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Time Preferences and Career Investments

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Abstract

This paper examines the role of time preferences in career investments. We focus on the effects of impatience on two types of career investments: work effort and on-the-job search. Whereas the former increases the probability of obtaining a promotion, the latter affects the chance of receiving an outside job offer. We propose a theoretical career model which allows for these two distinct career paths. To test the theoretical relations, we make use of the DNB Household Survey. This large Dutch longitudinal survey contains detailed information on individual time preferences, on-the-job search behaviour and indicators of work effort. The results show that on-the job search and work effort increase with patience. The relation between patience and job mobility is more ambiguous. These findings may be hard to reconcile with standard on-the-job search models, but can be rationalized by models in which work effort and on-the-job search are substitutes.

Research highlights

We examine how time preferences affect career investments and mobility

Workers can invest in work effort and on-the-job search

Patience is positively related to work and search effort

The relation between patience and job mobility is ambiguous

1 Introduction

Climbing up the wage ladder – like any other ladder – takes time and effort. There are two distinct career paths one can follow to reach a higher position: through (internal) promotions or (external) job mobility. First, the worker can stay within the firm and exert high effort on-the-job in an attempt to obtain a promotion. Alternatively, an employee can search on-the-job for vacancies in order to increase the chances of receiving an outside offer. Since on-the-job search and work effort involve immediate costs and delayed rewards, they can be considered as investment activities. It can be expected that whether and to what extent workers are willing to make such career investments depends on how they value future rewards compared to immediate costs. Hence, individual time preferences are likely to be important for this intertemporal decision making process. This paper therefore examines theoretically and empirically how time preferences are related to career investments and thereby shape the individual's career path.

Recent literature in economics shows that time preferences predict all sorts of social and economic outcomes. Using a large Swedish sample, Golsteyn et al. (2014) show that a high discount rate measured at age 13 is negatively associated with educational attainment, labour supply and income later in life. Cadena and Keys (2014) also demonstrate that impatience is negatively related to school performance and thereby depresses lifetime income: the earnings gap between 'impatient' and 'patient' individuals is over $75.000 by the time they reach middle age. Both studies emphasise the role of time preferences in the development of human capital. Other papers (e.g. Fouarge et al., 2014) assess to what extent economic preferences of recent graduates predict their occupational choice. These previous studies focus on mechanisms before entering the labour market (i.e. educational and occupational choice). We explore whether time preferences affect labour market outcomes through an effect on career investments – that is, after entering the labour market. This channel could indeed be important, given that ample empirical research shows that internal and external job mobility are important sources of wage growth (e.g. Borjas, 1981; Topel and Ward, 1992; McCue, 1996; Light and McGarry, 1998; Le Grand and Tahlin, 2002; Blau and DeVaro, 2007; Kosteas, 2009).

A limited number of studies have examined the role of time preferences in (post-entry) labour market behaviour. Notable exceptions are the studies of Paserman (2008) and DellaVigna and Paserman (2005), who use the NLSY to examine the relation between time

preferences and job search behaviour of unemployed job seekers. Their findings indicate that impatient individuals search less intensively and are less likely to exit unemployment. The results are consistent with the predictions derived from the hyperbolic rather than the standard exponential discounting model. Halima and Halima (2009) and Van Huizen and Plantenga (2014) replicate these findings for France and the Netherlands respectively. Whereas these studies examine the behaviour of unemployed job seekers, the work of Drago (2006) is more related to our study as he also focuses on career investments of workers. Drago's theoretical model predicts that impatience increases on-the-job search effort and thereby job mobility. A potential limitation is that the model implicitly assumes that on-the-job search is a leisure activity and may therefore overlook some central dimensions of job search, a typical investment activity. However, his empirical findings confirm that more impatient job seekers switch more frequently between jobs.[1]

This study contributes to this literature in several ways. First, we discuss an alternative, simple model of on-the-job search and work effort with endogenous career investments. Although promotions and job mobility are typically studied in isolation, recent literature stresses that on-the-job search may play an important role in the wage formation of workers staying in the firm (Cahuc et al., 2006; Postel-Vinay and Turon, 2010; Moen and Rosen, 2013). We follow this literature and argue that on-the-job search and work effort are substitutes, leading to career paths that are mutually exclusive: when a worker accepts an outside job offer, he forgoes promotion opportunities in the current firm (and vice versa). When these interactions between inside and outside mobility are taken into account, we can derive new predictions on how time preferences are related to career investments and mobility. The model shows that patience increases work and search effort (at least within a certain range of the discount rate), but that the relation with mobility is ambiguous.

Second, making use of the DNB Household Survey (DHS), a large Dutch panel study, we assess empirically how time preferences are related to work effort, on-the-job search activities and job mobility. To our knowledge, this is the first study to analyse empirically the relation between time preferences and on-the-job search behaviour. In general, studies on on-the-job search examine job-job transitions and ignore the search process. A final contribution is methodological: whereas most studies rely on (a combination

[1] Although it is not the focus of their study, Cadena and Keys (2014) also provide evidence that impatience increases job mobility. Like Drago (2006), the results of Cadena and Keys (2014) are based on the NLSY.

of) rather noisy behavioural proxies for time preferences[2], we construct a measure for time preferences using items from the Consideration of Future Consequences (CFC) Scale, a psychological construct that measures an individual's orientation towards the future. We argue that this measure is a more precise than those derived from behavioural proxies. Moreover, we compare the estimation results using the CFC scale with an indicator based on behavioural proxies and demonstrate that the results depend crucially which indicator is used to captures heterogeneity in time preferences.

Overall our findings show that more patient workers both exert more work effort in the current job and search more intensively for outside positions. The results on job mobility are in general ambiguous, although there is some weak evidence that, in line with previous studies, impatient workers move more frequently from one job to another. The result that patience is positively related to on-the-job search intensity but not (or negatively) associated with job mobility may be hard to reconcile with standard on-the-job search that focus exclusively on external mobility. These findings can, however, be explained by models in which work effort and on-the-job search are substitutes in determining career progress.

