,258	-0,273	0,987	0,211	-0,16	0,975	0,466	-0,117	1,008	0,607
Dummy_finance	0,324	0,723	0,162	0,384	0,725	0,1	0,41	0,64	0,079	0,353	0,671	0,146
Concern	0,141	0,591	0,407	0,138	0,619	0,438	0,161	0,567	0,393	0,146	0,588	0,455
Tenure	0,168	0,01	0,347	0,232	0,01	0,187	0,206	0,009	0,264	0,133	0,01	0,502
R2	0,369			0,333			0,332			0,368		
Adjusted R2	0,211			0,166			0,158			0,128		
N	31			31			31			31		

Table 6, regression analyses small model and dummies

In the small model wit control variables, duration has no longer a significant effect on wages. This could be caused by the relatively strong correlation of duration with the sector dummies. Especially with dummy_production exist a strong positive relationship. At a 10% significant level, visits has a significant and positive effect on wages. This result supports the regression results without the added control variables. Looking at the significant level of the control variables I can conclude that none of the control variables have a significant effect in this regression.

6.2 Large model

In the following tables the regression results for the large model will be presented. First the individual effect of the extra supervision variables will be tested with the help of an individual regression analysis with the average wage level as depended variable. After that, the model with all the variables will be tested. In order to see the individual effect of the added indirect supervision variables, the next table shows the individual regression results.

	Beta	std. Error	Sign.	Beta	std. Error	Sign,	Beta	std. Error	Sign,
Firm size	-0,168	0,001	0,366						
Incentive_pay				0,115	0,572	0,537			
Owner							0,077	0,629	0,681
R2	0,028			0,013			0,006		
Adjusted R2	-0,005			-0,021			-0,028		
N	31			31			31		
Depended variable average wage									

Table 7, individual regression results

I can conclude that none of the extra supervision variables have a significant effect on the average wage of students. Next to that, the sign of the beta coefficients of each variable in above table is against primary assumptions. I will discuss in short why above results are against primary assumptions.

Due to a bigger firm size controlling individual employees become more difficult what should results in a higher wage level and therefore in a positive beta according to the efficiency wage theory. The use of incentive pay is one way of supervision personnel, therefore firms could lower their wage level what explains the expected negative beta for the variable incentive pay. And if an owner is entitled to residual profits he/she has more reasons to supervise employees and by that use a lower wage standard,

The next table shows the regression results for the model with the direct and indirect supervision variables and the control variables. Since the results of the small model indicated that the variable control_hours had no influences on the wage level; control_hours is no longer incorporated in the model.

	Model 1 (HBO18)			model 2(HBO20)			model(WO18)			model 4(WO20)			Model5(av. Wage)		
	Beta	std. Error	Sign.	Beta	std. Error	Sign,	Beta	std. Error	Sign,	Beta	std. Error	Sign,	Beta	std. Error	Sign.
Firm size	-0,086	0,001	0,731	-0,265	0,001	0,244	-0,119	0,001	0,61	-0,241	0,001	0,312	-0,241	0,001	0,441
Duration	0,301	0,032	0,309	0,225	0,025	0,392	0,313	0,031	0,257	0,239	0,028	0,388	0,239	0,028	0,303
Incentive_pay	-0,29	0,843	0,324	-0,258	0,668	0,324	-0,278	0,829	0,31	-0,137	0,743	0,616	-0,137	0,743	0,354
Visits	0,469	0,37	0,03	0,385	0,293	0,044	0,472	0,364	0,02	0,289	0,326	0,141	0,289	0,326	0,035
Concern	0,383	1,213	0,307	0,492	0,961	0,147	0,35	1,193	0,316	0,125	1,069	0,718	0,125	1,069	0,314
Owner	-0,271	1,34	0,525	-0,449	1,062	0,243	-0,162	1,318	0,682	0,133	1,181	0,739	0,133	1,181	0,627
Dummy_prod.	-0,182	1,779	0,553	-0,029	1,41	0,916	-0,21	1,749	0,465	-0,077	1,568	0,79	-0,077	1,568	0,637
Dummy_prom.	-0,353	1,359	0,218	-0,176	1,077	0,485	-0,392	1,337	0,146	-0,281	1,198	0,294	-0,281	1,198	0,232
Dummy_fin.	0,091	0,836	0,739	0,397	0,662	0,113	0,179	0,822	0,483	0,26	0,736	0,315	0,26	0,736	0,357
Tenure	0,222	0,0014	0,407	0,424	0,011	0,085	0,277	0,014	0,27	0,229	0,012	0,363	0,229	0,012	0,237
R2	0,372			0,501			0,455			0,446			0,446		
Adjusted R2	0,041			0,238			0,168			0,155			0,155		
N	31			31			31			31			31		

Table 8, regression results large model

Considering the variables that are used in the small model, some remarks can be made. The variable visits proofs to be the most significant indicator in this model. At 5% significant level visits proved to be significant for all wage categories but WO20, although the positive beta remains contra dictionary. Compared to the model without the control variables, there is less evidence in favor for duration in is this model. In none of the models a significant effect of duration at wages can be found, however the sign of the betas remain unchanged. Ownership,

firm size and incentive pay are in none of the models significant. The betas of ownership and incentive pay are inconsistent throughout the different models. The beta of firm size has in this regression the same negative sign as in the individual regression of firm size on average wage, however insignificant this indicates a lower wage when a temporary labor agency employs more workers.

