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The Search for Motivated Employees

A Theoretical and Empirical Research into the Screening of Worker's Motivation

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I. Introduction

Over the last decades, the economic field has become more accepting to the view that intrinsic motivation has a significant impact on the behavior of employees. This paper uses the term intrinsic motivation as described in Self-Determination Theory (Deci & Ryan, 1985). People that are intrinsically motivated for a certain activity experience interest and enjoyment during said activity. Motivation for an activity can only be considered intrinsic if the initiative for the activity is perceived to be internal. Any source of motivation that is not perceived to originate internally (e.g. a material reward or improving social standing) is considered extrinsic. Presently, many economic models include the effect of intrinsic motivation on the employee's utility. For example, the Delfgaauw & Dur (2007) model considers a situation in which a firm attempts to fill a vacancy, given that workers are heterogeneous in the level of intrinsic motivation for the job. Firms value intrinsic motivation, because it positively affects the amount of utility an employee derives from exerting effort on the job and thus induces employees to exert effort without extrinsic motivation. Unmotivated workers can be deterred from applying by offering a low wage, at the expense of an increased probability that the vacancy remains unfilled. This paper adds to the existing literature by expanding the Delfgaauw & Dur model to include the fact that firms can also choose to adjust the cost of application to deter unmotivated workers from applying.

The extended Delfgaauw & Dur model predicts that 1) employee's intrinsic motivation is positively related to effort exerted, which leads to higher productivity, 2) Firms that face relatively high (low) costs of leaving a job position unfilled offer relatively high (low) wages, 3) the utility derived from a job is increasing in intrinsic motivation, 4) given that a firm can determine both wage and cost of application, the firm will prefer to minimize cost of application and use the wage to attract highly motivated applicants and 5) given that firms are constraint by an external minimum wage, firms that identify intrinsic motivation as a relatively important (unimportant) determinant of productivity and firms that face relatively low (high) costs of leaving a vacancy unfilled are characterized by a higher (lower) cost of application.

The empirical analysis primarily consists of ordinary least squares regressions. In addition to the ordinary least squares regressions, the paper includes an instrumental variable estimation to investigate the effect of job satisfaction on intrinsic motivation, using perceived fairness of earnings as the instrument. A measure of intrinsic motivation is constructed using factor analysis. Employee data is collected from the U.S. Quality of Employment Survey (QES), which investigates the working conditions of 1,515 paid workers (20 or more hours per week) aged 16 and older for in the United States in 1977. Employer data is collected from the Multi-City Study of Urban Inequality (MCSUI), which conducted a survey among employers in Atlanta, Boston, Detroit and Los Angeles from 1992-1994.

Comparable recent research into screening has been conducted by Huang & Cappelli and Englmaier et al. However, unlike this paper, these papers do not focus on the screening of intrinsic motivation. Instead, Huang & Cappelli investigate the effects of screening for work ethic, which is described as "the ability to work hard independent of monitoring by employers or of rewards". Since this definition focuses on the ability to work hard in absence of extrinsic motivation, it is closely related to the concept of intrinsic motivation. Huang & Cappeli find that the employer's perceived importance of work ethic in assessing job applications is positively related to teamwork, employee productivity and wages for production or frontline workers. Furthermore, the employer's perceived importance of work ethic in assessing job applications is found to be negatively related to monitoring and involuntary turnover rates. Note that the findings of this paper may deviate significantly from these

related articles, because the focus on this paper is intrinsic motivation, which is based most on perceived interestingness and enjoyment of the job, whereas Huang & Cappelli focus on work ethic, which is associated, but not necessarily directly related to, these variables.

The research of Englmaier et al. complements Huang & Cappelli's work. Whereas Huang & Cappelli use data on frontline workers only, Englmaier et al. uses a much wider range of occupational groups. Furthermore, Englmaier et al. use direct information on whether a written personality test is used in the hiring process, instead of the employer's perceived importance of such tests. Englemeier et al. propose that the requirement of a personality test can be used as a measure for the level of reciprocity of the employees within a firm. In other words, according to Englemeier et al., the personality test is used to screen for worker reciprocity. Subsequently, the firm offers workers favorable working conditions, either through a high wage or good job benefits, and the worker reciprocates this gesture by exerting a high level of effort. This proposition is consistent with their findings; firms which require personality tests are more likely to provide their employees non-pecuniary benefits, are less likely to offer low wages and are more likely to provide on the job training.

The rest of the paper is structured as follows. Section II discusses and extends the Delfgaauw & Dur model, Section III presents the methodology used in the empirical analysis, section IV presents the data used in the empirical analysis, section V presents and discusses the results of the empirical analysis, and section VI concludes.

II. Theoretical background

The main hypotheses of this research are based on the model presented by Delfgaauw & Dur (2007). Their model considers a situation in which a firm attempts to fill a vacancy. The firm provides a fixed wage, has all bargaining power and can credibly commit to a minimum wage during the application procedure. There is a non-zero chance that a potential employee does not observe the vacancy and employees are, besides their intrinsic motivation, homogeneous.

2.1 Utility & profit function

Employees have a utility function of the following form:

$$U_i = U[w, c(e_i), \gamma_i e_i] \qquad with\ \frac{\partial c}{\partial e_i} < 0, \frac{\partial^2 c}{\partial e_i^2} > 0\ and\ \gamma_i \in [0, \bar{\gamma}].$$

Where w represents the fixed wage offered by the company, $c(e_i)$ represents the cost of effort exerted by employee i. The employee derives utility from his wage, thus as wage (w) increases, utility increases. Exerting effort is assumed to be costly, thus as effort (e_i) increases the employee's utility decreases. Furthermore, it is assumed that the cost of effort is a convex function of e_i; the marginal costs of exerting effort increases as the level of effort exerted increases. In other words, if the employee increases the amount of effort exerted, then the cost of exerting an extra unit of effort increases. γ_i represents intrinsic motivation of the employee; an intrinsically motivated employee ($\gamma_i > 0$) derives utility from exerting effort. The combination of intrinsic motivation and convex cost of effort implies that utility is first increasing in effort, but eventually starts decreasing in effort when the marginal cost of effort exceeds the marginal benefit of intrinsic motivation. Hence, the optimal level of effort (e_i^*) is above zero, even under a fixed wage.

Profits have the following functional form:

$$\pi = q(e_i^*) - w \qquad with\ \frac{\partial q}{\partial e_i^*} > 0\ and\ \frac{\partial^2 q}{\partial e_i^{*2}} < 0$$

Where $q(e_i^*)$ represents the production of the firm, which is determined by the optimal amount of effort exerted by the employee. Therefore, the profits of the firm depend positively on the amount of effort exerted by the employee. Delfgaauw & Dur mathematically show that it is plausible that an employee's optimal level of effort is increasing in the employee's intrinsic motivation.

Proposition I *An employee's intrinsic motivation is positively related to effort exerted, which leads to higher productivity.*

Hence, intrinsic motivation is positively related to profits, through effort and production, and thus desirable for the firm. A further implication is that the firm is willing to offer a higher wage to highly intrinsically motivated employees. However, Delfgaauw & Dur also find that highly intrinsically motivated employees require a lower wage to accept a job offer. As such, the effect of intrinsic motivation on wage is ambiguous.

2.2 Delfgaauw & Dur model

The Delfgaauw & Dur model considers a situation in which a firm creates an advertisement to fill a vacancy. The following steps represent the application procedure.

1. Firm creates an advertisement for the vacancy, in which it credibly commits to a minimum wage.
2. The potential employees who observe the ad decide whether or not to apply. If a potential employee applies, he incurs cost C.
3. After application the firm observes the applicants' level of intrinsic motivation, selects an applicant, and offers the job for a wage w.
4. Applicant accepts or rejects. Rejection yields zero profits

This section first considers the model under observable intrinsic motivation; the firm observes intrinsic motivation after a potential employee has applied. Thereafter, the model is examined under unobservable intrinsic motivation; the firm cannot observe intrinsic motivation before an applicant is hired.

Observable intrinsic motivation

First, consider a situation in which the firm does not commit to a minimum wage in stage 1. This set-up leads to a Diamond paradox (Diamond paradox (Diamond, 1971; see also Mortensen and Pissarides, 1999)). At stage 4, the employee will accept any wage offer that yields more, or equal, utility to his outside option ($U(\gamma_i, e) \geq U^{outside}$), because at that stage the cost of application is sunk. Therefore, the firm will maximise profits by offering the lowest w, which satisfies this constraint, at stage 3. However, since the employees realise the firm will extract all their rents at stage 3, but must additionally incur the application cost at stage 2, no potential employee will apply.

This paradox is resolved if the firm commits to a minimum wage (w_{min}) in the job vacancy advertisement. A sufficiently high credible minimum wage will induce some potential workers to apply. Since the firm's profits are increasing in worker motivation, the firm will choose to offer the job to the applicant with the highest intrinsic motivation at stage 3. The potential employees know w_{min} before they choose to apply, thus only the employees that would accept a wage below or equal to w_{min} have applied, which means w_{min} is always binding. Logically, if a potential employee with a certain intrinsic motivation applies, then any potential employee with a higher or equal level of intrinsic motivation will apply as well, since each potential employee has the same outside option. Any employee will apply that satisfies:

$$\mathrm{f}(\gamma_i)[\mathrm{U}(\gamma_i, \mathrm{w}_{min}) - \mathrm{U}^{outside}] - C \geq 0$$

Where $\mathrm{f}(\gamma_i)$ represents the probability that the employee will actually receive a job offer after applying. A potential employee with motivation γ_i will be offered the job only if 1) no potential employees with $\gamma > \gamma_i$ observed the advertisement and 2) he gets randomly picked from all applicants with $\gamma = \gamma_i$. The firm sets w_{min} such that:

$$f(\gamma_{min})\left[U(\gamma_{min}, w_{min}) - U^{outside}\right] - C = 0$$

Where γ_{min} is the least motivated potential employee that still wants to apply for the job. As discussed before, any potential employee with $\gamma > \gamma_{min}$ will want to apply for the job if the firm commits to w_{min}. Delfgaauw & Dur show that a change in w_{min} has benefits and costs. Increasing w_{min} decreases the minimum intrinsic motivation required to induce a potential employee to apply, thus more potential employees want to apply. Hence, increasing w_{min} has the benefit of increasing the probability that the vacancy will be filled. However, there is a chance that the newly attracted applicant has a high level of motivation and would also have applied if the wage had not increased. In this case, the increase in w_{min} is a pure cost to the firm. Additionally, Delfgaauw & Dur show that, if the distribution of intrinsic motivation is uniform and the increase in w_{min} to induce one additional potential employee type to apply is equal for all potential employee types, then there is only one optimal minimum wage (w^*_{min}) from the firm's perspective.

The fact that increasing w_{min} induces more potential employees to apply, and thus increases the probability that the firm can fill the vacancy, logically leads to the prediction that firms that face high (low) costs of leaving a job position unfilled have a high (low) optimal minimum wage. The conjecture that firms that face high costs of leaving a job position unfilled offer higher wages has also been found in the context of other search models (e.g. Burdett, Shi, & Wright, 2001; Shi, 2002; Montgomery, 1991).

Proposition II *Firms that face relatively high (low) costs of leaving a job position unfilled offer relatively high (low) wages.*

Unobservable intrinsic motivation

Under unobservable motivation, the firm cannot observe the employee's intrinsic motivation before the employee has accepted the job offer. This complicates the matter for the firm. Instead of picking the applicant with the highest intrinsic motivation at stage 3, the firm is now limited to picking a random employee from the pool of applicants.

First, consider a situation in which the firm does not commit to a minimum wage. The optimal wage offer depends on the distribution of intrinsic motivation as perceived by the firm, because the firm needs to randomly pick from the applicant pool. Suppose that the firm believes that there exists a certain level of intrinsic motivation required to just induce a potential employee to apply. Of course, given that there is a positive cost of application, any optimum wage offer at stage 4 is below the wage required to induce the potential employees with this level of intrinsic motivation to apply, because the firm will never offer a wage higher than the wage necessary to satisfy the participant constraint of the potential employee with the lowest motivation. Due to the fact that the potential employees with the lowest intrinsic motivation do not apply, the optimal wage offer at stage 4 decreases, which again causes the potential employees with the lowest motivation do no longer apply. This process continues until no potential employees are willing to apply. Hence, identical to the case with observable intrinsic motivation, the firm needs to offer a minimum wage in order to induce potential employees to apply under unobservable intrinsic motivation.

However, the fact that motivation is no longer observable has consequences for the optimal minimum wage that the firm commits to, compared to the situation under observable motivation, there is an additional cost of increasing the minimum wage. An increase in the minimum wage reduces the intrinsic motivation required to make applying worthwhile. Hence, the average intrinsic motivation

in the applicant pool goes down and thus, since the firm randomly picks an applicant, the expected intrinsic motivation of the applicant that receives the job offer goes down as well. The opposite effect occurs if the minimum wage is reduced. Since increasing the minimum wage posits additional costs the optimal minimum wage is lower for under unobservable motivation than under observable motivation.