This paper is structured as follows. In the next section we present the model and derive theoretical predictions on the relation between time preferences and career investments and job mobility. In section 3, we present the data on time preferences, work effort, search intensity and mobility. Subsequently, we discuss our empirical findings. The final section concludes.

[2] For instance, Drago (2006) and DellaVigna and Paserman (2005) use behavioural outcomes, such as smoking, alcohol consumption and having a life insurance, to construct a measure of impatience. However, these proxies are rather noisy measures. In fact, in both studies the Cronbach's alpha is below conventional norms. The results of Cadena and Keys (2014) are based on a single item (i.e. the interviewer's assessment whether the respondent acts impatient or restless), which is likely to capture various individual characteristics other than time preferences.

2 Theoretical framework

2.1 A career model

On-the-job search and work effort may be seen as substitutes since both activities increase the chances of improving the worker's future labour market position. However, internal and external mobility are generally examined in isolation. Focusing exclusively on either internal or external mobility, the relation between time preferences and on-the-job search and work effort may seem obvious. Following basic on-the-job search or promotion models, one can easily show that the marginal gains from search or work effort increase with patience. These models therefore predict that more patient workers invest more in these career activities and are more likely to move to another job (within and outside the current firm).

However, if search and work effort are considered jointly in a theoretical model, this may lead to different predictions. Drago (2006) shows that more patient workers invest more in effort, but less in on-the-job search: Drago's model therefore predicts a negative relation between patience and job mobility, for which he finds empirical support. Clearly, this finding is inconsistent with the prediction derived from a standard on-the-job search model. Nevertheless, the assumptions of the model are rather strict: the total level of career effort (i.e. search plus work effort) is exogenous and job search involves immediate net benefits and delayed costs in terms of foregone promotions. Hence, workers allocate their total time between a leisure activity (on-the-job search) and an investment activity (work effort, or 'collaboration'). More impatient workers therefore engage more in the former and less in the latter activities. In order to accommodate these problems, we use a career model where the total level of on-the-job search intensity and work effort is endogenous and both activities are modelled as career investment (involving immediate costs and delayed rewards).

2.2 The optimization problem

The structure of our model is in the spirit of Moen and Rosen (2013), who develop a model where on-the-job search and work effort are substitutes. In their 2-period model, the wage in period 2 depends on whether the worker found a job (during on-the-job search in period 1) and, if the workers stays within the firm, on his effort exerted in period 1. One of the central premises of the model is that workers receive deferred compensation for effort, which

may negatively affect on-the-job search. We also use a 2-period model but focus on the supply side aspects of job search and do not focus general equilibrium issues. In contrast to Moen and Rosen (2013), we allow for a discount rate between the two period and we do not assume that all outside job offers are accepted.

Workers can climb the career ladder though promotions (internal mobility) and by moving to another job (external mobility). In period 1, workers decide on the allocation of time and energy to work effort ($e \geq 0$) and on-the-job search ($s \geq 0$). Work effort may be interpreted as the amount of effort which is in addition to the minimal acceptable work effort: it represents 'extra-role behaviour', such as working overtime hours, accepting temporary impositions without protest, assisting co-workers and building good relationships with supervisors. On-the-job search effort consists of all kinds of 'screening' (e.g. searching for vacancies in newspapers and on the internet) and application activities (writing application letters, preparing for and attending job interviews). Both career activities involve immediate costs according to the increasing convex cost functions $c_1(s)$ and $c_2(e)$, with $c_1'(0) = c_2'(0) = 0$.

By investing in work effort, the agent increases the probability of receiving a promotion through probability μe ($0 \leq \mu e \leq 1$), where μ is a constant ($\mu > 0$). A promotion leads to a wage increase of $w^p - w$, according to the deterministic function $\Phi(w)$ ($\Phi'(w) > 0$), which continuously describes the promotion wage in $[w, \overline{w}]$: by definition, promotion offers are always higher than the current wage. Similarly, increasing the level of on-the-job search intensity positively affects the probability of receiving an outside offer with probabilityλs ($0 \leq \lambda s \leq 1$), where λ is a constant ($\lambda > 0$). The wage offer x is drawn from a known distribution $F(x)$, which is the cdf with a lower and upper bound $[\underline{w}, \overline{w}]$. Assuming that workers aim to maximize expected utility, the worker chooses on-the-job search intensity and work effort to solve:

$$\max_{s,e,\hat{w}} \; w - c_1(s) - c_2(e) + \delta\left\{w + \mu e(w^p - w) + \lambda s \int_{\hat{w}}^{\overline{w}} \left[x - \left(w + \mu e(w^p - w)\right)\right] dF(x)\right\} \quad (1)$$

In period 1, the worker receives wage w and makes career investments $c_1(s)$ and $c_2(e)$. The payoffs in period 2 will be discounted according to the discount factor δ ($0 < \delta \leq 1$). If the worker decides to stay within the firm, he receives his current wage or, depending on the effort level exerted in period 1, obtains a promotion. The term multiplied by λs represents the payoffs when the worker receives an outside offer. To maximize utility, workers will

decide on the cut-off point $\hat{w}$, which is similar to the reservation wage in unemployed job search models.

From equation (1) we can derive the three first order conditions:

$$c_1'(s) = \delta\lambda \int_{\hat{w}}^{\overline{w}} \left[x - \left(w + \mu e(w^p - w)\right)\right] dF(x) \quad (2)$$

$$c_2'(e) = \delta\mu(1 - \lambda s(1 - F(\hat{w})))(w^p - w) \quad (3)$$

$$\hat{w} = w + \mu e(w^p - w) \quad (4)$$

Equation (2) shows that marginal costs of on-the-job search are equal to the marginal benefits. Given the convexity of the cost functions, marginal costs and therefore the level of on-the-job search increase with the size of the marginal benefits. A higher probability of finding an acceptable offer increases search intensity, whereas the payoffs from staying negatively affect search. Similarly, the right hand side of equation (3) presents the marginal benefits of work effort, which decline with the probability of leaving the firm $(1 - \lambda s(1 - F(\hat{w})))$. Finally, equation (4) describes the reservation wage $\hat{w}$, indicating the wage offer at which the worker is indifferent between staying an moving.