The sign of the sector dummies is more or less as expected. The dummies for the promotion and production sector have a negative sign, indicating that workers in those sectors earn a lower wage. The positive sign of the finance dummy indicates that workers in the finance sector earn a higher wage. Tenure has a positive beta which suggests that a longer tenure means a higher wage and the positive sign of concern indicate that temporary labor agencies that are part of a bigger concern pay a higher wage than stand alone firms. The last result is not in congruence with hypothesis 1i.

Overall, several conclusions can be made about the regression results.

Although the amount of visits to a host employer delivers a significant result in the small and large model; the negative beta is against primary expectations and the research of Kruse (1992). Before testing the influences of this variable on wages I expected to find a negative relationship. More visits mean more supervision possibilities and so a lower wage according to the efficiency wage theory. An explanation for the opposite results can be the fact that this variable is in this particular industry not the correct proxy for supervisory intensity. The variable duration has a significant and positive effect in the small model which confirms the hypothesis about this variable, however in the large model the significant effect of duration on wages disappeared. This could be caused by the correlation between some of the control variables and duration. The variables that were added in the larger model as indirect measurements for supervision delivered no significant results.

Although the control variables were insignificant, the sign of the sector dummies and the sign of tenure are in congruence with earlier assumptions.

The specific characteristics of the temporary labor industry, temporary workers always perform their assignment at a host location, could cause the fact that variables that proved to be significant in earlier research delivered insignificant results in this research

7. Conclusion

Proving the shirking version of the efficiency wage theory in an empirical setting is a troublesome assignment. Only a few earlier studies found convincing evidence in support of

the efficiency wage theory. Most studies are hindered by the difficulty of finding a good proxy for supervisory intensity. Quantification and measuring supervising is difficult and can only be based on extensive knowledge of the processes and management goals of specific firms and industries. Methods of supervising vary across industries. A proxy that proved to be significant in one industry can be of little use for a study in another industry. Up until now, no variable is found that proved to be significant across industries and regions. In order to quantify variables as a proxy for supervision, a good knowledge of the specific industry is needed and variables that proved to be successful in earlier studies cannot be copied without controlling or modifying them. This thesis offer some useful insights for the effect of the shirking version of the efficiency wage theory in the temporary labor market. Next to that, some broader efficiency wage subjects are discussed.

In theory, the efficiency wage model offers explanations for the wage premiums that are paid in various industries. Those explanations are supported with four different micro-economic foundations (the shirking model, gift exchange model, turnover costs and adverse selection) that all offer a mechanism for explaining the wage premiums. Although the mechanisms are diverse, the outcome of the four models is the same. It is profitable for firms to pay a higher wage than the market wage level. Even in case of unemployment, workers cannot bid down wages by offering to work for a lower wage. According to the efficiency wage theory, it lowers total productivity and by that profitability if a firm decides to lower wages. Although the four micro economic foundations all use another mechanism for explaining wage premiums, distorted and incomplete information are two phenomena that the mechanisms try to overcome. Employers have imperfect information about the ability or effort level of applicants and employees. In order to overcome this information problem a wage premium can be paid. Since a wage premium can act as a device to elicit the required effort level, to create a self selecting device, to avoid turn over costs or to create reciprocity.

A potential result of raising wages is unemployment. If one firm decides to raise wages, than it pays for all firms to raise their wages. This causes a rise of labor costs which will lead to a drop in labor demand. By explaining why firms pay a wage premium to their workers the efficiency wage theory offers an explanation for involuntary unemployment as well. Unemployed workers cannot credibly promise to work for a lower wage as employer know that this will lead to shirking behavior and by that lower productivity. In addition to that, the efficiency wage theory depends on involuntary unemployment as in an equilibrium situation all employers pay the same wage premium. In such a situation, unemployment acts as a workers discipline device to overcome shirking behavior.

This thesis tested for evidence of the shirking version of the efficiency wage model in the temporary labor sector. Students are an important part of the workforce of temporary labor agencies because they have several advantages over other employees. Students have a relatively high education level; they have a short time horizon and are relatively cheap. These characteristics make them an ideal labor force for temporary labor agencies. In order to regulate the temporary labor sector there is a collective labor agreement which is obliged for almost all agencies. This collective labor agreement specifies among other things a minimum wage and fringe benefits level. All payments above the minimum wage level can be regarded as a wage premium. This paper shows that almost all participants in the research pay wages above the required minimum level and some pay up to twice the minimum level. Next to that, the dataset shows that there are large wage differences between temporary labor agencies. According to the correlations analyses between the different wage categories show there are some agencies that pay all wage categories a relatively high wage and other agencies that pay all categories a relatively low wage. Those differences in wage policies could be a caused by efficiency wage payments.