2.3 Cost of application and employee rent

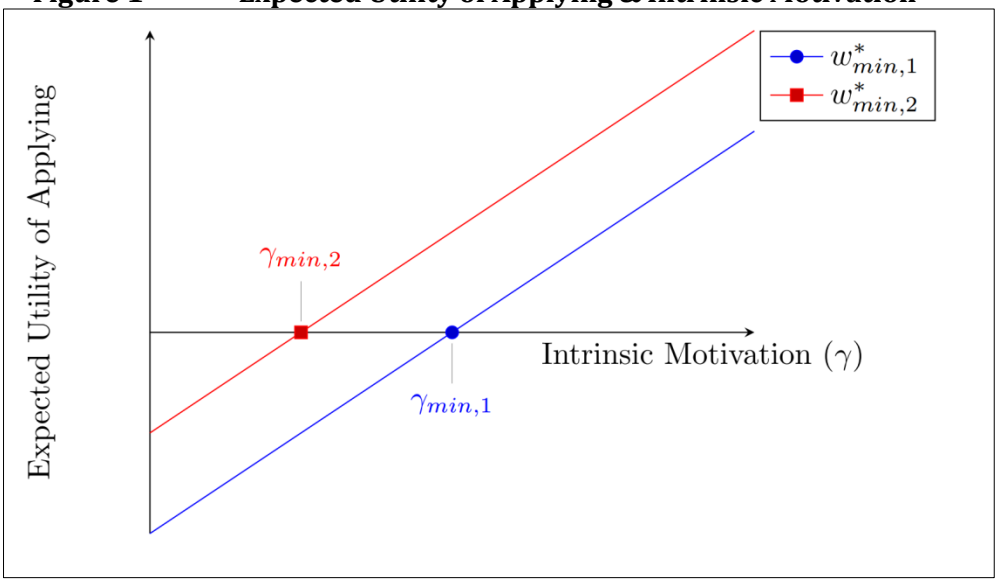
As discussed above, the cost of application requires the firm to commit to an optimal minimum wage (w^*_{min}). Due to this commitment the firm cannot extract all rents from employees that have a level of intrinsic motivation exceeding the minimum required to apply ($\gamma_j > \gamma_{min}$), which would accept $w < w_{min}$. The expected utility of applying for these employees is larger than zero;

$$f(\gamma_j)[U(\gamma_j, w_{min}) - U^{outside}] - C > 0,$$

Furthermore, this difference is increasing in intrinsic motivation, since the higher a worker's intrinsic motivation, the more utility he derives from working. Hence, for a given optimal minimum wage level, the expected utility derived from applying increases in intrinsic motivation. An increase in the optimal minimum wage increases the expected utility of all potential employees. The following figure graphically shows the interaction between the ex-ante expected utility of applying, intrinsic motivation and the firm's optimal wage level[1] (Note that $w^*_{min,1} < w^*_{min,2}$).

Proposition III *The utility derived from a job is increasing in intrinsic motivation.*

Figure 1 Expected Utility of Applying & Intrinsic Motivation



[1]For the sake of simplicity, the relationship between intrinsic motivation and expected utility of applying is depicted as linear in figure 1. However, this relationship could take any functional form, as long as the expected utility of applying is increasing in intrinsic motivation, without changing the inferences of the figure.

The intersection with the x-axis represents (γ_{min}) the level of intrinsic motivation required to make a potential employee indifferent between not applying and applying. All potential employees to the right of the intersection want to apply, because they expect a positive amount of utility. Those to the left of the intersection do not want to apply, because they expect a negative amount of utility. The figure clearly shows that an increase in the firm's optimal wage level causes an upward shift of all potential employees' expected utility. This reduces the intrinsic motivation required to make applying worthwhile (γ_{min} decreases) and thus increases the share of potential employees that are willing to apply.

The previous predictions do not hold when $C = 0$, because it is no longer necessary to commit to a minimum wage; the Diamond paradox no longer holds. Potential employees do not have to incur the cost of application in stage 2. Hence, all workers who observe the advertisement apply, because the firm will exactly meet the participation constraint of the potential employee with the highest intrinsic motivation that applies. As such, the number of applicants is determined purely by the probability of a potential employee observing the vacancy, not by the wage offered. If there is no cost of application and motivation is observable, all rents can be extracted from the potential employees. This also implies that if cost of application is zero the firm exactly meets the participation constraint and $U(\gamma_i, e) = U^{outside}$.

Note that under unobservable intrinsic motivation the firm may want to commit to a maximum wage in the advertisement, to discourage potential employees with low intrinsic motivation from applying. This increases the average intrinsic motivation in the applicant pool, which is beneficial to the firm since it must offer the job to a random applicant. Changing the maximum wage has both benefits and costs. Increasing the maximum wage benefits the firm because it causes an increase in the share of potential employees that are willing to apply and thus reduces the probability that the vacancy remains unfilled. However, an increase in the maximum wage reduces the motivation required for a potential employee to be willing to apply and thus causes the average intrinsic motivation level to decrease in the applicant pool, which, as discusses before, is costly to the firm. The optimal maximum wage is determined by the relative importance of these two effects.

Of course, the firm may offer a wage to a random applicant (at stage 3) below the maximum wage. Offering the maximum wage means that all applicants would accept and the vacancy will be filled with certainty. However, in that case there is a chance that the firm offers the maximum wage to an applicant with high intrinsic motivation, which would have accepted a wage below the maximum wage, and thus loses part of the rents of the job to the employee. Offering a wage below the maximum wage reduces the chance of the latter, but introduces the chance that an applicant is randomly picked which requires a wage higher than the firm offered and thus the vacancy remains unfilled. As such, the optimal wage offer depends on the relative importance of leaving the vacancy unfilled and offering a wage which is too high. In conclusion, under unobservable motivation and C=0, firms (especially those facing high costs of leaving the vacancy unfilled) may offer a wage which results in employees obtaining a level of utility higher than the utility of their outside option.

2.4 Cost of application as a screening tool

In addition to the wage the cost of application can also be used to screen for motivated employees. It is plausible that firms can affect the cost of application, because the firm decides how thorough the application process is. For example, some firms ask their applicants to write a motivational letter or to participate in personality testing. Similar to offering a low wage, increasing the cost of application

makes applying less attractive and thus increases the level of intrinsic motivation required to induce a potential employee to apply.

Obviously, given that firms can decide on both the wage and cost of application, wage is a more potent tool for screening than cost of application, because offering a low wage has the additional benefit of reducing wage costs. Cost of application is, in the setting of the Delfgaauw & Dur model, only a cost to the employee, but not to the firm. Hence, given that firms can decide on both the wage and cost of application, firms will prefer to have the cost of application as low as possible, such that that there is no need to commit to a minimum wage and all rents can be extracted from the potential employees. In case there is no cost of application and intrinsic motivation is unobservable, it may even be necessary to commit to a maximum wage such that the number of unmotivated employees in the pool of applicants is reduced.

Proposition IV *Given that a firm can determine both wage and cost of application, the firm will prefer to minimize cost of application and use the wage to attract highly motivated applicants.*

However, some firms may not be able to offer the optimal wage. This can arise due to a number of reasons. Firms may use the wage offered for different goals besides screening for highly motivated employees. For example, offering a high wage can be used to attract high ability workers. Indeed, it is found that mental ability and education positively affect earnings (e.g. Card, 1995 and Taubman & Wales, 1973). Recent literature found that differences in earnings due to education mainly reflect underlying ability differences (Chevalier, Harmon, Walker, & Zhu, 2004). Offering a low wage, in the context of screening for intrinsic motivation and ability, attracts employees with high intrinsic motivation and low ability (Handy & Katz, 1998). Assuming that ability is positively related to productivity, attracting low ability employees is a cost to the firm. Hence, introducing heterogeneous ability in the model of Delfgaauw & Dur introduces an additional cost to decreasing the wage offer and thus the optimal wage offer shifts upwards.

Furthermore, some firms may not be able to offer the optimal wage simply because they are bound by the minimum wage determined by law. In fact, any firm that pays its employees the legal minimum wage either has an optimal wage equal to or below the minimum wage. As such, most firms that pay the legal minimum wage cannot optimally screen for intrinsic motivation using wage. In addition to the legal minimum wage set by the government, employee bargaining power may push the actual wage above the optimal wage. In the previous section it was assumed that the firm holds all bargaining power. However, in reality it is likely that unions have considerable bargaining power and succeed in increasing wages above the firms' optimal level. Indeed, prior research in Germany and the U.S. found that unionization has a positive effect on overall worker wages, although low skilled workers benefit more from unionization than high skilled workers (Fitzenberger, Kohn, & Lembcke, 2013; Eren, 2007; Card, 1996).

When firms cannot practically use the wage to screen for motivation, either because the costs of decreasing the wage due to attracting low ability employees are too high or simply because there is a binding minimum wage, the cost of application can be used instead. This has implications for the Delfgaauw & Dur model described above (section 1.1 & 1.2). Consider a firm which subject to an externally given minimum wage ($\overline{w}_{min}$), e.g. due to union power or a legal minimum wage, which is above the firm's optimal wage ($\overline{w}_{min} > w^*_{min}$). Thus, the firm must offer a wage above their optimal wage in their job vacancy advertisement. Hence, due to the binding wage constraint, the firm cannot use the wage to attract motivated employees. However, the firm can change the cost of application

(C_f) First consider a situation in which motivation is observable. Similar to section 1.1, any employee will apply that satisfies:

$$f(\gamma_i)[U(\gamma_i, \overline{w}_{min}) - U^{outside}] - C_f \geq 0$$

The firm sets C_f such that:

$$f(\gamma_{min})\left[U(\gamma_{min}, \overline{w}_{min}) - U^{outside}\right] - C_f = 0$$

Where γ_{min} is the least motivated potential employee that still wants to apply for the job. In case changing C_f is only a cost to the applicant, decreasing C_f is costless to the firm, simply because a decrease in C_f increases the amount of potential employees that want to apply for the job and thus increases the probability that the vacancy will be filled. Therefore, the firm will reduce the cost of application as much as possible and thus increase the pool of applicants, from which the applicant with the highest intrinsic motivation is chosen. Therefore, if motivation is observable and the firm is bound by an external minimum wage, then it is optimal to minimize the cost of application; the optimal C_f is equal to zero.

However, this does not hold if intrinsic motivation is unobservable. In that case, decreasing C_f has both benefits and costs. The benefits are the same as described above. A decrease in C_f causes a decrease in the level of motivation required for a potential employee to be willing to apply, which, in turn, causes the average level of motivation in the applicant pool to decrease. This is costly the firm, because under unobservable motivation the firm needs to randomly select an applicant to offer the job to. Therefore, in case of unobservable motivation and a binding external minimum wage, firms may raise the cost of application above zero. However, the optimal cost of application only becomes larger than zero if the marginal benefit of increasing C_f exceeds the marginal cost at $C_f = 0$. Logically, the cost of raising C_f is larger (smaller) for firms that face relatively high (low) costs of leaving a job position unfilled. The benefit of raising C_f depends on the importance of intrinsic motivation to the firm, which is determined by the strength of the link between intrinsic motivation and employee productivity.

Mathematically, the expected benefit of decreasing the cost of application, which causes a decrease from γ_{min} to γ'_{min}, can be represented as follows:

$$F(\gamma'_{min})\pi(\gamma'_{min}, \overline{w}_{min})$$

$$with\ F(\gamma'_{min}) = (1-\mu)^{(N_{\gamma'_{min}} - n_{\gamma'_{min}})}[1-(1-\mu)^{n_{\gamma'_{min}}}] \qquad (0 < \mu < 1)$$

Where μ is the probability that a potential employee observes the job vacancy advertisement. $N_{\gamma'_{min}}$ is the total amount of potential employees with motivation equal to or higher than γ'_{min} and $n_{\gamma'_{min}}$ is the amount of potential employees with intrinsic motivation of exactly γ'_{min}. Hence, $F(\gamma'_{min})$ represents the chance that none of the potential employees with $\gamma > \gamma'_{min}$ observe the vacancy, but at least one of newly induced potential employees (with $\gamma = \gamma'_{min}$) does observe the vacancy. $\pi(\gamma'_{min}, \overline{w}_{min})$ gives the corresponding profits. These profits are a benefit of decreasing the cost of application, because if the cost of application had not decreased, then the vacancy would have been left unfilled.