Given that the right hand side of equation (3) is positive and that we assume convexity of the cost functions and $c_2'(0) = 0$, the optimal level of effort is positive ($e > 0$). Likewise, on-the-job search effort is positive, as we can show that equation (2) can be written as:

$$c_1'(s) = \delta\lambda\left(1 - F(\hat{w})\right) E\left[x - \left(w + \mu e(w^p - w)\right) | \; x > \hat{w}\right] > 0 \quad (5)$$

which implies that workers will always exert a positive amount of on-the-job search effort (s$>$ 0).

The central question here is how time preferences are related to career investments. Using the first order conditions and applying implicit differentiation (see Appendix A) we can derive how on-the-job search and work effort are related to the discount factor δ:

$$c_1''(s)s' = \lambda \int_{\hat{w}}^{\overline{w}} \left[x - \left(w + \mu e(w^p - w)\right)\right] dF(x) - \delta\lambda\mu e'\left(1 - F(\hat{w})\right)(w^p - w) \quad (6)$$

$$c_2''(e)e' = \mu(w^p - w)\left\{1 - \lambda s\left(1 - F(\hat{w})\right) + \lambda\delta\, f(\hat{w})\mu e'(w^p - w) - \delta\lambda s'\left(1 - F(\hat{w})\right)\right\} \quad (7)$$

Using equation (6) one can show that $c_1''(s)s' > 0$, that is, search effort increases with δ if $e' < 0$ or

$$\delta < \frac{E(x - \hat{w} | \; x > \hat{w})}{\mu e'(w^p - w)} \text{ and } e' > 0 \quad (8)$$

Basically, patience is positively related to on-the-job search when the payoffs from and the probability of receiving a promotion are relatively small: in that case, the future costs

from quitting (in terms of forgone promotions) do not outweigh the future gains from outside job mobility. Furthermore, one can clearly see that this condition is more likely to hold at low patience levels. As the model does not rule out the possibility of negative relation between patience and on-the-job search, there may exist a hump shaped relation between δ and this career investment. However, given $0 < \delta \leq 1$, search intensity increases in the entire range of δ when the expected future payoffs from external mobility are relatively large ($E(x - \widehat{w} | \, x > \widehat{w}) > \, \mu\delta e'(w^p - w)$).

Next, to further assess the relation between time preferences, we can use (7) to show that patience increases the level of work effort if:

$$\lambda s\big(1 - F(\widehat{w})\big) + \delta\lambda\big(s'\big(1 - F(\widehat{w})\big) - \mu(w^p - w)f(\widehat{w})e'\big) < 1 \tag{9}$$

We reach similar conclusions for work effort as for search intensity, since $e' > 0$ when $s' < 0$. The two career investments are indeed substitutes. Moreover, equation (9) implies that when $s' > 0$, work effort increases with patience if:

$$\delta < \frac{1-\lambda s\big(1-F(\widehat{w})\big)+\lambda f(\widehat{w})E[x-\widehat{w}|\, x>\widehat{w}]+c_1''(s)s\prime\big(1-F(\widehat{w})\big)^{-1}}{\lambda s\prime\big(1-F(\widehat{w})\big)} \tag{10}$$

Again this suggests there may be a inverse U-shaped relation between patience and work effort at higher patience levels. The potential negative association between δ and the two investment activities can be explained by a crowding out effect of one investment activity in favour of another. By moving to another job one forgoes the opportunity to climb the ladder within the current firm. Similarly, the worker may be inclined to reject a decent outside offer anticipating a future inside offer. However, an interesting result is that the model shows it is not possible that both work and search effort decrease with effort. Indeed, if $e' < 0$ implies $s' > 0$ and $s' < 0$ implies $e' > 0$.

Overall, the model predicts a positive or inverse U-shaped relation between patience and work and on-the-job search effort. The final issue concerns job mobility. In a standard on-the-job search model, patience is positively related to search intensity and the quit rate. Drago (2006), on the other hand, predicts a negative relation between patience and job mobility. In the model presented here, external job mobility occurs if the worker receives a wage that is higher than his reservation wage $\widehat{w}$. Hence, job mobility (i.e. the quit rate) is given by:

$$q = \lambda s\big(1 - F(\widehat{w})\big) \tag{11}$$

Equation (9) shows how the quit rate in this career model is closely related to the quit rate defined in standard on-the-job search models (e.g. Christensen et al., 2005): the difference exists because in standard models the probability of rejecting an offer is given by $F(w)$ rather than $F(\hat{w})$. This is why search models lead to unambiguous predictions on the relation between patience and job mobility, as patience just affects the job arrival rate λs through more intensive job search activities. However, our model predicts that both work and search increase with patience (at least for sufficiently low δ). Since the reservation wage increases with the level of effort, the model indicates two contrasting effects on the quit rate. A higher level of job search effort results in a positive effect on the job arrival rate, whereas an increase in the level of work effort generates a negative effect on the job acceptance rate $\left(1 - F(\hat{w})\right)$. How patience affects the quit rate depends on the relative size of these two effects. Interestingly, DellaVigna and Paserman (2005) arrive to similar conclusions on the relation between time preferences and the exit rate out of unemployment. Hence, the model does not lead to unambiguous predictions on job mobility.

2.3 Hyperbolic versus exponential discounting

The model discussed above captures the role of time preferences in a rather basic way. In general , standard economic models assume that agents discount future costs and benefits exponentially, which implies time-consistent preferences. However, a substantial amount of experimental and field evidence demonstrates that preferences are time-inconsistent and present-biased (see for a review: DellaVigna (2009); Frederick et al. (2002)). In order to allow for time-inconsistency, (quasi-)hyperbolic discounting models have been proposed as an alternative for the standard exponential model (e.g. Laibson, 1997). One of the most important predictions of hyperbolic discounting models is that individuals have a tendency to procrastinate investment activities (O'Donoghue and Rabin, 1999).