By testing the trade-off between supervision and wages this paper test whether those wage premiums and wage differentials can be explained with the shirking version of the efficiency wage theory. The data for this research was collected by means of a survey among temporary labor agencies that employ students and follow the ABU collective labor agreement. Using such a narrow setting can overcome some problems that are indicated in earlier studies as factors that hindered the empirical research: exogenous factors that influence workers productivity and management's personnel policies on shirking and discipline issues.

Using for the greater part variables that are already used in earlier studies as a measurement for supervision, this thesis introduced a new proxy for supervision as well. The duration of an assignment of a contract worker at a host employer is added as a proxy for supervision and used in this thesis as a measurement for supervision. There are two reasons for using this variable. First, the duration of an assignment influences the amounts of feedback a temporary agency receives from clients; the shorter the assignment of a contract worker, the more feedback an agency receives about the ability of a contract worker. Secondly, shirking behavior has more influence on the total satisfaction level of a client when the assignment is shorter. At a one day assignment an hour of shirking has great impact at the total result of the assignment, whereas an hour shirking time at an assignment of a few months has nearly any influence on the total result. The initial assumption is a positive influence of duration on wages.

Although there exist some doubts about the normality of this dataset, a multiple regression analysis is used to test the trade-off between wages and supervision. Two models are used to test the influences of the different variables, a small model with the three variables (duration, visits and control_hours) that have a direct and obvious link with supervision and a large model with all the independent variables. In four of the five regression analyzes for the small model, the variable that measure the duration of an assignment as a proxy for supervision has a significant positive effect at wages. In line with the efficiency wage model, this means that if there are less supervision possibilities due to a longer assignment, the wage of temporary workers becomes higher. Another remarkable conclusion from this dataset is the fact that wages paid to student employees of temporary labor agencies are all in excess of the going minimum wage. Some students receive more than twice the hourly wage that is strictly necessary. This indicate that this sector use wage premiums, whether this is caused by one of the underlining models of the efficiency wage theory needs more evidence.

However small, this thesis provides the first evidence for the use of efficiency wages in the temporary labor market. The main contribution of this thesis is the addition of a new proxy for supervisory intensity in the temporary labor market. As a proxy for supervision, the duration of an assignment proved to be significant in part of the models tested. Temporary labor agencies that employ students and follow the ABU collective labor agreement pay a higher wage to students when an assignment become longer. This to compensate for the fact that they receive less feedback of host employers about the productivity and effort level of the contract worker.

8. Discussion

This thesis provided evidence for the addition of a new variable in the already long list of measurements for supervisory intensity in order to test the shirking version of the efficiency wage model. Due to the specific characteristics of the temporary labor market, I doubt whether the duration of an assignment proves to be significant and useful for other industries. Industries other than the temporary labor market are less familiar with the phenomenon that workers perform various assignments at different locations and companies. Therefore, I expect that only firms that hire workers for performing tasks at other companies or locations can make wage levels depended on the actual duration of an employee's assignment.

This thesis tested the variable in a very narrow setting, only firms that employ HBO or WO students and follow the ABU collective labor agreement are incorporated. Interesting to know is whether this variable proves to be significant in a broader setting. I assume that duration of an assignment can be used as a proxy for supervision as long as the workers perform relatively low-skilled jobs. This because in case of low-skilled jobs the duration of an assignment can vary enormously. In this dataset the variation between the duration of jobs is a year, however I expect that the variation could be much larger if you look at the total temporary labor market. Due to the relatively short time horizon of students, most students are not willing to accept assignments that last longer than a year. Low-skilled workers with a longer time horizon are happy to accept an assignment that last many years for this gives them certainty on income and work. I expect that the influence of this variable grows stronger when the variations in duration of assignments are larger. Looking at the job characteristic of jobs that need temporary workers with more experience or a higher education level I assume that these jobs have less variation in time. A one day assignment is completely normal for low-skilled workers but a rarity for jobs that need "unique skilled" workers. Due to the complexity of jobs that need unique skilled workers, usually it costs a relatively long period to be productive for such a worker. Therefore I suppose that this variable has less explanatory power for unique skilled jobs.

Overall, the used model in this thesis provided little evidence in favor for the efficiency wage theory. Taking in account the large wage premiums that are paid in this industry the results seems to be contra dictionary. One reason for the poor results could be the low total population and by that the low response at the questionnaire. As a result of the relatively low sample there are doubts about the normality of the used data set which could cause a somewhat distorted outcome of the regression analysis.