The expected cost of decreasing the cost of application, which causes a decrease from γ_{min} to γ'_{min}, can be represented as follows:

$$\sum_{\gamma > \gamma'_{min}} F(\gamma)\,\pi(\gamma, \bar{w}_{min}) - \sum_{\gamma > \gamma_{min}} F(\gamma)\,\pi(\gamma, \bar{w}_{min})$$

$$with\ F(\gamma) = \frac{\mu n_\gamma}{\mu N_\gamma} = \frac{n_\gamma}{N_\gamma} \qquad (0 < \mu < 1)$$

$F(\gamma)$ represents the probability that an applicant with γ receives the job offer, because the firm needs to randomly select a worker to offer the job to under unobservable motivation. Due to the decrease from γ_{min} to γ'_{min}, the applicant pool has been expanded with potential employees with low intrinsic motivation (γ'_{min}) and the expected motivation level randomly drawn from the applicant pool has decreased, which consequently means the expected profits has decreased. This is mathematically represented by the fact that the first term ($\sum_{\gamma > \gamma'_{min}} F(\gamma)\,\pi(\gamma, \bar{w}_{min})$) is always smaller than the second term ($\sum_{\gamma > \gamma_{min}} F(\gamma)\,\pi(\gamma, \bar{w}_{min})$), simply because the second term includes potential employees with higher motivation than the first term. Therefore, the term in its entirety is always negative and thus a cost to the firm.

In conclusion, the optimal level of the cost of application depends on the relative size of the aforementioned cost and benefit of changing the cost of application. Firms that face high (low) costs of leaving the vacancy unfilled will find that the benefit of decreasing the cost of application is relatively large (small). Whereas firms that have job vacancy in which motivation plays a large (small) role in determining productivity will find that the cost of decreasing the cost of application is relatively (small) large.

Proposition V *Given that firms are constraint by an external minimum wage, firms that identify intrinsic motivation as a relatively important (unimportant) determinant of productivity and firms that face relatively low (high) costs of leaving a vacancy unfilled are characterized by a higher (lower) cost of application.*

2.5 Signaling of intrinsic motivation

The examples discussed in section 1.2 & 1.4 consider a situation in which motivation is either entirely observable or entirely unobservable during the application procedure. However, it is possible that applicants signal their intrinsic motivation. Delfgaauw & Dur show, given that applicants can credibly signal their intrinsic motivation to the firm, that all applicants will want to signal their motivation to increase their probability of receiving the job offer. In that case, motivation becomes observable from the perspective of the firm. However, it remains unclear whether an applicant can actually credibly signal their intrinsic motivation. One might argue that there are specific procedures during the application which allow the applicants to signal their motivation, for example by requesting applicants to write a motivational letter or to participate in personality testing. Intuitively, the applicant has an incentive to signal that their intrinsic motivation is high, even if it is low, because this increases the chance that they will be hired. However, falsely reporting intrinsic motivation may also have extensive costs; once the applicant is actually employed, and his productivity can be observed, the firm may realize that the applicant has a low intrinsic motivation and subsequently fire the employee. However, it may take a significant amount of time for the firm to realize that the employee lied, which means that the employee could benefit from the wage for some time. As such, it is unclear

to what extent applicants can actually credibly signal their motivation. It is likely that the credibility of the signal depends on the difficulty of the firm to actually observe the intrinsic motivation once the applicant is employed and the ease with which a dishonest employee can be laid off.

Moreover, the credibility of signaling may also depend on the degree to which applicants are dishonest. Recent experimental research indicates that there exists some positive amount of adversity to dishonesty (Fischbacher & Föllmi-Heusi, 2013). The participants were students from the University of Zurich and the Swiss Federal Institute for Technology in Zurich. The students were asked to roll a die, the outcome of which determined their pay-off. The individual die rolls are not observed by the researchers; the pay-off received by the participant is determined by his reported outcome. As such, participants can increase their pay-off by lying and, in the absence of adversity to such behavior, all participants would report the outcome that maximizes their pay-off. It is estimated that 22% of participants were dishonest to maximize their pay-off. However, assuming participants do not lie to their disadvantage, it is also estimated that 39% honestly report an unfavorable outcome. Furthermore, there is also a fraction of participants that are partial liars; these participants report a more favorable outcome than the actual outcome, but not the most favorable outcome possible. Although the amount of liars and partial liars increases if this experiment is repeated; there remains a significant positive share of honest participants. In conclusion, this experiment indicates there is some positive amount of lying cost which deters some participants from lying to maximize their pay-off.

A similar experiment was conducted among the German population, which found similar results (Abeler, Becker, & Falk, 2014). Participants were contacted by telephone and asked to flip a coin; tails yielded €15 and heads yielded no pay-off. The researchers could not observe the coin flip, thus giving the participants an incentive to report heads, regardless of the actual coin flip. However, 55.6% of the participants reported heads, which yielded no pay-off. This indicates that, on aggregate, the participants do not significantly overstate the preferable outcome; on aggregate people seem to truthfully report the outcome of the coin flip. Additionally, the researchers conduct a comparable experiment, in which participants are asked to flip four coins. For each of the four coin flips that results in heads, the participant receives €5 euro. If the participants are not averse to lying, one would expect that all participants report that the coin flips resulted in four times heads (€20). However, the actual reported distribution of coin flips is indistinguishable from the distribution under complete truth-telling. In conclusion, similar to the previous experiment, these results indicate that, on aggregate, people are averse to lying to some degree and thus unwilling to misreport outcomes in order to increase their pay-off.

These results may not be as strong in a job-search setting, because the potential pay-off of lying is much larger than in an experiment with relatively small pay-offs. However, this research does indicate that, at least on aggregate, people are averse to lying in their benefit to some degree. This implies that intrinsic motivation signals may be somewhat credible; signals give imperfect information on actual motivation.

The uncertainty surrounding the credibility signals of motivation raises the question whether elaborate applicant procedures can actually provide valuable information on intrinsic motivation. Intuitively, elaborate applicant procedures are likely to be characterized by high cost of application, since applicants are required to exert more effort during the application. As such, procedures designed to allow applicants to show their motivation are effective through two separate channels; the firm gains some information on applicant motivation and the cost of application deters potential employees with low motivation from applying. Assuming that firms can imperfectly estimate applicant motivation during the application procedure has two implications. First, firms are unlikely

to create barriers solely designed to increase cost of application, instead of application procedures which may give some information on motivation (e.g. personality testing and motivational letters). Second, application procedures designed to allow applicants to signal their motivation may be a better screening tool than offering a low wage, if the benefit of the extra information on applicant motivation exceeds the benefit of lower wage costs. The second implication contradicts Proposition IV, which resulted from the Delfgaauw & Dur model, because one of its underlying assumptions is that motivation is entirely unobservable to the firm. As discussed above, this assumption may not hold; it is plausible that applicant signals are not entirely incredible, which implies that signaling can give the firm some imperfect information on applicant motivation.

This subsection shows that there is uncertainty around the credibility of applicant motivation signal. The degree of credibility has large consequences for the theoretical predictions of the model, because if signals are perfectly credible, then intrinsic motivation is observable from the perspective of the firm and if signals convey no credible information, then intrinsic motivation is unobservable from the perspective of the firm. However, it is plausible that reality lies somewhere in the middle; application procedures designed to allow applicants to signal their motivation give the firm imperfect information on applicant motivation. As such, elaborate applicant procedures may have additional positive effects besides increasing the cost of application.

III. Methodology

This section describes the methodology used to empirically test the Propositions derived from the Delfgaauw & Dur model. Employer data is collected from the Multi-City Study of Urban Inequality (MCSUI) (Bobo, et al., 2000), which conducted a survey among employers in Atlanta, Boston, Detroit and Los Angeles from 1992-1994. The questions of this survey are used to show associations between a number of employer characteristics and the corresponding employer's recruitment procedure. Employee data is collected from the U.S. Quality of Employment Survey (QES) (Quinn & Staines, 1977), which investigates the working conditions of 1,515 paid workers (20 or more hours per week) aged 16 and older for in the United States in 1977. The datasets are discussed more thoroughly in section IV. The methodologies for the Propositions, which were derived from the Delfgaauw & Dur model in section II, are discussed below.

3.1 An employee's intrinsic motivation and its effect on effort exerted and job satisfaction

Proposition I *An employee's intrinsic motivation is positively related to effort exerted, which leads to higher productivity.*

Proposition I predicts that there exists a positive relationship between intrinsic motivation and optimal effort, which leads to higher productivity. However, since the QES does not contain any data on (self-reported) productivity, the analysis of this prediction is limited to the association between intrinsic motivation and self-reported worker effort. The QES contains eight questions directly related to the intrinsic enjoyment derived from working[2]. These separate questions are simplified into a single dimension, which measures the degree of intrinsic motivation, using factor analysis[3] (FA). Furthermore, the QES also includes a question relating to the willingness to exert effort above the level of effort required[4]. The following ordered logit model is estimated to quantify this link[5]:

[2] These 8 questions are: "What I do at work is more important to me than the money I earn", "My main satisfaction in life comes from my work", "My main interest in my work is to get enough money to do the other things I want" (Note that this statement is negatively related to intrinsic motivation), "The work I do on my job is meaningful to me", "I feel that most of the things I do on my job are meaningless" (opposite of the previous question), "I'd be happier if I didn't have to work at all", "the work is interesting" and "If you were to get enough money to live as comfortably as you'd like for the rest of your life, would you continue to work?". The participants can choose to answer on a 5-point scale, ranging from "strongly disagree" to "strongly agree", except for the last two questions. "The work is interesting" is answered on a 4-point scale ranging from "not at all true" to "very true" and "If you were to get enough money to live as comfortably as you'd like for the rest of your life, would you continue to work?" is answered with "yes" or "no".

[3] For the FA, all questions are measured on a 1-5 point scale. As such, the question "the work is interesting" is transformed by recoding 2, 3 and 4 to 3.33, 4.67 and 5, respectively. This effectively transforms the 1-4 point scale to a 1-5 point scale. Furthermore, the question "If you were to get enough money to live as comfortably as you'd like for the rest of your life, would you continue to work?" is transformed to a 1-5 point scale by coding "yes" as a 1 and "no" as a 5.

[4] This question is: "how much effort do you put into your job beyond what is required". The participants can choose to answer "a lot", "some", "only a little", or "none".

[5] This regression analysis only includes salaried workers and workers paid by the hour. Since these workers have no incentive to exert more effort than the minimum required besides intrinsic motivation.

$$(1) \qquad E_i = \alpha + \beta I_i + \gamma C_i + \varepsilon_i \qquad with\ \varepsilon_i \sim N(0, \sigma^2)$$

Where E_i is the self-reported effort level of employee i, I_i is the intrinsic motivation of employee i and C_i is a vector of control variables[6] related to employee i. The coefficient of interest is β, since it shows the effect of intrinsic motivation on the likelihood of an employee is to report a high level of effort.

Proposition III *The utility derived from a job is increasing in intrinsic motivation.*

The ordered logit model described above can also be used to test Proposition III, using the self-reported job satisfaction instead of effort as the dependent variable:

$$(2) \qquad S_i = \alpha + \beta I_i + \gamma C_i + \varepsilon_i \qquad with\ \varepsilon_i \sim N(0, \sigma^2)$$

Where S_i measures employee i's job satisfaction[7]. The regressors are identical to those described above. Again, the coefficient of interest is β, as it shows the effect of intrinsic motivation on the likelihood that an employee reports a high level of job satisfaction.

However, a caveat of this regression analysis is its inability to account for reverse causality. It is possible an employee's intrinsic motivation is affected by job satisfaction itself. This effect may be viewed as a form of reciprocity; an employee that feels well treated by his employer will be more motivated to exert effort on his job. The coefficient (β) in regression (2) represents the combined effect of intrinsic motivation on job satisfaction and vice versa Hence, in order to find the causal effect of intrinsic motivation on job satisfaction, the causal effect of job satisfaction on intrinsic motivation should be investigated. The causal effect of job satisfaction on intrinsic motivation is examined using instrumental variable (IV) estimation. The validity of the IV-estimation relies on the assumption that the instrumental variable is exogenous; it should only affect intrinsic motivation through job satisfaction. For example, the instrumental variable should not be associated with the type of job an employee has, since some jobs may attract more intrinsically motivated employees than others. The IV-estimation essentially extracts the effect of the instrumental variable on job satisfaction and subsequently examines whether the change in job satisfaction, due to the instrumental variable, is associated with a change in intrinsic motivation. In other words, the IV-estimation examines the effect of job satisfaction on intrinsic motivation, through the instrumental variable. This yields the causal effect of job satisfaction in intrinsic motivation, under the assumption that the instrumental variable does not directly affect intrinsic motivation.

A two-stage least squares (2SLS) regression[8] is performed to quantify the effect of job satisfaction on intrinsic motivation, through the instrumental variable. This estimation method is only valid if the

[6] The vector of control variables includes job description survey questions and job satisfaction questions (excluding those used for the principal component), gender, sector of employment, number of years worked for current employer, whether the employee has any condition limiting the amount of work he can do, hourly wage, education and race. More details on these survey questions can be found in Appendix A.