The hyperbolic discounting model has been tested against the standard exponential in the labour market. Job search behaviour of unemployed job seekers seems to be consistent with this model (DellaVigna and Paserman, 2005; Halima and Halima, 2009; Van Huizen and Plantenga, 2014). Drago (2006) discusses a theoretical model of search and work effort of workers that allows for hyperbolic discounting. The model predicts that more impatient (exponential or hyperbolic) discounting invest less in search and are less likely to move from one job to another. The hypothesis that distinguishes between exponential and hyperbolic

discounting is based on sophistication (the degree to which individuals are aware of their tendency to procrastinate): this has an effect on search behaviour of hyperbolic discounters but should have no effect under exponential discounting. However, sophistication is hard to measure. Moreover, the predictions depend on rather strict assumptions on the timing and size of the payoffs of the different career paths. It appears therefore that it is difficult to distinguish empirically between exponential and hyperbolic discounting. We therefore focus more on the role of time preferences in general in decisions on work effort, search and mobility.

3 Data

3.1 Sample

To examine the relations between time preferences and career investments, we make use of the DHS (DNB Household Survey; former name: CentER Savings Survey). This Dutch longitudinal survey has been collected annually by CentERdata since 1993. Around 2500 households participate in the panel. All household members aged 16 or older complete a questionnaire online.[3]

The analyses are based on the panel waves 1996-2013. As the questions about time preferences were not asked in 1993-1995, we exclude the first waves. We select male employees who have not just (re)entered the labour market by excluding workers who were non-employed in the previous year. The rationale is that workers who just (re)entered the labour market may have rather distinctive job search behaviour, as they may for instance accept a job which they regard as temporary. In addition, many questions refer to the period two months prior to the interview (e.g. the number job applications in the past two months). During this period the entrants could have been unemployed and in that case their answers may not reflect on-the-job search effort. Due to panel attrition and refreshment, we make use of an unbalanced panel, consisting of over 7000 observations (more than 2000 individuals).

[3] It is not necessary that households have a PC or internet: when a PC is absent, access is provided through a special box which enables household members to fill in the survey via the television.

3.2 Time preferences

We construct an indicator for time preferences using eleven items from the Consideration of Future Consequences (CFC) Scale (Strathman et al., 1994).[4] This psychological construct aims capture the individual's orientation towards the future. Respondents use a 7-point scale to indicate to which extent they agree with each of the eleven statements (see Table 1). The answers to these statements indicate how much value the individual puts on the present compared to the future. Interestingly, empirical work has shown that the CFC items are significantly correlated with conventional time preference measures (Borghans and Golsteyn, 2006; Daly *et al.*, 2009) and predict field behaviour (Van Huizen and Plantenga, 2014; Fouarge et al., 2014).[5]

Table 1 Time preferences: descriptive statistics

Name	Description	Mean	St. Dev.	Patienc[a]
CFC01	I think about how things may be in the future and I try to influence these in everyday life	4.12	1.46	+
CFC02	I often deal with things that will have consequences in several years	3.64	1.51	+
CFC03	I am only concerned about the present, assuming it will turn out all right in the future	4.32	1.46	-
CFC04	I only think about the immediate consequences of my actions (several days/weeks)	4.36	1.51	-
CFC05	Whether something is convenient determines my decisions to a large extent	3.61	1.31	-
CFC06	I am prepared to sacrifice my current well-being in order to achieve objectives in the future	3.70	1.38	+
CFC07	I think that it is important to take warnings about negative future results of my actions seriously, even if these results will materialize in the distant future	4.91	1.25	+
CFC08	I believe it is more important to deal with matters that will have major consequences in the future, than to deal with matters with immediate but minor consequences	4.25	1.25	+
CFC09	I generally ignore warnings about future problems because I assume that these problems will be solved by then	4.70	1.31	-
CFC10	I believe that there is no need to make sacrifices now for future issues, because these could be solved later	4.26	1.34	-
CFC11	I only respond to urgent problems, supposing that I can deal with future problems when they emerge	4.33	1.37	-

Note: the statistics refer to the rescaled items and are presented for the group of workers used in the job search analyses (N=7177)

[a]This column indicates the expected relation between the 11 CFC items and the patience (δ).

[4] The original CFC Scale consists of twelve rather than eleven statements. However, this twelfth item is missing in the waves 1996-2003 and is therefore not included in the analysis.

[5] Van Huizen and Plantenga (2014) demonstrate that the items are associated to job search behaviour of the unemployed. Fouarge et al. (2014) show that CFC02 is related to occupational choice of recent graduates.

Between 1996 and 2009, the DHS included the CFC items in every wave, except for the 2008 wave. From wave 2010 onwards, the questions are asked only to the respondents who did not provide the information in one of the previous waves (including new panel members). Assuming time preferences are stable, we use lagged information for the 2008 and 2010-2013 waves.[6]

We would expect that CFC01, CFC02 and CFC 06-08 are positively related to patience, whereas the other six items can be expected to be negatively correlated with patience. The latter variables are recoded (1 is recoded to 7, etcetera) so higher values of the items indicate higher levels of patience. After recoding, almost all correlations between the items are positive and significant (see Appendix A). Furthermore, various statistics point out internal consistency: the average interitem covariance is equal to 0.38, the value of the Cronbach's alpha is 0.73 and the overall KMO value is 0.77 (varying between 0.72 and 0.83).

We use the average of all items as a measure of patience.[7] Table 2 shows some descriptives of this measure. The average (median) patience level is 4.2 (4.18). Over 80 percent of the individuals are within a one unit range of the average and median. We tested whether this measure of patience is correlated with behavioural outcomes (such as smoking and alcohol consumption), statements about spending behaviour and the individual's financial position. All correlations between the patience variable and the behavioural proxies are significant and have the expected sign, suggesting that that the measure is a reliable indicator for the individual's time preference.