Another reason could be the fact that the observed wage premiums in this sector are caused by reasons other than the efficiency wage theory. There are several other economic reasons for paying a wage higher than the market clearing level. I discuss several reasons that could be relevant for this specific sector. None of them are empirically tested in this research. First, the wage paid depends on the ability to pay of the employer, or the profit level of the firm. More profitable firms tend to pay a higher wage to their temporary employers. In this case, temporary labor agencies that earn a relatively large profit margin on each billable hour are likely to pay a higher wage. In the empirical literature this is called rent sharing. The second explanation for high wages could be the bargaining power of workers. Temporary labor

agencies that only employ skilled students[6] can be forced to pay those workers a wage premium due to their higher bargaining power. Since skilled students are harder to find and harder to replace for temporary labor agencies, agencies are willing to pay a higher wage to such workers. Another reason for paying wage premiums can be the scarcity of students willing to work next to their study. Due to increased study pressure and regulations, students choose to study rather than work. Temporary labor agencies must pay a higher wage to students in order to induce students to work on a part time basis.

The supervisor to supervised ratio was excluded from this research due to too much variance in respondents' answers. Respondents indicated that they had difficulties answering how many employees were managed by one account manager as most employees are not supervised by one account manager but by several. Next to that, some temporary labor agencies have other distributions of responsibilities in which not the account manager is responsible for employees but the division manager or location manager. Those two factors together made the answers unreliable and not suitable for this research. In the study of Rebitzer (1995) he defined more or less the same problems with the supervisor to supervised ratio.

The positive effect of visits on wages indicate that visits to employees at host location are not used as a way of supervising workers, at least for this data set. If temporary labor agencies use visits as a supervision tool than the beta of visits should be negative so that more supervision means a lower wage. Since the sign is positive I assume that there are other reasons for visiting employees. Most temporary labor agencies have a group of clients that call them "preferred suppliers". Such clients are important for every temporary labor agency as they adapt their pool of workers to the demand of such important clients. It could be the case that temporary labor agencies pay special attention to such customers and visit them more often. In line with above reasoning it could be possible that contract workers who have assignments by important clients receive a higher wage in order to reduce shirking and turn over costs. This research cannot make a difference between assignment at important clients and assignments at less important clients. Further research could possibly link the amount of visits to the sort of client and by that provide more evidence for the efficiency wage theory.

9. Further research

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[6] Skilled students are for instance students that are familiar with an ERP system or financial system that a client of a temporary labor agency uses.

This is as far as I know the first time that the efficiency wage theory is tested in the temporary labor sector. Although there are some characteristics in this sector that could overcome problems that earlier research into the shirking version of the efficiency wage theory distorted, this research delivered ambiguous results. Further research could create a bigger sample size in order to overcome the normality problems that hindered this research. Another interesting subject that further research could attempt to clarify is the link between wages and visits. Why is there a positive relation between visits and wages? A suggestion could be to connect the amount of visits to some indicator of clients' importance for an individual temporary labor agency.

Testing the relationship between duration and wages in a less narrow setting should confirm whether the duration of an assignment still proves to influence wages of contract workers in a broader setting. By creating a sample with data for all temporary workers in Europe the potential sample size increase enormously. The dataset of such a study can prove to be valuable for testing various different facts. First, it offers the opportunity to test the influence of duration on wages for low skilled workers and unique skilled workers separately. Second, by performing a regression analyses for each country in Europe and one for the total data set, differences between countries can be measured. Possible differences in results can be linked to differences in regulations and importance of the sector between countries. My expectation is that countries with a more regulated and mature temporary labor market deliver better results. Such countries have a competitive temporary labor sector with more competition on prices en quality. In such setting it is important to motivate employees to elicit the required effort level. Therefore I expect to find the most evidence in favor for the efficiency wage theory in countries with a more developed temporary labor sector.

10 References

Akerlof, G. a. (1986). *Efficiency wage models of the labor market.* New York: Cambridge University press.

Akerlof, G. A. (1984). Gift Exchange and Efficiency-Wage Theory: Four Views. *The AMerican Economic Review* , 79-83.

Akerlof, G. A. (1982). Labor Contracts as Partial Gift Exchange. *The Quarterly Journal of Economics, Vol 97, No. 4* , 543-569.

Arai, M. (1994). Compensating Wage Differentials versus Efficiency Wages: An Empirical Study of Job Autonomy and Wages. *Industrial Relations* .

Arrowsmith, J. (2008). *Temporary agency work and collective bargaining in the EU.* European Foundation for the Improvement of Living and Working Conditions.

Azam, J.-P., & Lesueur, J.-Y. (vol. 6, number 3). Efficiency Wage and Supervision: Theory and Application to the Ivorian Manufacturing Sector. *Journal of African Economies* , 445-462.

Cappelli, P., & Chauvin, K. (Aug. 1991). An interplant test of the efficiency wage hypothesis. *The Quarterly Journal of Economics* , 769-787.

Chatterjee, S., & Miseman, F. (2004). Team Payroll and Team Performance n Major League Baseball: 1985-2002. *Economics Bulletin* .

Company, B. &. (2007). *More work opportunities for more people.* Eurociett.