[7] Job satisfaction is measured through the survey question "All in all, how satisfied would you say you are with your job". The participants can choose to answer "very satisfied", "somewhat satisfied", "not too satisfied" or "not at all satisfied".

[8] Job satisfaction is an ordinal variable, used as a dependent variable in a linear regression. This means that the 2SLS regression assumes that the effect of the instrumental variable on job satisfaction and job satisfaction

instrumental variable (IV) is exogenous (ε_i is uncorrelated with v_i) and the relationship between the instrumental variable and job satisfaction is sufficiently strong.

$$Stage\ 1: \qquad I_i = \beta_0 + \beta_1 S_i + \beta_2 C_i + \varepsilon_i$$

$$Stage\ 2: \qquad S_i = \gamma_0 + \gamma_1 IV_i + \gamma_2 C_i + v_i$$

$$with\ \varepsilon_i, v_i \sim N(0, \sigma^2)$$

The QES includes two variables that may be used as an instrumental variable. The first is a combination of two questions, namely "Do you have anything you regard as a physical or nervous condition that limits the amount or kind of work you do?" and "Was [the condition] either caused by, or has it been made more severe by, any job you've ever had?". The employees that suffer from a condition that is not caused or aggravated by their job answer "yes" to the first question and "no" to the second question. As such, the proposed instrumental variable is binary, that takes the value of 1 for employees that answer "yes" to the first question and "no" to the second and 0 for the other employees. Since the condition is caused by an exogenous factor, outside the work environment, this variable is an appropriate candidate for instrument.

The second possible instrumental variable is measured through the question "How fair is what you earn on your job in comparison to others doing the same type of work that you do?". It is assumed that the variation in perceived fairness of earnings is exogenous. It is unlikely that this question is directly linked to intrinsic motivation, because the question focuses on the fairness of the earning compared to other workers in the same type of job. Due to the way the question is stated, employees are asked to objectively compare their earnings with their colleagues', which should be independent of personal characteristics, such as intrinsic motivation. Intuitively, it is plausible that employees that feel that they receive fair compensation are more likely to be satisfied with their job. However, whether this variable is entirely exogenous is doubtful.

If there a relationship exists between intrinsic motivation and wage, then employees may perceive such wage differences as unfair. As briefly discussed in section 2.1, the sign of the relationship between wage and motivation is ambiguous. Intrinsically motivated employees are willing to accept a lower wage, compared to unmotivated employees, due to the positive effect of motivation on job utility. However, employers are willing to offer a higher wage, because intrinsically motivated employees exert more effort. Note that any significant difference in wage between employees, within the same company, is inconsistent with the model presented in section II, because, in the context of the model, firms always commits to a minimum wage in the advertisement and this minimum wage is always binding. However, the model does not take into account that wage differences may develop after the initial hiring process, for example when the employee is promoted or receives a personal pay raise. Since wage developments after the initial hiring process are not included in the setting of the extended Delfgaauw & Dur model, the following section is outside its scope.

Investigating the effect of wage on intrinsic motivation is difficult. First, because there are many confounding factors that affect both wage and intrinsic motivation (e.g. job and employee characteristics), which may not all be observable. Second, the existence of a relationship between wage and intrinsic motivation may actually materialize through job satisfaction, which is consistent

on intrinsic motivation is equal between all categories of the job satisfaction. Furthermore, this 2SLS approach is less consistent than an estimation method that uses an ordinal logistic model in the second stage, because the dependent variable is categorical.

with the original hypothesis that employees reciprocate (possibly subconsciously) employer kindness through intrinsic motivation. Note that the latter mechanism, in theory, implies a positive relationship between wage and intrinsic motivation is positive, because wage positively affects job satisfaction, which in turn is hypothesized to positively affect intrinsic motivation. Nonetheless, the relationship between wage and intrinsic motivation is examined using the following regression analysis:

$$W_i = \alpha + \beta I_i + \gamma C_i + \varepsilon_i \quad (3)$$

$$with\ \varepsilon_i \sim N(0, \sigma^2)$$

Where W_i is the hourly wage of the employee, I_i is the intrinsic motivation measure and C_i is a vector of control variables[9].

Given that a positive relationship exists between intrinsic motivation and wage, unmotivated employees may perceive this wage difference as unfair. However, one may argue that such wage differences are in fact not unfair, because there is an underlying reason that highly motivated employees earn more, namely higher effort exerted. If unmotivated employees observe and acknowledge this difference in effort, then its resulting earnings difference may be perceived as a fair reward. Given that a negative relationship exists between intrinsic motivation and wage, motivated employees may perceive this wage difference as unfair. However, the motivated employee is compensated for this loss in wage through higher job utility received. Therefore, this wage difference may be perceived as a fair reward for the fact that unmotivated employees experience less job satisfaction. However, even if no relationship exists between wage and intrinsic motivation, intrinsic motivation on its own may be a source of perceived unfairness of earnings. An unmotivated employee may envy the fact that other, motivated employees, experience more enjoyment from the same job. In that case, the unmotivated employee may feel that they should be compensated for the lack of job enjoyment.

In conclusion, the exogeneity of this instrumental variable is disputable. First, assuming a positive relationship between intrinsic motivation and wage, wage differences may be perceived as unfair if unmotivated workers do not acknowledge that the wage difference is caused by the difference in effort exerted. Second, assuming a negative relationship between intrinsic motivation and wage, wage differences may be perceived as unfair if motivated workers do not acknowledge that the wage difference is caused by the difference in job satisfaction. Third, given that intrinsic motivation is not related to the wage, unmotivated workers may still feel that they should be compensated for their lack of job enjoyment and thus perceive their earnings as unfair. It is difficult to assume that perceived fairness of earnings and intrinsic motivation are unrelated, because of the subjective nature of fairness. Therefore, it is possible that this instrumental variable is not entirely exogenous, thus care must be taken interpreting the results of the IV-estimations.

Besides the assumption of exogeneity, the validity of the IV-estimation also relies on the strength of the relationship between the instrument and job satisfaction, as pointed out by (Bound, Jaeger, & Baker, 1995). The strength of the possible instruments is examined in section V.

[9] This is the same vector of control variables as used in model (1) and (2). However, instead of using hourly wage as control variable it is the regressor of interest. Additionally, job satisfaction is included as a control variable.

3.2 The costs of leaving a job position unfilled and wage offered

Proposition II	*Firms that face relatively high (low) costs of leaving a job position unfilled offer relatively high (low) wages.*

Testing Proposition II requires information on the employer's wage offer and the cost of leaving the vacancy unfilled. Fortunately, the MCSUI includes a question on the wage offered by the employer to fill a vacancy. Unfortunately, there is no direct question on the cost of leaving the vacancy unfilled. However, it is possible to examine the mechanism that underlies this Proposition; firms that offer higher wages should receive more applications and the vacancy is filled quicker. Hence, the analysis is split into two parts; 1) do firms that offer higher wages receive more applications and 2) do firms that offer higher wages fill the vacancy quicker? Fortunately, the survey includes questions on both the duration of the vacancies and the number of applications received. In order to investigate question 1), the following regression is estimated:

$$A_i = \alpha + \beta_{W_1} W_i + \gamma C_i + \varepsilon_i \qquad (4)$$

$$with\ \varepsilon_i \sim N(0, \sigma^2)$$

Where A_i represents the amount of applications received for the vacancy that has remained unfilled the longest out of all vacancies at the time of the survey, by employer i, W_i represents the hourly wage offered by employer[10] i and C_i is a vector of control variables[11] relating to employer i. β_{W_1} is the coefficient of interest, as it represents the amount of applications received due to a one dollar increase in hourly wage.

In order to investigate question 2), the following regression is estimated:

$$L_i = \alpha + \beta_{W_2} W_i + \gamma C_i + \varepsilon_i \qquad (5)$$

$$with\ \varepsilon_i \sim N(0, \sigma^2)$$

Where L_i represents the amount of weeks the vacancy of employer i remained unfilled. β_{W_2} is the coefficient of interest, as it represents the change in the duration of the vacancy due to a one dollar increase in hourly wage.

3.3 Application procedures and bounded wages

[10] Data on the wage offered are only available for the vacancy that has remained unfilled the longest out of all vacancies at the time of the survey for jobs that do not require a college degree; as such the regression analysis is limited to such vacancies.

[11] The vector of variables includes the required qualifications for the vacancy, recruiting methods used and a number of firm and job characteristics, which includes the city that the employer's firm is located in, location of the firm within the city, workforce size, number of sites the firm operates, whether the firm is non-profit, whether the firm is part of a franchise, the sector of the firm, share of workers covered by a collective bargaining agreement and the number of hours per week that the job offered is for.

Proposition IV	*Given that a firm can determine both wage and cost of application, the firm will prefer to minimize cost of application and use the wage to attract highly motivated applicants.*

Proposition IV states that firms which can determine their wage, and are thus not bound by a union or legal minimum wage, will prefer to use the wage over cost of application to attract motivated workers. As such, cost of application of these firms should be minimized. However, this Proposition is based on the underlying assumption that application procedures cannot produce reliable information on the applicant's intrinsic motivation. As discussed in section 1.5, it is plausible that applicants do give (partially) credible signals of their motivation. Therefore, a firm may implement application procedures, such as requiring a motivation letter or personality testing, to give applicants the chance to signal their motivation. These application procedures are costly to the applicant, but this is merely a side effect of these procedures, not its objective. Hence, firms may choose to implement such procedures, because the benefit of the information on motivation is perceived to be larger than the cost of the increase in the applicant's cost of application. As such, it is unlikely that this Proposition holds in this form in a realistic setting.

However, the Proposition may be weakened to accommodate the fact that firms may believe that certain application procedures produce useful information on motivation. The firms bound by external wages (bound firms) cannot use the wage as a screening tool, and thus must rely solely on application procedures to deter unmotivated employees, whereas firms not bound by external wages (unbound firms) can use the wage instead. Therefore, assuming that bound firms do not significantly differ from unbound firms, bound firms use application procedures more often than unbound firms. This prediction can be tested using the following logistic regression using the survey data of the MCSUI:

$$P_i = \alpha + \beta B_i + \gamma C_i + \varepsilon_i \qquad (6)$$

$$with\ \varepsilon_i \sim N(0, \sigma^2)$$

Where P_i is a certain application procedure conducted by employer i, relating to determining the motivation of the applicant. The application procedures examined in this regression analysis are 1) whether there are any tests in general for the job position 2) a test of personality or interests and 3) whether work samples are required. B_i is a variable which takes the value of 1 for bound firms and 0 for unbound firms. Firms are considered bound if all its employees are covered by a collective bargaining agreement. C_i is a vector of control variables[12] relating to the employer. Hence, β indicates how much more likely bound firms are to implement a certain application procedure than unbound firms.

Proposition V	*Given that a firm is constraint by an external minimum wage, firms that identify intrinsic motivation as a relatively important (unimportant) determinant of productivity and firms that face relatively low (high) costs of leaving a vacancy unfilled are characterized by a higher (lower) cost of application.*

[12] In addition to the control variables of regression (2), this vector of control variables also includes the employer's perceived importance of attractive physical appearance, physical neatness, politeness, verbal skills, demonstrating motivation and the ability to speak English well.

Additionally, as predicted in Proposition V, bound firms that identify intrinsic motivation as important and firms that face relatively low costs of leaving a vacancy unfilled are characterized by a higher cost of application. Unfortunately, as discussed in section 3.2, the MCSUI dataset contains no data on the cost of leaving a vacancy unfilled. However, the survey does include a question on the importance of worker motivation as perceived by the employer. Note that, comparable to Proposition IV, Proposition V is derived under the assumption that application procedures cannot produce reliable information on the applicant's intrinsic motivation, which implies that unbound firms have no benefit from implementing such application procedures. However, as discussed before, this is not necessarily a realistic assumption, since it is plausible that applicants give partially credible signals of their motivation. Therefore, both unbounded and bounded firms benefit from implementing application procedures to collect information on motivation and the magnitude of this benefit depends on the perceived importance of motivation. Regression (5) can be extended to include this effect:

$$(7) \quad P_i = \alpha + \beta B_i + \delta M_i + \gamma C_i + \varepsilon_i$$

Where M_i is the perceived importance of motivation. The perceived importance of motivation is based on the following survey question on job interviews: "How important or unimportant is demonstrating motivation". The employer can choose from three responses; "not important", "somewhat important" and "very important". The effect of the motivation importance variable (M_i) is added to the regression analysis through two dummy variables; the first dummy variable takes the value 1 if the employer answered "somewhat important" and 0 otherwise and the second dummy variables takes the value 1 if the employer answered "very important" and 0 otherwise. Hence, the coefficients (δ) of these two dummy variables show how much more likely the implementation of certain application procedure is, given the employer's perceived importance of demonstrating motivation. Additionally, an interaction term between the dummy for bound firms and the importance of motivation is added.

$$(8) \quad P_i = \alpha + \beta B_i + \delta M_i + \theta B_i M_i + \gamma C_i + \varepsilon_i$$

Note that care must be taken in the interpretation of the results of these regression analyses, because firms bound by wage may fundamentally differ from other firms. These differences should, ideally, be fully contained in the control variables used in the regression. However, it is not impossible that unobserved variables differ between the two groups and significantly affect the application procedures used by the firm.