Table 2 Patience measure: summary statistics

	Mean	Std. Dev.	Percentiles				
			10	25	50	75	90
Patience [N=7177]	4.20	0.72	3.36	3.73	4.18	4.64	5.18

[6] The results are robust to excluding the 2008-2013 waves.

[7] As a robustness check, several alternative measures have been used in the empirical analyses (see section 4.4).

3.3 Work effort

We measure the effort exerted by employees on the job using two different indicators: a statement about shirking behaviour and working overtime. From wave 2004 onwards, respondents are asked to what extent they agree (on a 5-point scale) with the following statement: 'I shirk my duties'. Although this question refers to the individual's behaviour in general and not specifically in the work environment, it can be argued that respondents who agree with this statement have a tendency to shirk at work. Table 3 shows that almost three quarters of the workers disagrees with this statement. About 12 percent of the workers state that they are 'shirkers' (answer 'accurate' or 'very accurate'). Given the small number of respondents reporting the answer 'very accurate', for the analysis we pooled the answer categories 'accurate' and 'very accurate' together. A potential problem, however, is that this item may capture the personality trait 'conscientiousness', which may be related to time preferences (Borghans et al., 2008).

In addition to the shirking indicator, we make use of average overtime work as an indicator for work effort. Landers et al. (1996) demonstrated that long working hours may be used as indicators of work effort in promotion decisions, leading to a 'rat-race'. Several empirical studies examined the investment character of working hours and found a positive relationship between overtime hours and the incidence of promotion (Francesconi, 2001; Booth et al., 2003; Pannenberg, 2005).

Table 3 Work effort

	Freq.	Percent
Statement: 'I shirk my duties' (N=3930)		
Very Inaccurate	1525	38.80
	1417	36.06
	597	15.19
	302	7.68
Very accurate	89	2.26
Overtime hours (N=7018)		
$Hours_{contract} > Hours_{actual}$	340	4.84
$Hours_{contract} = Hours_{actual}$	2673	38.09
$Hours_{contract} < Hours_{actual}$	4005	57.07
	Mean	Std. Dev.
Actual hours – contract hours	3.119	4.456

Our definition of overtime is based on the difference between actual (average) weekly working hours and contractual weekly working hours (see Table 3 for descriptives). The overtime variable equals 0 if the individual on average works less than the specified in the employment contract, 1 if actual hours are equal to contractual hours and 2 if the worker works more than the number of contract hours. The majority of the employees reports that they work overtime hours: individuals work on average over three hours more than their contract indicates. Less than 5 percent of the workers state that they work less than their contractual working hours. The correlation between the shirking variable and the overtime indicator is rather small (-0.0277), but has the expected sign and is significant at the 10 percent level. The low correlation may indicate that the two measures reflect different aspects of work effort.

3.4 On-the-job search intensity and transitions

In the literature on (on-the-)job search behaviour, search intensity has been measured in a variety of ways. We use the following indicators to capture on-the-job search intensity: 1) search attitude: this variable equals 0 if the worker is not searching for a job, 1 if he is considering looking for another job and 2 if he reports to be seriously searching for another job (see also Bloemen, 2005); 2) a dummy indicating whether the worker has applied for a job in the last two months; 3) the number of job applications made by the worker during the last two months (e.g. Van der Klaauw and van Vuuren, 2010); 4) the number of job search channels used by the worker in the last two months (e.g. DellaVigna and Paserman, 2005). [8] The latter may be interesting as previous empirical findings indicate that the number of search methods is positively related to the time spent searching (Krueger and Mueller, 2008).

Table 4

Table 4 and Table 5 present information on these search intensity variables. About 18 per cent of the workers is either thinking about looking for or seriously searching for another job. Over a quarter of these 1200 employed job searchers report that they are seriously

[8] Employed respondents are asked the following question: "Are you currently looking for another job?" Potential answers are: "Yes, I am seriously searching for another job"; "Yes, I am considering searching for another job"; "No, I just found another job"; "No, I am not looking". We make use of the answer to this question to construct the job search attitude variable. Information for the other three variables is obtained from the questions "How many times have you applied for a job during the last two months" and "How have you searched for a job during the last two months?" (up to eight different methods).

searching for another job. One out of 13 workers applied for a job in the last two months, whereas 45 percent of the employed job seekers applied for a job during the previous months. Concerning the number of different search methods, it appears that reading advertisements is the most popular search method. Answering advertisements, directly contacting employers and asking friends and relatives are frequently used job search methods as well. A small minority (around 20 percent) of the searching workers uses more than two channels. Table 6 shows that all correlations between the different indicators are positive and highly significant (also within the group of employed job seekers), suggesting that the measures represent the same underlying variable: the intensity of on-the-job search.

Table 4 Job search effort

	Frequency	Percentage all workers	Percentage job seekers
Search attitude (N=7180)			
Not looking for another job	5980	83.29	-
Considering looking for another job	898	12.51	74.83
Seriously searching for another job	302	4.21	25.17
Applied for a job in the past two months (N=7132)			
No	6614	92.74	55.03
Yes	518	7.26	44.97
Number of applications in the past two months (N=7132)			
0	6614	92.74	47.56
1	252	3.53	18.90
2	128	1.79	9.60
3	45	0.63	3.38
4	35	0.49	2.63
5	18	0.25	1.35
≥6	40	0.57	16.58
Different search channels			
Answered advertisements	395	5.50	33.00
Placed advertisements	10	0.14	0.84
Asked employers	123	1.71	10.28
Asked friends/relatives	231	3.22	19.30
Through job center	44	0.61	3.68
Temporary employment agency	44	0.61	3.68
Reading advertisements	534	7.44	44.61
Other way	214	2.98	17.88
Number of search channels (N=7177)			
0	6,222	86.69	18.15
1	533	7.43	39.98

2	260	3.62	19.50
3	120	1.67	9.00
≥4	42	0.58	13.35

Table 5 Number of channels and applications

Variable	Obs.	Mean	Std. Dev.
# channels (all workers)	7177	0.2425	0.6898
# channels (job seekers)	1197	1.3325	1.0552
# applications (all workers)	7132	0.1760	0.9206
# applications (job seekers)	1152	1.0894	2.0628