Davis, D. R., & Harrigan, J. (2007). Good Jobs, Bad Jobs, and Trade Liberalization. *NBER Working Paper Series* , 1-52.

Ewing, B. T., & Payne, J. E. (1999). The Trade-Off Between Supervision and Wages: Evidences of Efficiency Wages from the NLSY. *Southern Economic Journal* , 424-433.

Fitzroy, F. R., & Kraft, K. (1986). Efficiency and Internal Organization: Works Council in West German Firms. *Economica* , 493-504.

Foster, J. E., & Wan, H. J. (1984). Involuntary unemployment as a principal-agent equilibrium. *American Economic Review* , 476-484.

Georgiadis, A. (2008). Efficiency wages and the economic effects of the minimum wage: evidence from a low-wage labour market. *Centre for Economic Performance* .

Georgiadis, A. P. (2006). Is there a Wage-Supervision Trade-Off? Efficiency Wage Evidence From the 1990 British Workplace Industrial Relations Survey. *CMPO, Judge Business School*

Gerhart, B., & Sara, R. L. (2003). *Compensation, Theory, Evidence and Strategic Implications.* Doundations for Organizational Science.

Goldsmith, A. H., Veum, J. R., & Darity, W. (2000). Working hard for the money? Efficiency wages and workers effort. *Journal of Economic Psychology 21* , 351-385.

Guell, M. (200). Fixed-term Contracts and Unemployment: an Efficiency Wage Analysis. *Working Paper nr 433* .

Katz, L. F. (1986). Efficiency Wage Theories: A Partial Evaluation. *NBER Macroeconomics* , 235-290.

kerlof, G. A. (1984). Gift Exchange and Efficiency-Wage Theory: Four Views. *The American Economic Review* , 79-83.

Krueger, A. B. (1991). Ownership, Agency and Wages: an examination of franchising in the fast food industry. *The quaterly journal of economics* , 75-101.

Krueger, A. B., & Summers, L. H. (1988). Efficiency Wages And The Inter-Industry Wage Structure. *Econemtrica* , 259-293.

Kruse, D. (1992). Supervision, Working Conditions, and the Employer Size-Wage Effect. *Industrial Relations: A Journal of Economy and Society* , 229-249.

Lazear, E. P. (2000). Performance Pay and Productivity. *The American Economic Review* , 1346-1361.

Leibenstein, H. (1963). THe Theory of Underemployment in Densely Populated Backward Areas. *Economic Backwardness and Economic Growth* .

Leonard, J. S. (1987). Carrots and Sticks: Pay, Supervision, and Turnover. *Journal of Labor Economics* , 136-152.

Levine, D. I. (1992). Can Wage Increase Pay For Themselves? Test with a Productive Function. *The Economic Journal* , 1102-1115.

Levine, D. L. (1991). You Get What You Pay For: Tests of Efficiency Wage Theories in the United States and Japan. *Institute for Research on Labor and Employment UC Berkeley* , 1-32.

Lindbeck, A., & Snower, D. J. (1987). Efficiency wages versus insiders and outsiders. *European Economic Review* , 407-416.

Malcomson, J. M. (1981). Unemployment and the efficiency wage hypothesis. *The Economic Journal* , 848-866.

Meer, P. v., & Wielers, R. (2001). The Increased Labour market Participation of Dutch Students. *Work Employment Society* , 15-55.

Nagin, D., Rebitzer, J., Sanders, S., & Taylor, L. (2002). Monitoring, Motivation, and Management: The Determinants of Opportunistic Behavior in a Field Experiment. *NBER Working Paper* .

Neugart, M., & Storrie, D. (2005). The emergence of temporary work agencies. *Oxford Economic Papers 58* , 137-157.

Pissarides, C. (1997). The impact of employment tax cuts on unemployment and wages: The role of unemployment benefits and tax structure. *Centre for Economic Performance* .

Purcell, J., Purcell, K., & Tailby, S. (2004). Temporary Work Agencies: Here today, gone tomorrow? *British Journal of Industrial Relations* , 705-725.

Raff, D. M., & Summers, L. H. (1986). Did Henry Ford Pay Efficiency Wages. *nber working paper series* .

Rebitzer, J. B. (1995). Is there a trade-off between supervision and wages? An empirical test of efficiency wage theory. *Journal of Economic Behavior & Organization* , 107-129.

Rebitzer, J. (1993). Is there a trade-off between supervision and wages? An empirical test of efficiency wage theory. *Journal of Economic Behavior and Organization Vol. 28* , 107-129.

Riley, J. G. (2001). Silver Signals: Twenty-Five Years of screening and signaling. *Journal of Economic Literature* , 432-478.

Salop, S. C. (1973). A Model of the Natural Rate of Unempoyment. *The American Economic Review* , 117-125.

Schlicht, E. (1978). Labour Turnover, Wage Structure, and Nutral Unemployment. *Journal Of institutional and Theoretical Economics* , 337-346.