IV. Data

This section presents the datasets used to perform the empirical tests described in section III. The QES employee dataset is discussed in section 4.1 and the MSCUI employer dataset in section 4.2.

4.1 Employee (QES) data

The summary statistics of the dependent variables used in models (1) and (2) can be found in Table I. There are 1285 possible valid observations (employees with a fixed wage; either salaried or paid by the hour). The frequency tables of the dependent variables (effort exerted and job satisfaction) show that the number of employees that exert no effort, beyond what is required, is rather small (27). As such, the dependent variable effort exerted beyond required is recoded to a variable with three categories, where the responses "none" and "only a little" are aggregated into one category. The same recoding procedure is performed for the variable job satisfaction, which includes few employees that report that they are not at all satisfied with their job. As such, this variable is also recoded from four to three categories; the responses "Not at all satisfied" and "Not too satisfied" are aggregated into one category.

Table I

Question:	How much effort do you put into your job beyond what is required?		
Variable name:	**effort**		
	Frequency	*Percent*	*Cumulative*
None	27	2.1	2.1
Only a little	64	5.0	7.1
Some	447	34.9	42.0
A lot	744	58.0	100.0
Total observations	**1282**		
Missing values	3		

Variable name:	**effort_3cat**		
	Frequency	*Percent*	*Cumulative*
None or Only a little	91	7.1	7.1
Some	447	34.9	42.0
A lot	744	58.0	100.0
Total observations	**1282**		
Missing values	3		

Question:	All in all, how satisfied would you say you are with your job?		
Variable name:	**jobsat**		
	Frequency	*Percent*	*Cumulative*
Not at all satisfied	32	2.5	2.5
Not too satisfied	111	8.7	11.2
Somewhat satisfied	539	42.0	53.2
Very satisfied	600	46.8	100.0
Total observations	**1282**		
Missing values	3		

Variable name:	**jobsat_3cat**		
	Frequency	*Percent*	*Cumulative*
Not at all or not too satisfied	143	11.2	11.2
Somewhat satisfied	539	42.0	53.2
Very satisfied	600	46.8	100.0
Total observations	**1282**		
Missing values	3		

The regressor of interest is intrinsic motivation, which is derived from a collection of questions using factor analysis. Summary statistics of the questions used to construct the latent intrinsic motivation variable can be found in Table II, on page 18. This table also includes the expected sign of the correlation with the latent variable intrinsic motivation. These signs are all intuitive, except for the last question: "If you were to get enough money to live as comfortably as you'd like for the rest of your life, would you continue to work?". This question is coded with a 1 corresponding to "yes" and 5 to "no", thus, intuitively, one would expect that a high value on this question corresponds to an employee with low intrinsic motivation.

Table II

Question	Responses	Mean	Std. Dev	Exp. corr.
"What I do at work is more important to me than the money I earn"	1460	3,02	1,34	+
"My main satisfaction in life comes from my work"	1472	2,70	1,29	+

"My main interest in my work is to get enough money to do the other things I want"	1473	2,93	1,30	-
"The work I do on my job is meaningful to me"	1481	3,90	1,01	+
"I feel that most of the things I do on my job are meaningless"	1473	1,77	0,91	-
"I'd be happier if I didn't have to work at all"	1474	2,28	1,30	-
"the work is interesting"	1486	4,03	1,20	+
"If you were to get enough money to live as comfortably as you'd like for the rest of your life, would you continue to work?"	1500	2,16	1,80	-
Number of observations that has a valid response for each of the questions above	**1403**			

The actual correlations with the intrinsic motivation variable can be found in Table III, which reports the results of the factor analysis. The factor analysis includes all 1403 observations in the QES dataset that include a valid answer for all questions reported in Appendix A (page 38-42). The results show that the expected correlations are confirmed by the actual correlation found in the factor analysis. Since this research is only interested in deriving intrinsic motivation from these questions only the component with the highest eigenvalue is extracted. This component is consequently used as the measure for intrinsic motivation in models (1) and (2).

Table III

Question	Communalities	Corr. with component
"What I do at work is more important to me than the money I earn"	0.468	0.684
"My main satisfaction in life comes from my work"	0.310	0.556
"My main interest in my work is to get enough money to do the other things I want"	0.339	-0.583
"The work I do on my job is meaningful to me"	0.516	0.718
"I feel that most of the things I do on my job are meaningless"	0.243	-0.493
"I'd be happier if I didn't have to work at all"	0.202	-0.449
"the work is interesting"	0.502	0.709
"If you were to get enough money to live as comfortably as you'd like for the rest of your life, would you continue to work?"	0.109	-0.330
Kaiser-Meyer-Olkin measure of sampling adequacy	0.764	
Barlett's test of sphericity (signficance)	0.000	
Eigenvalue of component	2.69	
% variance in questions explained by component	33.6	

Summary statistics on all regressors used in models (1), (2) and (3) can be found in Appendix A. Since the models (1), (2) and (3) include only employees that are either salaried or paid by the hour, these summary statistics are calculated using this subsample. The main regressor of interest is intrinsic motivation, as measured by the component estimated in the factor analysis. The other variables are control variables. Note that the hourly wage data is based on a relatively small number of responses (640), which means that any specification of model (1) or (2) that includes this variable is estimated using this relatively small sample.

4.2 Employer (MSCUI) data

The summary statistics of the dependent variables used in models (3), (4) and (5) can be found in Table IV. Out of the 3510 possible respondents, 761 employers report the number of days that the vacancy[13] has remained vacant and 1099 employers report the number of applications that they have received for the vacancy.

Table IV

Dependent variables, models (3), (4) & (5)

Name	*N*	*Min*	*Max*	*Mean*	*St. Dev*
Days Vacant	761	7.000	730.0	71.34	106.9
Number of applications	1099	0.000	6000	68.55	285.4
Log(Hourly wage)	640	-0.12	1.93	0.646	0.216

Summary statistics of all regressors, including control variables, can be found in Appendix B (page 43-47). The regressor of interest is the hourly wage offered for the vacancy. In order to limit the effect of erroneous data on the regression results, employers that offer an hourly wage offered above 100 are excluded from the sample[14].

The summary statistics of the dependent variables used in models (5), (6) and (7) can be found in Table V. Roughly a third of employers require applicants to participate in a test. The test of personality or interests is used least often; only 6% of employers state that they require such a test.

Table V

Dependent variables, models (5), (6) & (7)

Do you require a test?

	Frequency	*Percent*	*Cumulative*
Yes	1153	33.0%	33.0%
No	2346	67.0%	100.0%
Total	3499		
Missing values	11		

Do you require a general aptitude test?

	Frequency	*Percent*	*Cumulative*
Yes	410	11.7%	11.7%
No	3093	88.3%	100.0%
Total	3503		
Missing values	7		

Do you require a job knowledge test?

	Frequency	*Percent*	*Cumulative*

[13] The employers are asked for the vacancy that has remained vacant the longest out of all vacancies at the time of the interview.

[14] There are two observations in the dataset that include an hourly wage offered above 100.

Yes	604	17.2%	17.2%
No	2900	82.8%	100.0%
Total	3504		
Missing values	6		

Do you require a test of personality or interests?

	Frequency	*Percent*	*Cumulative*
Yes	210	6.0%	6.0%
No	3294	94.0%	100.0%
Total	3504		
Missing values	6		

Summary statistics of the additional control regressors that are used models (5), (6) & (7), but not in models (3) & (4), can be found in Appendix C (page 48-49). The regressors of interest are the bound firms and the perceived importance of demonstrating motivation. Out of 3289 valid responses, 247 employers indicate that all employees are covered by a collective bargaining agreement; these employers are considered to be bound by an external wage. Furthermore, demonstrating motivation seems to be deemed very important by a large proportion of employers (74.8%), which indicates that employers view intrinsic motivation as a positive employee trait. Since there are few employers that deem demonstrating motivation to be unimportant (1.3%), the categories "not important" and "somewhat important" are combined into one category. The combined variable is presented in the table directly below the original variable.

V. Results

This section presents the results of the models described in section III. First, the results of the regression analysis on the effect of intrinsic motivation on employee effort and job satisfaction is discussed in section 5.1. Second, the mechanics underlying the proposition that the costs of leaving a job position unfilled is positively related to the wage offered is examined in section 5.2. Last, the relationship between application procedures, bounded wages and the perceived importance of motivation is investigated in section 5.3.

5.1 The effect of intrinsic motivation on employee effort and job satisfaction

The results of the ordered logit models presented in section 3.1 can be found in Table VI and VII. The models are estimated using six different specifications, which differ in the combination of control variables used.

Table VI

Model (1)

Dependent variable:	effort exerted beyond required					
Variable name:	effort_3cat					
Frequency table dependent variable						
None or Only a little	84	53	81	60	59	34
Some	423	229	404	325	321	182
A lot	692	315	637	509	502	252
Sample size	1199	597	1122	894	882	468
Missing values	86	688	163	391	403	817
Total	1285	1285	1285	1285	1285	1285
Model Estimation						
μ_1	-2,790***	-2,794***	-1,803***	0,242	1,908	0,506
μ_2	-0,341***	-0,362*	0,763	3,118***	4,958***	3,756**
Intrinsic motivation measure	0,656***	0,733***	0,700***	0,578***	0,617***	0,792***
Job survey and description questions				X	X	X
Employee characteristics			X		X	
Hourly wage		X				X
*. ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.						
Marginal effect of Motivation						
Average motivation:	0,024	0,024	0,024	0,024	0,024	0,024
marginal effect of Motivation on P(y= None or Only a little)	-3,5%	-3,9%	-8,4%	-14,3%	-7,0%	-18,7%
marginal effect of Motivation on P(y= Some)	-12,4%	-13,8%	-6,9%	11,9%	6,6%	16,9%
marginal effect of Motivation on P(y= A lot)	15,9%	17,7%	15,3%	2,4%	0,4%	1,8%

First consider the results for model (1) (Table VI). These results show a positive and significant coefficient for the intrinsic motivation measure across all specifications, which means that a high (low) level of intrinsic motivation increases the chance that an employee reports a high (low) level of effort exerted. This effect of intrinsic motivation can be quantified using the marginal effect of the intrinsic motivation measure on the probability that an employee chooses "None or a little", "Some" or "A lot".

Since the coefficient of the intrinsic motivation measure is positive, its marginal effect on the probability that an employee chooses "None or a little" is always negative and its marginal effect on the probability that an employee chooses "A lot" is always positive. For example, the first specification, without control variables, indicates that a standard deviation increase of the intrinsic motivation measure (which is roughly equal to 1) increases the probability that an employee chooses to report that he exerts a lot of effort beyond what is required by 15.9%. This increase is balanced by a decrease in probability that the employee chooses "None or only a little" or "Some" of 3,74% and 23,3%, respectively. Note that in the results the marginal effect is calculated at the mean level of the intrinsic motivation measure (0.024).

The coefficient of intrinsic motivation changes little when different control variables are added to or removed from the model. However, the estimation of the thresholds (μ1 and μ2) becomes problematic when the number of control variables increases, as their standard errors increase. As such, the marginal effects are more accurate for the specifications with fewer control variables.

Table VII

	Model (2)					
Dependent variable:	Job satisfaction					
Variable name:	jobsat_3cat					
Frequency table dependent variable						
Not at all or not too satisfied	137	79	134	107	106	63
Somewhat satisfied	511	298	488	391	385	232
Very satisfied	553	222	502	396	391	173
Sample size	1201	599	1124	894	882	468
Missing values	84	686	161	391	403	817
Total	1285	1285	1285	1285	1285	1285
Model Estimation						
μ_1	-2,495***	-2,080***	-2,395***	0,955	1,402	0,730
μ_2	0,196***	0,863***	0,409	4,654***	5,248***	4,963***
Intrinsic motivation measure	1,045***	1,024***	1,098***	0,755***	0,804***	1,043***
Job survey and description questions				X	X	X
Employee characteristics			X		X	
Hourly wage		X				X
*. ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively						
Marginal effect of Motivation						
Average motivation:	0,024	0,024	0,024	0,024	0,024	0,024
marginal effect of Motivation on P(y= Not at all or not too satisfied)	-7,2%	-9,9%	-8,2%	-15,3%	-12,9%	-23,1%

marginal effect of Motivation on P(y= Somewhat satisfied)	-18,7%	-11,7%	-18,2%	14,6%	12,5%	22,3%
marginal effect of Motivation on P(y= Very satisfied)	25,9%	21,6%	26,5%	0,7%	0,4%	0,7%

Now consider the results for model (2) (Table VII). These results show that the intrinsic motivation measure is also positively related to job satisfaction; a high (low) level of intrinsic motivation increases the probability that an employee reports a high (low) level of job satisfaction. The first specification indicates that a standard deviation increase in the intrinsic motivation measure increases the probability that an employee chooses to report that he is "very satisfied" by 25.9%. Accordingly, the probability that an employee chooses to report that he is "Not at all or not too satisfied" or "somewhat satisfied" decreases by 7,2% and 18,7%, respectively.