Table 6 Correlation between search effort variables

	Search attitude	Applied	# applications	# channels
Search attitude	-			
	-			
Applied	0.6939			
	(0.3546)			
# applications	0.5309	0.6843		
	(0.3830)	(0.5855)		
# channels	0.7869	0.7113	0.5893	-
	(0.3549)	(0.4468)	(0.4404)	

Note: Entries are correlation coefficients based on all workers (and based on job seekers between parentheses). All correlations are significant ($p<0.0001$)

The model presented in section 2 leads to ambiguous predictions on the relation between time preferences one the one hand and job mobility and promotions on the other hand. These relations therefore remain an empirical question. Unfortunately, the DHS does not contain data on promotions. Although respondents are not asked directly whether or not they moved to another job, we can exploit the panel structure of the data to infer whether a workers has accepted an outside job between two consecutive waves. For the empirical analyses, we use a job mobility dummy indicating whether the worker switched jobs between wave t and t+1. Accordingly, between the years 1996 and 2013 333 (6.5 per cent) 'movers' and 4762 (93.5 per cent) 'stayers' can be identified.

4 Results

4.1 Work effort

In order to examine the relation time preferences and work effort, two equations are estimated using different dependent variables: a self-assessed measure of shirking and a variable indicating whether the employee works less, equal or more than his contractual hours ('overtime'). Both equations are estimated with an ordered probit model and include various controls: demographic variables (age, age squared, marital status, number of children, educational level), employment related factors (type of contract, civil servant, tenure), the unemployment rate (province level), three regional dummies and year dummies (see Appendix C for descriptive statistics).

Error! Reference source not found. shows the average marginal effects of patience on the two work effort variables for estimations with and without a squared patience term (coefficients of the regressions are reported in Appendix D). The presented marginal effects in the first columns are on the outcome that the worker is defined as a shirker (see 3.3). In these estimations, the average marginal effect of patience is negative and highly significant. Although the size of the effect seems to decrease somewhat with the level of patience, there is no indication that the effect is driven by workers with lower patience levels. These findings indicate that more impatient workers have a higher tendency to shirk their duties. The estimation results where overtime categories are used as the dependent variable are consistent with these results: using this alternative indicator of work effort, we find that patience is positively related with the probability of overtime work.[9]

To test for a potential hump shaped relation between patience and work effort, we included a squared patience term in the analyses. The estimated coefficient of the squared term in the shirking estimations is negative and significant. However, since higher values represent lower effort, this indicates a U- rather than an inverse U-shaped relation. This is confirmed by the marginal effects where a squared term is included in the model. The estimation results for overtime work also show no evidence for a negative relation between patience and the probability to work overtime at higher patience levels. In fact, the relation becomes stronger in the upper part of the patience distribution. Overall, results are in line with the prediction that more patient workers invest more in work effort.

[9] In addition of the overtime categories, the difference between actual and contractual hours has been used as a dependent variable. This alternative specification (estimated with OLS) leads to the same qualitative result. This finding is also consistent with the results of Drago (2006).

Table 7 Effort on the job

	Shirker (ordered probit)		Overtime (ordered probit)	
Average ME	-0.0262***	-0.0216***	0.0706***	0.0705***
	(0.00757)	(0.00710)	(0.0112)	(0.0113)
MEs at patience percentile:				
5	-0.0324***	0.0229	0.0728***	0.0447*
	(0.0111)	(0.0173)	(0.0118)	(0.0232)
25	-0.0285***	-0.00816	0.0725***	0.0620***
	(0.00883)	(0.0114)	(0.0119)	(0.0132)
50	-0.0261***	-0.0267***	0.0717***	0.0722***
	(0.00748)	(0.00807)	(0.0117)	(0.0119)
75	-0.0238***	-0.0406***	0.0704***	0.0815***
	(0.00620)	(0.00797)	(0.0112)	(0.0157)
95	-0.0204***	-0.0476***	0.0673***	0.0929***
	(0.00434)	(0.00747)	(0.00998)	(0.0239)
Include patience sq.	No	Yes	No	Yes

Note: The columns provide the marginal effects of the ordered probit models on the outcome where the individual worker is defined as a shirker or works overtime hours. See Appendix D for the coefficients of all independent variables. Standard errors in parentheses (clustered at the individual level). *** p<0.01, ** p<0.05, * p<0.1

4.2 On-the-job search intensity

We estimate the relation between time preferences and search effort using different estimation methods: the models using search attitude and a dummy indicating whether the worker applied for another job as the dependent variable are estimated by ordered probit and binary probit respectively. The equations where the number of job applications or the number of search channels is the dependent variable are estimated by poisson regressions.[10] The main findings are presented in Table 8 (see Appendix D for the coefficients of all independent variables). All of the average marginal effects of patience on the various job search indicators are positive and significant. Moreover, when we estimate the marginal effects at different patience levels, the results do not indicate a negative relation at higher levels of patience. However, the standard errors of the marginal effects increase somewhat at higher patience levels, which may indicate that the relation between patience and search

[10] We also estimated the latter two models with a negative binomial regression model. This leads to similar results.

intensity becomes more ambiguous among the most patient workers. This is especially the case for the number of applications are estimated: the marginal effects seem to be concentrated at a lower patience level.