Sessions, J. a. (2009). Tenure, wage profiles and monitoring. *Department of economics university of Cyprus* .

Shapiro, C., & Stiglitz, J. E. (1984). Equilibrium Unemployment as a Workers Discipline Device. *Amercan Economic Review* , 433-444.

Simon, H. A. (1991). Bounded Rationality and Organizational Learning. *Organization Science* .

Solow, R. M. (1979). Another Possible Source of Wage Stickiness. *Journal of Macroeconomics* , 79-82.

Strobl, E., & Walh, F. (2007). Estimating the Shirking Model with variable effort. *Labour Economics* , 623-637.

Sushil, W. B., & Wall, M. (1991). A direct test of the efficiency wage model using uk micro-data. *Oxford economic Papers* , 529-548.

Taylor, J. E. (2003). Did Henry Ford mean to pay efficiency wages? *Journal of Labor Research* , 638-694.

Walsh, F. (1999, vol 17). A Multisector Model of Efficiency Wages. *Journal of Labor Economics* , 351-374.

Weiss, A. (1980). Job Queues and Layoffs in Labor Markets with flexible Wages. *Journal of political Economy* , 526-538.

Yellen, J. L. (1984). Efficiency Wage Models of Unemployment. *American Economic Review* , 200-205.

Appendix 1, Questionnaire

Pagina: 1

Geachte heer/mevrouw,
Hieronder vindt u de vragenlijst. De gegevens worden vertrouwelijk en anoniem
behandeld.

Start

Pagina: 2

1.

Hoeveel nog studerende uitzendkrachten tussen de leeftijd van 18 en 24 jaar zijn er voor uw vestiging werkzaam als uitzendkracht?

2.

Kunt u voor bovenstaande groep uitzendkrachten aangeven hoeveel van deze studenten een opleiding volgen op HBO-niveau, WO-niveau of een ander niveau?

	Aantal uitzendkrachten
HBO	
WO	
Anders	

3.

Hoe lang is het gemiddelde dienstverband van bovenstaande uitzendkrachten in weken?

4.

Hoe lang duurt de gemiddelde opdracht van bovenstaande uitzendkrachten? Geeft u hierbij aan of uw antwoord in dagen/weken of maanden is.

[ ]

5.

Hoe bepaalt u het salaris van de voor uw vestiging werkzame uitzendkrachten?

	antwoord
Leeftijd	☐
gebruikelijk loon opdrachtgever	☐
Studiefase/opleiding	☐
soort opdracht	☐
anders, namelijk	[ ]

6.

Hebben uw uitzendkrachten naast een vast loon ook recht op een variabele beloning?

	antwoord
nee	☐
ja, afhankelijk van productie	☐
ja, afhankelijk van targets	☐
ja, afhankelijk van aantal gewerkte uren	☐
anders, namelijk	[ ]

7.

Kunt u van onderstaande groepen uitzendkrachten globaal aangeven hoe hoog het salaris per uur is?

	salaris
HBO 18 jaar	
HBO 20 jaar	
WO 18 jaar	
WO 20 jaar	

8.

Hoe vaak per jaar hebben uitzendkrachten eventueel recht op een loonsverhoging?

9.

Bied uw uitzendbureau functies aan in verschillende branches/sectoren? In het geval u nee invult kunt u doorgaan met vraag 12.

	antwoord
ja	☐
nee, vooral actief in	

10.

Stel, de functies die door uw uitzendbureau worden aangeboden aan de nog studerende uitzendkrachten kunnen worden opgedeeld in 3 branches, te weten: Productie & Callcenter
Horeca & Promotie
Dienstverlening & Financieel Administratief
Kunt u hieronder aangeven in welke branche de functies die u aanbiedt het hoogste uurloon kennen?

	antwoord
Productie & Callcenter	☐
Horeca & Promotie	☐
Dienstverlening & Fin. Administratief	☐
geen verschil	☐

11.

Kunt u bovenstaande verschil verklaren?

12.

Wat is binnen uw organisatie bepalend voor een eventuele loonsverhoging van uitzendkrachten?

- ◉ werkervaring van werknemer
- ☐ leeftijd
- ☐ afronden van opdracht
- ☐ goede beoordeling van opdrachtgever
- ☐ anders, namelijk

13.

Hoeveel uitzendkrachten (in aantallen) vallen gemiddeld onder de verantwoordelijkheid van een accountmanager?

[   ]

14.

Hoeveel uur per week besteedt een intercedent of accountmanager gemiddeld aan supervisie taken of controlerende werkzaamheden? Dit kan in de vorm zijn van een telefoontje, klantbezoek, etc.

[   ]

15.

Hoe vaak wordt de gemiddelde uitzendkracht bezocht tijdens zijn werk bij de opdrachtgever door een medewerker van uw uitzendbureau? Geeft u bij uw antwoord aan of dit per week of per maand is.

[   ]

16.