Again, the coefficient of the intrinsic motivation measure is not sensitive to the introduction or deletion of control variables from the model. However, the estimation of the thresholds is characterized by high standard errors when there are many control variables added to the model. In conclusion, the results of the ordered logit models indicate that intrinsic motivation is positively associated with self-reported effort exerted and job satisfaction.

However, as discussed in section 3.1, reverse causality may play a role in model (2); job satisfaction may also affect intrinsic motivation. Hence, an additional IV-estimation is performed to investigate the causal effect of job satisfaction on intrinsic motivation. However, as discussed in section 3.1, the link between wage and intrinsic motivation must first be investigated.

Table VIII

Model (3)

Dependent variable:	log(hourly wage)				
Regressor:	Intrinsic motivation				
Sample size	599	599	580	468	461
Missing values	686	686	705	817	824
Total	1285	1285	1285	1285	1285
Regression results					
Intrinsic motivation	-0.006	-0.017*	-0.012*	-0.021**	-0.025**
Job survey and description questions				X	X
Employee characteristics			X		X
Job satisfaction		X			X

*. ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively

Table VIII reports the results of the regression analysis of model (3), presented in section 3.1. The results show weak evidence of a negative relationship between intrinsic motivation and hourly wage. Since the dependent variable is the log of the hourly wage, the coefficient approximates the semi-elasticity of the effect of intrinsic motivation on wage. Specifically, the results indicate that a one standard deviation increase in intrinsic motivation is associated with a roughly 1.5-2.0% lower wage. Hence, highly motivated employees may feel that their earnings are lower than they deserve. This implies that intrinsic motivation is possibly negatively associated with perceived fairness of earnings,

which means that the instrumental variable is not entirely exogenous. As such, the coefficient estimated in the IV-estimation suffers from a downward bias, because the instrumental variable, perceived fairness of earnings, may negatively affect the dependent variable, intrinsic motivation. Fortunately, the hypothesized sign of the coefficient is positive; since a positive relationship between job satisfaction and intrinsic motivation is expected. Hence, if highly motivated perceive that their earnings are lower than they deserve, then the coefficient of the IV-estimation is a prudent measure of the actual magnitude of the effect.

Before the IV-estimation can be performed, the strength of the proposed instrumental variables must be examined. The results of the regression of the instrumental variables on job satisfaction are presented in Table IX.

Table IX

Reduced form equations: stage 2

Dependent variable: Job satisfaction **Regressor:** condition (not caused by job)		**Dependent variable:** Job satisfaction **Regressor:** Fairness of earnings	
Frequency table		**Frequency table regressor**	
Yes	76	Much less than I deserve	154
No	1202	Somewhat less than I deserve	323
		About as much as I deserve	744
		More than I deserve	25
Sample size	1278	Sample size	1246
Missing values	7	Missing values	39
Total	1285	Total	1285
Regression results		**Regression results**	
Condition (Yes)	-0.030	Somewhat less than I deserve	0.290***
		About as much as I deserve	0.534***
		More than I deserve	0.652***
F-statistic	0.138	F-statistic	34.76
R^2	0.000	R^2	0.077

*. ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively

The results show that the effect of having a physical or nervous condition, not caused or aggravated by the job, is negative but insignificant. Hence, it must be concluded that this instrument is not sufficiently strong enough to be used in the IV-estimation. The relationship of the variable "fairness of earnings" on job satisfaction is examined using dummy variables. The dummy variable for the category "Much less than I deserve" is excluded from the regression, thus the coefficients denote the difference in job satisfaction compared to the employees that answered "Much less than I deserve. The coefficients are all positive and significant; employees that believe that they earn less than they deserve are less satisfied with their job. The F-statistic is sufficiently large (34.76) to conclude that the instrument is strong enough to use in the IV-estimation. Based on these results, the IV-estimation will be performed using the perceived fairness of earnings as instrument.

Table X

Two-stage least squares regressions

Dependent variable:	Intrinsic motivation				
Regressor:	Job satisfaction				
Instrument:	fairness of earnings (dummy variables)				
Sample size	1172	591	875	1101	456
Missing values	113	694	410	184	829
Total	1285	1285	1285	1285	1285
Regression results					
Job satisfaction	0.434***	0.549**	0.586**	0.438***	0.687
Job survey and description				X	X
Employee characteristics			X		X
Hourly wage		X			X

The results of the Two-stage least squares regressions can be found in Table X. These results show that job satisfaction, through fairness of earnings, significantly positively affects intrinsic motivation. Note that job satisfaction is measured on a 4 points scale, thus the coefficients indicate that a one point increase in job satisfaction is associated with roughly a half standard deviation increase in intrinsic motivation. The coefficient is not significant in the specification that uses all control variables, but the size of the coefficient is not affected. As such, the insignificant result is caused by the relatively small sample size and loss of degrees of freedom, due to the large number of control variables. In conclusion, these results show, assuming that the instrument is exogenous, that job satisfaction itself positively affects intrinsic motivation. As such, an increase in job satisfaction can motivate employees and thus increase their effort exerted. Hence, these results imply that profit-maximizing firms may value the happiness of their employees, because increasing job satisfaction can motivate employees and thus increase their effort exerted. Recent academic research has found similar results in an experimental setting with employees that receive piece-rate pay. Randomly selected individuals that are made happier, either through showing them a comedy clip or providing them with chocolate, fruit and drinks, have approximately 12% greater productivity (Oswald, Proto, & Sgroi, 2015).

5.2 The costs of leaving a job position unfilled and wage offered

The results of the regression analysis presented in section 3.2 can be found in Table XI (See page 28). The models are estimated using four different specifications, which differ in the combination of control variables used. First, consider the results of model (4). The wage offered does not significantly affect the number of applications in the specifications that do not include firm and job characteristics. However, the effect of wage offered does seem to be significantly positive in the specification that includes all control variables, namely required qualifications, recruitment methods and firm and job characteristics. This specification finds that a one dollar increase in wage offered is associated with a 10 increase in the number of applications. The finding that the wage offered is (insignificantly) negatively related to the number of applications without control variables, but positively related with control variables, can perhaps be explained by the expectations that employers have of the attractiveness of the job offered. An employer that expects to receive many applications, for example

because many people are intrinsically motivated for the job offered (the job is attractive), will not have to offer a wage as high as an employer that expects few applications. This implies that there exists a negative correlation between the attractiveness of a job and the wage offered. Hence, the inclusion of firm and job characteristics caused the correlation between the wage offered and the number of applications received to become positive, because it contains variables that are related to the attractiveness of the firm and job.

Table XI

Model (4)

Dependent variable:	**Number of applications**			
Sample size	614	613	603	253
Missing values	2896	2897	2907	3257
Total	3510	3510	3510	3510
Model estimation				
Wage offered	-4.676	-0.872	-0.355	9.698*
Required Qualifications		X	X	X
recruitment methods used			X	X
Firm/job characteristics				X

Model (5)

Dependent variable:	**Days vacant**			
Sample size	397	395	389	175
Missing values	3113	3115	3121	3335
Total	3510	3510	3510	3510
Model estimation				
Wage offered	2.839*	2.091	2.273	-0.701
Required Qualifications		X	X	X
recruitment methods used			X	X
Firm/job characteristics				X

*. ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively

Now consider the results of model (5). Contrary to the results of model (4), the wage offered is significantly positively related to the number of days that the job has remained vacant only for the specification that does not include control variables. However, a negative sign was expected, as discussed in section 3.2. The inclusion of the control variables does cause the effect to change sign, but it remains insignificant. Again, these findings can perhaps be explained by the attractiveness of the job offered. An employer that expects to fill the vacancy quickly, for example because many people are intrinsically motivated for the job offered (the job is attractive) and thus will receive many applications, will not have to offer a wage as high as an employer that expects that the vacancy will remain unfilled for a significant amount of time. This implies that there exists a negative correlation between the attractiveness of a job and the wage offered. Since the attractiveness of a job negatively affects the amount of time that the vacancy remains unfilled, the wage offered can be positively correlated with the length of the period that the vacancy remains unfilled, if the regression is not controlled for the attractiveness of the job. Hence, the addition of the firm and job characteristics to

the regression causes the sign to switch of the correlation between wage offered and days vacant from positive to negative. However, since the effect is not significant it cannot be concluded that the wage offered is negatively associated with the length of the period that a vacancy remains unfilled.

Of course, the job and firm characteristics cannot perfectly account for the effect of job attractiveness. As such, if future research is conducted on this topic, a more efficient method of controlling for the effect of job attractiveness may be to simply dedicate a survey question to the attractiveness of the firm and job offer for applicants, as perceived by the employer.

5.3 Application procedures, bounded wages and the perceived importance of motivation

The results of the binary logistic models presented in section 3.3 can be found in Table XII. Each test is used as a dependent variable in nine specifications. The first three specifications present the results of model (6), with bound firms as the regressor of interest. The next three specifications present the results of model (7), with bound firms and the importance of motivation (as perceived by the employer) as the regressors of interest. The last three specifications present the results of model (8), with bound firms, the importance of motivation and the interaction of these two variables as the regressors of interest.

Table XII

Models (6), (7) & (8)

Dependent variable:	**Any test**								
Frequency table dependent variable									
No	2196	628	1064	2155	625	1045	2155	625	1045
Yes	1083	364	470	1062	363	463	1062	363	463
Sample size	3279	992	1534	3217	988	1508	3217	988	1508
Missing values	231	2518	1976	293	2522	2002	293	2522	2002
Total	3510	3510	3510	3510	3510	3510	3510	3510	3510
Constant	-0.769***	-0.973	-0.971***	-0.684***	-0.864	-0.887***	-0.685***	-0.830	-0.857**
Bound	0.761***	0.627**	0.136	0.784***	0.611**	0.192	0.800***	0.005	-0.434
Importance motivation	-	-	-	-0.118	-0.222	-0.115	-0.116	-0.257	-0.157
Bound*Importance_motivation	-	-	-	-	-	-	-0.022	0.732	0.808
Perceived importance		X			X			X	
Required Qualifications		X			X			X	
recruitment methods used		X			X			X	
Firm/job characteristics			X			X			X
Bound on P(y=Yes) at Bound = 0.0	16.52%	12.50%	2.71%	17.50%	12.77%	3.98%	17.86%	0.11%	-9.08%
Importance Motivation on P(y=Yes) at Importance Motivation = 0.0				-2.63%	-4.63%	-2.38%	-2.58%	-5.43%	-3.28%
Bound*Importance Motivation on P(y=Yes) at Bound*Importance Motivation = 0.0							-0.49%	15.48%	16.78%

Table XII (continued)

Dependent variable:	**General aptitude test**								
Frequency table dependent variable									
No	2905	864	1378	2844	860	1353	2844	860	1353
Yes	378	128	157	372	128	155	372	128	155
Sample size	3283	992	1535	3216	988	1508	3216	988	1508
Missing values	227	2518	1975	294	2522	2002	294	2522	2002
Total	3510	3510	3510	3510	3510	3510	3510	3510	3510
Constant	-2.122***	-4.508***	-2.109***	-2.021***	-4.481***	-2.026***	-2.026***	-4.410***	-1.994***
Bound	0.829***	0.626	-0.027	0.848***	0.863***	-0.059	0.889***	0.122	-0.753
Importance motivation	-	-	-	-0.134	-0.354	-0.064	-0.126	-0.411*	-0.122
Bound*Importance_motivation	-	-	-	-	-	-	-0.059	0.894	0.876
Perceived importance		X			X			X	
Required Qualifications		X			X			X	
recruitment methods used		X			X			X	
Firm/job characteristics			X			X			X
Marginal effects									
Bound on P(y=Yes) at Bound = 0.0	7.92%	0.67%	-0.26%	8.76%	0.96%	-0.61%	9.15%	0.14%	-7.94%
Importance Motivation on P(y=Yes) at Importance Motivation = 0.0				-1.38%	-0.39%	-0.66%	-1.30%	-0.49%	-1.29%
Bound*Importance Motivation on P(y=Yes) at Bound*Importance Motivation = 0.0							-0.61%	1.06%	9.24%