Table 8 Marginal effects of patience: search intensity

	Search attitude				
	Considering searching	Seriously searching	Applied for a job	# applications	# channels
Average ME	0.0138***	0.00794***	0.0132**	0.0314*	0.0339**
	(0.00495)	(0.00290)	(0.00542)	(0.0168)	(0.0135)
MEs at patience percentile:					
5	0.0130***	0.00655***	0.0110***	0.0252**	0.0281***
	(0.00437)	(0.00193)	(0.00372)	(0.0105)	(0.00904)
25	0.0136***	0.00735***	0.0123***	0.0287**	0.0313***
	(0.00477)	(0.00247)	(0.00469)	(0.0139)	(0.0115)
50	0.0139***	0.00788***	0.0131**	0.0311*	0.0336**
	(0.00498)	(0.00284)	(0.00535)	(0.0164)	(0.0132)
75	0.0141***	0.00844***	0.0139**	0.0337*	0.0360**
	(0.00517)	(0.00324)	(0.00604)	(0.0192)	(0.0151)
95	0.0145***	0.00938**	0.0153**	0.0384	0.0402**
	(0.00539)	(0.00394)	(0.00721)	(0.0245)	(0.0186)
Include patience sq.	No	No	No	No	No

	Search attitude				
	Considering searching	Seriously searching	Applied for a job	# applications	# channels
Average ME	0.0136***	0.00810***	0.0131**	0.0317*	0.0342**
	(0.00487)	(0.00295)	(0.00538)	(0.0166)	(0.0136)
MEs at patience percentile:					
5	0.00403	0.00209	0.00226	0.0296	0.0252
	(0.00980)	(0.00497)	(0.0105)	(0.0263)	(0.0248)
25	0.00958	0.00516*	0.00791	0.0313*	0.0299*
	(0.00591)	(0.00313)	(0.00624)	(0.0185)	(0.0173)
50	0.0132***	0.00742***	0.0120**	0.0321*	0.0334**
	(0.00483)	(0.00273)	(0.00504)	(0.0164)	(0.0139)
75	0.0171***	0.0101***	0.0167**	0.0325	0.0372**
	(0.00590)	(0.00362)	(0.00663)	(0.0233)	(0.0158)
95	0.0236**	0.0156**	0.0264*	0.0326	0.0444
	(0.0106)	(0.00776)	(0.0148)	(0.0495)	(0.0324)
Include patience sq.	Yes	Yes	Yes	Yes	Yes

Note: See Appendix D for the coefficients of all the independent variables. Standard errors in parentheses (clustered at the individual level). *** p<0.01, ** p<0.05, * p<0.1

Next, we consider the results when patience squared is included in the analyses. The coefficients of the squared term are positive in three of the four models. However, in all four

specifications the patience coefficient estimates are individually and jointly insignificant (except for the positive coefficient of patience squared in the model where search attitude is the dependent variable). The bottom part of Table 8 presents the marginal effects of patience (including the squared term) on job search intensity: these estimation results do not indicate any significant negative effects of patience on job search intensity. In all specification including a squared term, the marginal effects become insignificant at lower levels of patience. This also holds for the marginal effects at higher patience levels in the estimations on the number of applications and number of search channels. The results again point out positive, though not always significant, marginal effects when evaluated at higher levels of patience. Hence, we found no evidence that patience is negatively related to on-the-job search intensity at higher patience levels. Given that patient workers search more intensively for other jobs, the findings suggest that search is an investment activity: impatient workers spend little time and effort on such activities.

4.3 Job mobility

To assess the relation between time preferences and job mobility, we estimated a probit model with a dummy as dependent variable indicating whether the worker has made a job-job transition between the current and the consecutive wave. The estimation results are presented in Table 9. In the specifications including and excluding patience squared, the average marginal effect of patience and marginal effects estimated at different patience levels are negative and insignificant.

The theoretical model leads to ambiguous predictions on the effect of patience on job mobility: patience has a positive job arrival effect and a negative job acceptance effect (at least within a certain range of the discount rate). Since we find evidence for a positive relation between patience and on-the-job search intensity while there is no indication that patience is significantly related to job mobility, the findings suggest that the effect through the job acceptance decision is important. Theoretically, we have shown that higher patience levels lead to two contrasting effects on job mobility: a positive job arrival effect and a negative job acceptance effect. The empirical results point out that neither effect dominates. Finally, the finding is inconsistent with standard on-the-job search models: when job mobility is examined in isolation, a positive relation between patience and job search intensity implies a positive relation between patience and mobility. The combined findings

may therefore be hard to reconcile with such models, but can be rationalized within a model that allows for both career advancement within the current firm as well as mobility to outside employers.

Table 9 Marginal effects of patience on job mobility

Average ME	-0.00125	-0.00152
	(0.00523)	(0.00517)
MEs at patience percentile:		
5	-0.00127	-0.0149
	(0.00542)	(0.0132)
25	-0.00126	-0.00652
	(0.00530)	(0.00650)
50	-0.00125	-0.00199
	(0.00523)	(0.00476)
75	-0.00124	0.00239
	(0.00516)	(0.00563)
95	-0.00123	0.00991
	(0.00505)	(0.0110)
Include patience sq.	No	Yes

Note: See Appendix D for the coefficients on the patience measure and the controls. Standard errors in parentheses (clustered at the individual level).
*** p<0.01, ** p<0.05, * p<0.1

4.4 Robustness tests

We performed several tests to examine the sensitivity of the empirical results. First, we assessed whether the results are sensitive to how and which CFC items are aggregated in our patience measure. For instance, we used an aggregate measure excluding the items CFC01, CFC04 and CFC05. These items are negatively correlated with some of the other CFC variables and especially CFC04 and CFC05 have low factor loadings. Moreover, Cronbach reliability scale increases to 0.767 and the average interitem covariance increases to 0.528 when these items are excluded. Alternatively, we used an aggregate patience measure using the factor scores of the first factor of the 11 (or 9, excluding CFC01, CFC04 and CFC05). Estimations using such alternative measures lead to similar results as presented above.

Second, we examined whether involuntary job search drives the results. Until now we have assumed that workers search on-the-job as a means to increase their wages. However, job search may not always be voluntary: some employees may search for other job opportunities anticipating job loss in the near future. We use information provided by the DHS about why employed job searchers are looking for another job to test whether

involuntary job search drives the results.[11] It appears that the results do not change substantially when involuntary job searcher are excluded from the analyses, although they become somewhat stronger. Furthermore, assuming that involuntary job mobility is concentrated within the group of flexible workers, we estimated the relations on a subsample of permanent workers. Again the estimations lead to the same qualitative results: patience is positively associated with work effort, search is not significantly related to job mobility.