Is uw vestiging onderdeel van een groter concern? *

⦿ ja
◯ nee

17.

Evalueert u op regelmatige basis de tevredenheid van uw opdrachtgevers?

☐ ja
☐ nee

📝

18.

Hebben accountmanagers binnen uw organisaties targets die gebaseerd zijn op klanttevredenheid?

☐ ja
☐ nee

📝

19.

Zo ja, wordt het behalen van deze targets meegewogen bij het bepalen van een eventuele bonus uitbetaling van de accountmanager?

☐ ja
☐ nee

📝

20.

Is de leidinggevende van uw vestiging tevens (mede) eigenaar van de uitzendonderneming?

☐ ja
☐ nee

📝

verstuur

Pagina: 3

hartelijk dank voor uw medewerking

Appendix 2, guidance letter
Geachte heer/mevrouw,

Mijn naam is Igor Meijs en ik ben op dit moment bezig met mijn afstudeerscriptie van mijn studie Economie aan de Erasmus Universiteit Rotterdam. Voor mijn scriptie doe ik een onderzoek naar de invloed van beloning op de motivatie van personeel. Dit onderzoek zal zich specifiek richten op studenten tussen de 18 en 24 jaar die werkzaam zijn als uitzendkracht. Om verschillende redenen is het interessant om dit onderzoek specifiek op uitzendkrachten te

richten maar de belangrijkste is dat de uitzendmarkt wordt gereguleerd door de ABU-CAO waardoor de minimale beloning overal hetzelfde zal zijn.

Om mijn onderzoek zo goed en representatief mogelijk te laten zijn heb ik de medewerking nodig van zoveel mogelijk uitzendbureaus. Ik zou het dan ook erg waarderen als u een paar minuten te tijd kan nemen om de volgende vragenlijst te beantwoorden.

Het invullen van de vragenlijst gebeurt en anoniem en vertrouwelijk. Het zal niet meer dan 5 minuten van uw tijd kosten!

Link naar vragenlijst

Als u meer wilt lezen over het onderwerp voordat u de vragenlijst invult of als u geïnteresseerd bent in de achtergrond open u dan de bijlage: Verdere informatie.

Ik dank u alvast hartelijk voor uw medewerking. Als u geïnteresseerd bent in de uitkomsten van het onderzoek dan kunt u deze ontvangen door een email bericht te sturen naar igormeijs@hotmail.com met als onderwerp: Uitkomst loononderzoek.

Achtergrond onderzoek

Voor werkgevers is het in veel gevallen moeilijk om de productiviteit van werknemers te meten. Toch willen werkgevers weten of hun werknemers goed werk leveren en in ieder geval aan de minimale eisen voldoen die afgesproken zijn in een arbeidscontract. Om een beeld te krijgen van de inzet van personeel en om personeel aan te sporen om goed werk te leveren geven organisaties veel geld uit aan supervisie kosten. Onder supervisie wordt in dit geval verstaan alle activiteiten die een werkgever onderneemt om personeel te controleren. Dit kan gebeuren door middel van steekproeven, aanstellen van speciale supervisors, ophangen van camera's, onverwachte bezoekjes op de werkvloer of op vele andere manieren. Hoe het ook mag gebeuren, elke manier van supervisie zal de werkgever tijd en/of geld kosten.

Binnen de economische wetenschap bestaat er een theorie die zegt dat werknemers gemotiveerd worden door uitbetaling van een hoger loon. Werknemers die een relatief hoog loon ontvangen zullen hun best doen om zo goed mogelijk werk te leveren omdat ze in geval van herhaaldelijk slecht werk uiteindelijk ontslagen worden en hun hoge loon verliezen. Deze werknemers worden of werkeloos of gaan voor een andere organisatie werken waar ze een lager loon zullen verdienen. Werknemers willen dit voorkomen en zijn dus extra gemotiveerd om goed werk te leveren zodat ze hun goed betaalde baan kunnen behouden. Organisaties

hoeven in dat geval minder geld uit te geven aan supervisie activiteiten omdat het personeel intrinsiek gemotiveerd is om goed werk te leveren.

Deze theorie wordt in de economische literatuur de "Efficiency Wage Theory" genoemd. Tot op heden zijn er verschillende onderzoeken gedaan met als doel te testen of deze theorie ook in de praktijk wordt toegepast. Door middel van verschillende data onderzoeken is er getest of er een relatie bestaat tussen supervisie activiteiten en de hoogte van beloningen. De resultaten van deze testen zijn niet eenduidig en met dit onderzoek probeer ik dan ook een relevante aanvulling te leveren op de bestaande literatuur. Mijn aanname vooraf is dat er een negatieve relatie bestaat tussen loon en supervisie. Dit wil zeggen dat ik verwacht dat een organisatie met hoge lonen minder supervisie activiteiten zal ontplooien.