Dependent variable:	**Job knowledge test**								
Frequency table dependent variable									
No	2716	812	1276	2661	808	1255	2661	808	1255
Yes	568	181	260	556	181	254	556	181	254
Sample size	3284	993	1536	3217	989	1509	3217	989	1509
Missing values	226	2517	1974	293	2521	2001	293	2521	2001
Total	3510	3510	3510	3510	3510	3510	3510	3510	3510
Constant	-1.584***	-1.070	-1.344***	-1.491***	-1.016	-1.193***	-1.511***	-1.019	-1.171***
Bound	0.243	0.084	-0.561	0.268	0.100	-0.463	0.470	0.149	-1.053
Importance motivation	-	-	-	-0.131	-0.077	-0.189	-0.103	-0.074	-0.22
Bound*Importance_motivation	-	-	-	-	-	-	-0.294	-0.060	0.739
Perceived importance		X			X			X	
Required Qualifications		X			X			X	
recruitment methods used		X			X			X	
Firm/job characteristics			X			X			X
Bound on P(y=Yes) at Bound = 0.0	3.43%	1.60%	-9.20%	4.02%	1.95%	-8.27%	6.96%	2.90%	-19.02%
Importance Motivation on P(y=Yes) at Importance Motivation = 0.0				-1.96%	-1.50%	-3.37%	-1.53%	-1.44%	-3.97%
Bound*Importance Motivation on P(y=Yes) at Bound*Importance Motivation = 0.0							-4.35%	-1.17%	13.35%

Table XII (continued)

Dependent variable:	**Personality or interest test**								
Frequency table dependent variable									
No	3092	935	1448	3030	932	1422	3030	932	1422
Yes	192	56	87	187	55	86	187	55	86
Sample size	3284	991	1535	3217	987	1508	3217	987	1508
Missing values	226	2519	1975	293	2523	2002	293	2523	2002
Total	3510	3510	3510	3510	3510	3510	3510	3510	3510
Constant	-2.813***	-6.787***	-2.515***	-2.977***	-6.585***	-2.719***	-2.983***	-6.629***	-2.645***
Bound	0.388	0.626	-0.187	0.210	0.396	-0.201	0.418	0.951	-6.578
Importance motivation	-	-	-	0.366	0.398	0.303	0.218	0.444	0.224
Bound*Importance_motivation	-	-	-	-	-	-	-0.07	-0.66	6.668
Perceived importance		X			X			X	
Required Qualifications		X			X			X	
recruitment methods used		X			X			X	
Firm/job characteristics			X			X			X
Bound on P(y=Yes) at Bound = 0.0	2.07%	0.07%	-1.29%	0.97%	0.05%	-1.17%	1.92%	0.13%	-40.72%
Importance Motivation on P(y=Yes) at Importance Motivation = 0.0				1.69%	0.05%	1.76%	1.00%	0.06%	1.39%
Bound*Importance Motivation on P(y=Yes) at Bound*Importance Motivation = 0.0							-0.32%	-0.09%	41.28%

First, consider the effect of firms being bound on the probability that a certain test is required by the employer. The bound firms seem to be more likely to require a test, but this effect is only significant and positive for the specifications that do not include firm and job characteristics. The same pattern can be observed for the general aptitude test. The other tests do not seem to show a significant difference between bound and non-bound firms at all. As such, it is not possible to conclude that bound firms are more likely to require applicants to participate in a test, since the positive effect disappears when job and firm characteristics are added to the model.

The employer's perceived importance of motivation also does not significantly positively affect the probability that a test is required. The only significant result is a negative correlation with the probability that a general aptitude test is required, whereas a positive effect was expected. However, this result is only significant at the 10% level, and is not persistent across the specifications. One would expect that the test of personality or interest is most likely to be significantly positively affected by the importance of motivation, because, intuitively, it is plausible that intrinsic motivation is closely related to the employee's personality and interests. Indeed, the sign of the coefficient for the importance of motivation is consistently positive, but not significant. There are two reasons that make finding significant results difficult. First, specifically for the test of personality or interest, there are relatively few firms that require such a test, which means that the "Yes" category is rather small (minimum of 55 observations). Second, as discussed before, there are very few employers that indicate that motivation is not important, which made it necessary to limit the variable to two categories; Somewhat/Not important and very important (see Appendix C). However, the difference

between somewhat important and very important may be too small to cause any sizeable difference in the employer's decision to require a test. In conclusion, it cannot be concluded that the perceived importance of motivation is positively correlated with the probability that an employer requires a test of personality or interest. This is a remarkable result, since the results of the related literature of Huang & Cappelli (2010) are based on the assumption that the perceived importance of a certain attribute increases the likelihood that a test is used to measure this attribute.

However, the lack of a significant result may be due to the fact that there are very little employers in the dataset that find importance unimportant. It is also possible that employers do not think that intrinsic motivation can be inferred from testing. The latter explanation is consistent with the fact that many employers perceive motivation as important, but the proportion of employers that require a test of personality or interest is very small (6%). Last, it is possible that the association between the perceived importance of motivation and personality testing had not yet materialized at the time of the survey (1993-1994), whereas it did emerge in the dataset of Huang & Cappelli (1997). A possible cause of this trend may be an increase in the quality of personality tests and psychological understanding of worker motivation over time in response to the high perceived importance of motivation as a worker trait. However, since this analysis is based on a cross-sectional dataset, it is impossible to study this proposition.

Last, the coefficient of the interaction term is also not significant in any of the specifications. This means that there is no significant association between the perceived importance of motivation and the probability that a test is required for bound firms. As such, from this analysis no significant association between the perceived importance of motivation and employer's requiring a test is found, neither for bound firms nor for non-bound firms.

VI. Conclusion

This paper expands the Delfgaauw & Dur model by hypothesizing the employers can not only use the wage, but also the cost of application to screen applicants for intrinsic motivation. For example, an

employer can require the applicant to perform a work sample during the application procedure, which increases the cost of application as perceived by the applicant and thus deters the lesser motivated workers from applying. From the perspective of the firm, changing the cost of application has both benefits and costs. Increasing the cost of application deters unmotivated workers from applying, which is beneficial if intrinsic motivation is not observable. However, the fact that the increase in cost of application makes fewer workers willing to apply, implies that there is an increased probability that no worker applies, which means that the position remains unfilled.

The theoretical model produces five propositions. First, an employee's intrinsic motivation is positively related to effort exerted, which leads to higher productivity. Second, firms that face relatively high (low) costs of leaving a job position unfilled offer relatively high (low) wages. Third, the utility derived from a job is increasing in intrinsic motivation. Fourth, given that a firm can determine both wage and cost of application, the firm will prefer to minimize cost of application and use the wage to attract highly motivated applicants. And last, given that firms are constraint by an external minimum wage, firms that identify intrinsic motivation as a relatively important (unimportant) determinant of productivity and firms that face relatively low (high) costs of leaving a vacancy unfilled are characterized by a higher (lower) cost of application. Empirical analysis is conducted to examine whether these propositions materialize in reality.

A proxy for intrinsic motivation is created through factor analysis, using employee data collected from the U.S. Quality of Employment Survey (QES) , which investigates the working conditions of 1,515 paid workers (20 or more hours per week) aged 16 and older for in the United States in 1977. Regression analysis shows a significantly positive relationship between the intrinsic motivation measure and self-reported effort exerted in excess of the minimum effort required. Furthermore, the intrinsic motivation measure is found to be significantly positively related to self-reported job satisfaction. However, reverse causation may play a role in the materialization of this relationship; Well-treated employees may become more intrinsically motivated for their job than ill-treated employees. Therefore, instrumental variable (IV) estimation is performed to find the causal effect of job satisfaction on intrinsic motivation. Using the perceived fairness of earnings as the instrument, the IV-estimation finds a significantly positive effect of job satisfaction on the intrinsic motivation measure. As such, these results indicate not only that intrinsic motivation positively affects job satisfaction, but also that job satisfaction can positively affect intrinsic motivation. Hence, profit-maximizing firms may value the happiness of their employees, because increasing job satisfaction can motivate employees and thus increase their effort exerted.

In order to investigate the remaining propositions, employer data is collected from the Multi-City Study of Urban Inequality (MCSUI). First, it is investigated whether firms that face relatively high (low) costs of leaving a job position unfilled offer a relatively high (low) wage. Unfortunately, the MCSUI does not include any information on the cost of leaving a job position unfilled, thus the empirical analysis is limited to the mechanisms underlying the proposition: 1) firms that offer higher wages receive more applications and 2) firms that offer higher wages fill the vacancy quicker. Significant empirical evidence is only found for statement 1 and only using a specification which includes a large number of control variables. As such, it is not possible to conclude whether the proposition holds in reality based on this regression analysis.

Last, the effect of external wage bounds and the perceived importance of motivation on the cost of application is investigated. The cost of application is measured through the requirement of a test (e.g. a job knowledge test or a test of personality or interests). Firms are considered to be bound to an external wage if all its employees' contracts are covered by a collective bargaining agreement. Some weak evidence is found in support of the proposition that bound firms are more likely to require

applicants to participate in a general aptitude test. However, this relationship becomes insignificant when firm and job characteristics are added to the regression as control variables. Furthermore, no significantly positive relationship can be found between the employer's perceived importance of motivation and the requirement of a test during the application procedure. Remarkably, many employers indicate that demonstrating motivation is very important (74.8%), but few employers indicate that a test of personality or interests is required during the application process (6.0%), which one would intuitively expect to be used to examine an applicant's intrinsic motivation. This may be an indication that employers deem that such tests are ineffective at measuring intrinsic motivation. Further research is necessary to learn more about employers' believes on the value of intrinsic motivation and which methods are perceived to be effective to measure motivation.

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VIII. Appendix

A. Summary statistics of regressors (models 1 & 2 & 3)

8.1.1 Job description survey questions and job satisfaction questions

Regressors	Responses	Mean	Std. Dev
“my job requires that I work very fast”	1248	3,19	1,30
“I have the freedom to decide what I do on my job”	1253	3,27	1,30
“My job requires a high level of skill”	1261	3,60	1,24
“A lot of people can be affected by how well I do my work”	1266	4,18	0,96
“My job requires that I work very hard”	1263	3,56	1,19
“It is basically my own responsibility to decide how my job gets done”	1266	3,91	1,07
“My job requires that I be creative”	1261	3,33	1,31
“I get to do a number of different things on my job”	1271	4,04	1,00
“I have a lot of say about what happens on my job”	1260	3,33	1,32
“My job lets me use my skills and abilities”	1262	3,78	1,16
“I decide when I take breaks”	1264	3,38	1,34
“On my job there are procedures for handling everything that comes up”	1262	3,29	1,26
“I decide who I work with on my job”	1247	2,33	1,14
“Most of the time I know what I have to do on my job”	1269	4,21	0,75
“It would be very hard for me to leave my job even if I wanted to”	1263	2,93	1,36
“I never seem to have enough time to get everything done on my job”	1261	2,85	1,29
“On my job, I can't satisfy everybody at the same time”	1257	3,54	1,21
“I determine the speed at which I work”	1267	3,77	1,02
“I have too much work to do everything well”	1259	2,37	1,08
“I am afraid of what might happen if I quit my job without having another one	1259	3,16	1,42
“The product or service I help provide is up to the standards that the public	1244	4,00	0,97
“It is hard to tell what impact my work makes on the product or service”	1241	2,60	1,19
“To satisfy some people on my job, I have to upset others”	1258	2,69	1,29
“I have a lot of energy left over when I get off work”	1257	2,61	1,21
“On my job, I produce a whole product or perform a complete service”	1238	3,39	1,23
“On my job, I know exactly what is expected of me”	1272	4,02	0,89
“My job requires that I do the same things over and over”	1262	3,18	1,32
“Even if no one tells me, I can figure out how well I am doing on my job”	1272	4,09	0,74
“I feel personally responsible for the work I do on my job”	1270	4,36	0,66
“I have too much stake in mv job to change jobs now”	1259	3,00	1,35
“My job involves doing only a small part in producing the product or service”	1246	2,74	1,27
“I deserve all the credit or blame for how well I am doing in my work”	1254	3,49	1,18
“Supervisors or co-workers usually let me know how well I am doing in mv	1260	3,48	1,14
“On my job, I have to do some things that really go against my conscience”	1257	2,42	1,26
“My job has rules and regulations concerning almost everything I might do or	1259	2,97	1,31
“I am given a lot of chances to make friends”	1261	3,37	0,83
“the chances for promotion are good”	1171	2,31	1,06
“I have an opportunity to develop mv own special abilities”	1265	2,80	1,04
“travel to and from work is convenient”	1263	3,20	0,99
“I receive enough help and equipment to get the job done”	1267	3,21	0,89
“I am not asked to do excessive amounts of work”	1260	2,82	1,00

“I have enough information to get the job done”	1266	3,41	0,70
“the pay is good”	1269	2,82	1,00
“I am given a lot of freedom to decide how I do my own work”	1270	3,02	0,97
“I am given a chance to do the things I do best”	1265	2,80	1,02
“the job security is good”	1265	3,09	0,98
“the problems I am expected to solve are hard enough”	1259	2,65	1,00
“my supervisor is competent in doing his or her job”	1183	3,25	0,88
“my responsibilities are clearly defined”	1268	3,29	0,82
“I have enough authority to do my job”	1267	3,37	0,78
“my fringe benefits are good”	1191	2,82	1,09
“the physical surroundings are pleasant”	1266	2,96	0,96
“I can see the results of my work”	1267	3,37	0,80
“I can forget about my personal problems”	1260	2,66	0,99
“I have enough time to get the job done”	1268	3,01	0,88
“my supervisor is very concerned about the welfare of those under him or	1186	2,93	0,98
“I am free from the conflicting demands that other people make of me”	1251	2,41	0,96
“the hours are good”	1265	3,15	0,94
“my supervisor is successful in getting people to work together”	1180	2,92	0,96
“promotions are handled fairly”	1144	2,52	1,04
“the people I work with take a personal interest in me”	1263	2,90	0,91
“my employer is concerned about giving everyone a chance to get ahead”	1165	2,61	1,04
“my supervisor is friendly”	1186	3,33	0,84
“my supervisor is helpful to me in getting my job done”	1182	3,09	0,92
“the people I work with are helpful to me in getting my job done”	1263	3,21	0,83
“the people I work with are competent in doing their jobs”	1263	3,18	0,78
“the people I work with are friendly”	1267	3,45	0,68

8.1.2 Intrinsic motivation and employee characteristics

Continuous variables

Regressors	Observations	Mean	Std.Dev
Intrinsic Motivation	1202	-0,02	1,01
Hourly Wage	640	5,09	4,10

Industry

Question: What kind of business or industry is [your main occupation] in?