Mijn data voor dit onderzoek zal ik verzamelen onder uitzendbureaus die werken volgens de ABU-cao. Verder zal ik alleen gegevens gebruiken van nog studerende uitzendkrachten van 18 tot 24 jaar omdat bij deze groep werkervaring een minder grote rol speelt bij het bepalen van salaris.

Ik zou het erg op prijs stellen als u de moeite neemt om de vragenlijs via onderstaande link in te vullen, het zal u niet veel tijd kosten en zal voor mijn onderzoek betekenen dat de betrouwbaarheid van de uitkomsten stijgt.
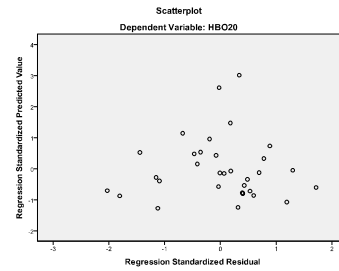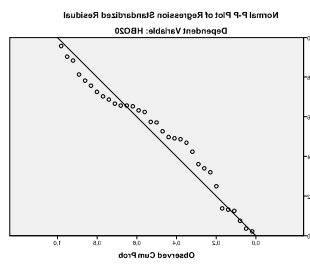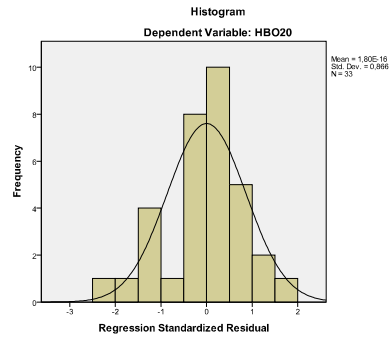
Link naar vragenlijst:

Hartelijk dank voor uw moeite

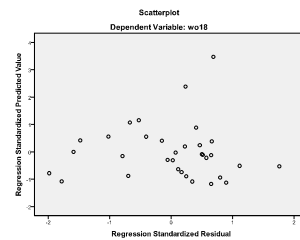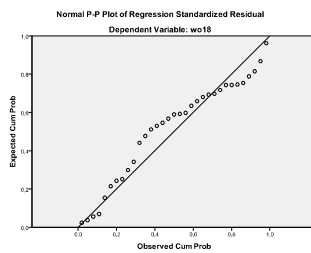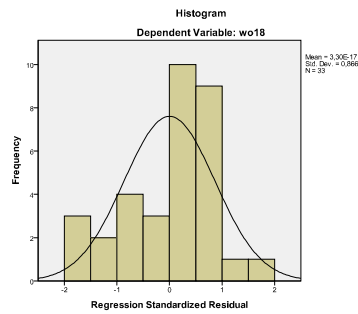**Appendix 3, Normality checks used model**
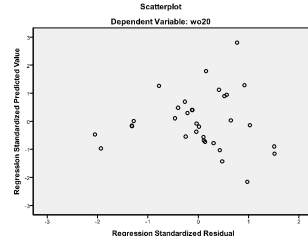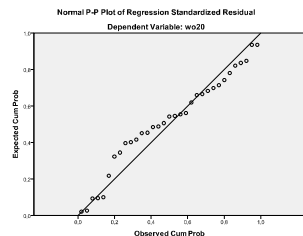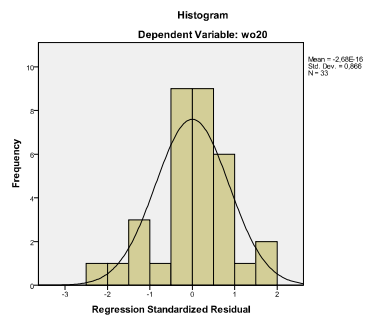

HBO 18
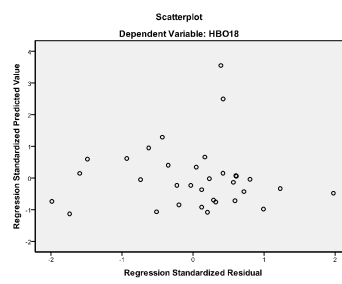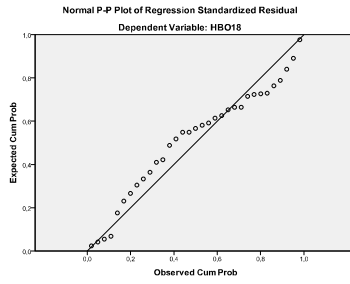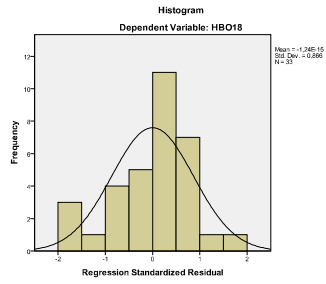
HBO 20

WO 18

WO 20

Appendix 4, Normality checks logarithmic model (with average wage as depended variable)

Histogram

Dependent Variable: Ingemloon

Mean = 8,01E-16
Std. Dev. = 0,83
N = 30

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Ingemloon

Scatterplot

Dependent Variable: Ingemloon