*Industry code**	*Frequency*	*Percent*	*Cumulative*
0	686	53,4%	53,4%
857	99	7,7%	61,1%
838	55	4,3%	65,4%
669	43	3,3%	68,7%
917	39	3,0%	71,8%
937	33	2,6%	74,3%
67	32	2,5%	76,8%
707	31	2,4%	79,2%
219	30	2,3%	81,6%
858	27	2,1%	83,7%
319	23	1,8%	85,4%
68	21	1,6%	87,1%
609	21	1,6%	88,7%
628	21	1,6%	90,4%
927	20	1,6%	91,9%
448	19	1,5%	93,4%
839	18	1,4%	94,8%
877	18	1,4%	96,2%
878	18	1,4%	97,6%
208	16	1,2%	98,8%
49	15	1,2%	100,0%
Total observations	**1285**		
Missing values	0		

*Only the 20 industries with the most employees are included in the industry dummy for the regression, in order to limit the amount of regressors required in regression (1) and (2). The other industries are included in category "0"

Education required

Question: What level of formal education do you feel is needed by a person in your job?

Response	*Frequency*	*Percent*	*Cumulative*
None	43	3,4%	3,4%
Some grade school	49	3,8%	7,2%
Completion of grade school	82	6,4%	13,7%
Some high school	112	8,8%	22,4%
High school diploma, GED, or any high school equivalent	554	43,5%	65,9%
Some college without degree	166	13,0%	79,0%
Some college with degree	52	4,1%	83,0%
College degree	124	9,7%	92,8%
Graduate or professional education in excess of college	92	7,2%	100,0%
Total observations	**1274**		
Missing values	11		

Employer Tenure

Question: For how many years or months have you worked for your present employer?

Response	*Frequency*	*Percent*	*Cumulative*
Less than 1 month	17	1,4%	1,4%
1-3 months	117	9,6%	11,0%
3-12 months	169	13,9%	24,9%
1-3 years	238	19,6%	44,5%
3-5 years	148	12,2%	56,7%
5-10 years	212	17,4%	74,1%
10-20 years	205	16,9%	91,0%
>20 years	110	9,0%	100,0%
Total observations	**1216**		
Missing values	69		

Race

Respondend's race?

Response	*Frequency*	*Percent*	*Cumulative*
White	1134	88,7%	88,7%
Black	112	8,8%	97,4%
Other	33	2,6%	100,0%
Total observations	**1279**		
Missing values	6		

Sex

Respondend's sex?

Response	*Frequency*	*Percent*	*Cumulative*
Male	798	62,1%	62,1%
Female	485	37,7%	99,8%
Total observations	**1285**		
Missing values	0		

Condition

Do you have anything you regard as a physical or nervous condition that limits the amount or kind of work you do?

Response	*Frequency*	*Percent*	*Cumulative*
Yes	140	10,9%	10,9%
No	1145	89,1%	100,0%
Total observations	**1285**		
Missing values	0		

B. Summary statistics of regressors (models 4 & 5)

8.2.1 Continuous regressors

Name	*N*	*Min*	*Max*	*Mean*	*St. Dev*
Hourly Wage Offered	660	2.1	25	7.875	3.443
Number of sites	3368	1.0	9000	69.57	401.4
% covered by collective bargaining	3289	0.0	100	16.90	34.04
Amount of hours the job is for (per week)	2996	0.0	75	13.31	18.47

8.2.2 Categorical regressors

Firm and job characteristics

Industry

The industry that the employer's firm operates in

*Industry code**	*Frequency*	*Percent*	*Cumulative*
0	2135	63.1%	63.1%
5812	138	4.1%	67.2%
59	134	4.0%	71.1%
8211	105	3.1%	74.2%
35	95	2.8%	77.0%
82	91	2.7%	79.7%
20	86	2.5%	82.3%
80	81	2.4%	84.7%
73	78	2.3%	87.0%
6021	64	1.9%	88.9%
50	58	1.7%	90.6%
7011	52	1.5%	92.1%
5411	45	1.3%	93.4%
6411	36	1.1%	94.5%
8062	34	1.0%	95.5%
5999	28	0.8%	96.3%
8111	26	0.8%	97.1%
5311	25	0.7%	97.8%
6282	25	0.7%	98.6%
7371	24	0.7%	99.3%
8011	24	0.7%	100.0%
Total	3384		
Missing values	126		

*Only the 20 industries with the most employees are included in the industry dummy for the regression, in order to limit the amount of regressors required in regression (1) and (2). The other industries are included in category “0”

City

City	*Frequency*	*Percent*	*Cumulative*
Los Angeles	1010	28.8%	28.8%
Boston	889	25.3%	54.1%
Detroit	804	22.9%	77.0%
Atlanta	807	23.0%	100.0%
Total	3510		
Missing values	0		

Location within the city

Location	*Frequency*	*Percent*	*Cumulative*
Suburb/All other	1925	54.8%	54.8%
Primary city center	1038	29.6%	84.4%
Other urban area	547	15.6%	100.0%
Total	3510		
Missing values	0		

Workforce size

number of employees	*Frequency*	*Percent*	*Cumulative*
1-4	240	11.2%	11.2%
5-9	114	5.3%	16.5%
10-19	121	5.7%	22.2%
20-49	766	35.8%	58.0%
50-99	228	10.7%	68.7%
100-249	475	22.2%	90.9%
250-499	126	5.9%	96.8%
500-999	69	3.2%	100.0%
Total	2139		
Missing values	1371		

For profit

Answer	*Frequency*	*Percent*	*Cumulative*
Yes	2520	78.3%	78.3%
No	697	21.7%	100.0%
Total	3217		
Missing values	293		

Franchise

Answer	*Frequency*	*Percent*	*Cumulative*
Yes	236	7.1%	7.1%
No	3069	92.9%	100.0%
Total	3305		
Missing values	205		

8.2.3 Employer recruiting methods and referrals

Help-wanted sign

Answer	*Frequency*	*Percent*	*Cumulative*
Yes	948	27.1%	27.1%
No	2553	72.9%	100.0%
Total	3501		
Missing values	9		

News paper advertisment

Answer	*Frequency*	*Percent*	*Cumulative*
Yes	1651	47.2%	47.2%
No	1846	52.8%	100.0%
Total	3497		
Missing values	13		

Did you consider walk-ins without referrals?

Answer	*Frequency*	*Percent*	*Cumulative*
Yes	2431	69.5%	69.5%
No	1068	30.5%	100.0%
Total	3499		
Missing values	11		

Did you ask for or accept referrals from current employees?

Answer	*Frequency*	*Percent*	*Cumulative*
Yes	2854	81.7%	81.7%
No	641	18.3%	100.0%
Total	3495		
Missing values	15		

How about referrals from the state employment service?

Answer	*Frequency*	*Percent*	*Cumulative*
Yes	1270	36.5%	36.5%
No	2205	63.5%	100.0%
Total	3475		
Missing values	35		

Referrals from a private employment service or a temp agency?

Answer	*Frequency*	*Percent*	*Cumulative*
Yes	705	20.2%	20.2%
No	2785	79.8%	100.0%
Total	3490		
Missing values	20		

How about referrals from a community agency?

Answer	*Frequency*	*Percent*	*Cumulative*
Yes	989	28.4%	28.4%
No	2492	71.6%	100.0%
Total	3481		
Missing values	29		

Did you as for referrals from schools?

Answer	*Frequency*	*Percent*	*Cumulative*
Yes	1261	36.1%	36.1%
No	2234	63.9%	100.0%
Total	3495		
Missing values	15		

How about referrals from a union?

Answer	*Frequency*	*Percent*	*Cumulative*
Yes	261	7.5%	7.5%
No	3229	92.5%	100.0%
Total	3490		
Missing values	20		

Did you ask for referrals from other sources?

Answer	*Frequency*	*Percent*	*Cumulative*
Yes	1241	35.5%	35.5%
No	2252	64.5%	100.0%
Total	3493		
Missing values	17		

8.2.4 Required qualifications

High school diploma

Answer	*Frequency*	*Percent*	*Cumulative*
Absolutely necessary	443	36.9%	36.9%
Strongly preferred	426	35.5%	72.4%
Mildly preferred	105	8.8%	81.2%
Does not matter	226	18.8%	100.0%
Total	1200		
Missing values	2310		

General experience

Answer	*Frequency*	*Percent*	*Cumulative*
Absolutely necessary	385	32.2%	32.2%
Strongly preferred	458	38.3%	70.4%
Mildly preferred	207	17.3%	87.7%
Does not matter	147	12.3%	100.0%
Total	1197		
Missing values	2313		

Specific experience

Answer	*Frequency*	*Percent*	*Cumulative*
Absolutely necessary	373	31.1%	31.1%
Strongly preferred	448	37.4%	68.5%
Mildly preferred	216	18.0%	86.6%
Does not matter	161	13.4%	100.0%
Total	1198		
Missing values	2312		

Employer references

Answer	*Frequency*	*Percent*	*Cumulative*
Absolutely necessary	504	42.0%	42.0%
Strongly preferred	395	32.9%	74.9%
Mildly preferred	201	16.7%	91.6%
Does not matter	101	8.4%	100.0%
Total	1201		
Missing values	2309		

Vocational education or formal job training

Answer	*Frequency*	*Percent*	*Cumulative*
Absolutely necessary	157	13.1%	13.1%
Strongly preferred	332	27.8%	40.9%
Mildly preferred	326	27.3%	68.2%
Does not matter	380	31.8%	100.0%
Total	1195		
Missing values	2315		

C. Summary statistics of regressors (models 6, 7 & 8)

8.3.1 Bound firms

Bound firms

	Frequency	*Percent*	*Cumulative*
Not bound	3042	92.5%	92.5%
Bound	247	7.5%	100.0%
Total	3289		
Missing values	221		

8.3.2 Perceived importance

Demonstrating motivation

	Frequency	*Percent*	*Cumulative*
Very important	2565	74.8%	74.8%
Somewhat important	822	24.0%	98.7%
Not important	44	1.3%	100.0%
Total	3431		
Missing values	79		

Demonstrating motivation (2 categories)

	Frequency	*Percent*	*Cumulative*
Very important	2565	74.8%	74.8%
Somewhat/Not important	866	25.2%	100.0%
Total	3431		
Missing values	79		

Physical appearance

	Frequency	*Percent*	*Cumulative*
Very important	384	11.2%	11.2%
Somewhat important	1279	37.3%	48.6%
Not important	1762	51.4%	100.0%
Total	3425		
Missing values	85		

Physical neatnness

	Frequency	*Percent*	*Cumulative*
Very important	1832	53.3%	53.3%
Somewhat important	1396	40.6%	93.9%
Not important	211	6.1%	100.0%
Total	3439		
Missing values	71		

	Frequency	*Percent*	*Cumulative*
Very important	2662	77.3%	77.3%
Somewhat important	723	21.0%	98.3%
Not important	57	1.7%	100.0%
Total	3442		
Missing values	68		

Verbal skills

	Frequency	*Percent*	*Cumulative*
Very important	2222	64.6%	64.6%
Somewhat important	1090	31.7%	96.3%
Not important	127	3.7%	100.0%
Total	3439		
Missing values	71		

The ability to speak English well

	Frequency	*Percent*	*Cumulative*
Very important	1798	56.7%	56.7%
Somewhat important	1178	37.1%	93.8%
Not important	197	6.2%	100.0%
Total	3173		
Missing values	337		