Finally, we included some additional controls in the regressions. First, the worker's health condition is likely to be positively related to patience and may also affect work effort, search intensity and job mobility. We therefore included self-reported health status as an additional control. Second, risk preferences may be related to time preferences and affect job search and mobility. Theoretically, our patience measure could capture variation in risk preferences. To test this potential alternative explanation, we constructed a measure of risk preferences and included this measure in the analyses as an additional control.[12] When measures for health, risk preferences or financial conditions are included, the estimates of the effects of patience are not substantially affected.

4.5 Measuring time preferences by behavioural proxies

Our patience measure is fundamentally different from those used in other studies. In order to facilitate the comparison between our results and the results of Drago, we created a patience measure using similar methods and comparable (though a smaller number of) behavioural proxies: dummies indicating whether the individual has a life insurance, holds a savings account, smokes cigarettes, and frequently consumes alcoholic beverages (see Appendix B for details). The smoking and drinking dummies are recoded in such a way that a higher number indicates a higher level of patience. Furthermore, the proxies are standardized to have a mean of zero and a standard deviation of one for the entire male population.[13] As an aggregate patience proxy measure, we retain the first factor scores of these four proxies. The proxy that receives the most weight is smoking. The correlation

[11] The DHS asks job searchers the question: "For what reason(s) are you looking for another job? (more than one answer is allowed)". A worker is considered as an involuntary job searcher when he reports the following reason for job search: "I will (probably) lose my current job".
[12] The DHS includes several questions indicating an individual's risk preference, such as: "I am prepared to take the risk of losing money when there is a chance that I will gain money as well", which is answered using a 7-point scale. We use six of such questions to create an aggregate risk preference indicator.
[13] The Cronbach alpha is 0.225 and the interitem correlation of 0.068. Although these numbers are low, they are actually comparable to the ones reported by Drago and DellaVigna and Paserman (2005).

between the patience measure based on the CFC items and the patience proxy measure is positive (0.065) and highly significant.

Table 10 Job mobility and patience proxies

Average ME	-0.0116**	-0.0100*	-0.0109*	-0.00858
	(0.00545)	(0.00539)	(0.00583)	(0.00577)
MEs at patience percentile:				
5	-0.0134*	-0.0114*	-0.0125*	-0.00965
	(0.00710)	(0.00688)	(0.00755)	(0.00721)
25	-0.0130*	-0.0111*	-0.0121*	-0.00941
	(0.00672)	(0.00654)	(0.00716)	(0.00688)
50	-0.0112**	-0.00970*	-0.0105*	-0.00835
	(0.00504)	(0.00501)	(0.00544)	(0.00544)
75	-0.0109**	-0.00942**	-0.0102**	-0.00813
	(0.00471)	(0.00472)	(0.00510)	(0.00516)
95	-0.0106**	-0.00924**	-0.00999**	-0.00799
	(0.00451)	(0.00453)	(0.00489)	(0.00498)
N	5177	5086	4409	4326
Exclude involuntary job seekers	No	Yes	No	Yes
Control for risk aversion	No	No	Yes	Yes

When we estimate the models presented above using this patience measure, we obtain generally inconsistent results. For the work effort models, the coefficients have the right sign but are insignificant. Furthermore, the results for search intensity are inconsistent across specifications and the coefficients are insignificant in all specifications. The most interesting results concern the estimations of job mobility: the coefficient of patience is negative and significant (Appendix D). In addition, the average marginal effects as well as the marginal effects evaluated at different levels of patience are positive. This is consistent with the predictions and results of Drago (2006). These findings point out that the way patience is measured may affect the results considerably.

The differences between the results using our patience measure versus those using behavioural proxies is striking: whereas our patience measure is positively associated with work effort and on-the-job search intensity and not significantly related to job mobility, the estimations using the behavioural proxy measure for patience indicate no relation between patience measures and the two career activities but do show a significant association with job mobility. A more detailed analysis suggests that the latter result is mainly driven by heterogeneity in smoking behaviour.

A potential explanation for the discrepancy in findings is that the proxy measure may capture other unobserved factors. In fact, if we exclude involuntary job mobility and control for risk aversion (see above), the effect disappears (column (5)). Although this may also be due to the drop in observations (of over 10 percent), the estimations do show that the negative relation is not very robust and suggest that a combination of involuntary job mobility and risk aversion rather than time preferences drives the results.

5 Conclusions

Workers can pursue different career paths by investing in their current job and by searching on-the-job. Theoretically, patience is generally positively related to work effort and on-the-job search intensity. However, given that the two activities are substitutes, we show that at higher levels of patience job search effort may crowd out work effort or vice versa. This suggests that there might be a hump shaped relation between patience and one of these career investments. The model does not lead to unambiguous predictions on the association between the discount rate and job mobility. The intuition is that patient workers probably invest more in their current job and, consequently, may be more critical about potential outside job offers anticipating a promotion. These predictions differ from existing models. For example, from standard on-the-job search models it is easy to derive that search intensity as well as job mobility increase with patience. Moreover, Drago (2006) predicts that patience is negatively rather than positively related to search intensity and job mobility.

The empirical results show that patience is positively related to both work and job search effort. There is little evidence that point out an inverse U-shaped relation between patience and the two career investment. Furthermore, our findings do not indicate that patience is significantly associated to job mobility. These results are in sharp contrast with the hypotheses and empirical findings from previous studies (Drago, 2006; Cadena and Keys, 2014), identifying a negative relation between patience and the hazard rate of moving to another job. A potential explanation for this inconsistency is that we use a different patience measure: whereas previous studies rely on behavioural proxies (e.g. smoking and alcohol consumption), we exploit a battery of items indicating the individual's orientation towards the future. We test this explanation by re-estimating our models using a patience measure based on behavioural proxies. Although our estimations also indicate a significant

negative relation between this patience measure and job mobility, the findings are sensitive to the inclusion of a measure for risk preferences.

The empirical findings have several methodological implications. First, relying on behavioural proxies to measure patience may generate misleading outcomes: these proxies are rather noisy measures and are likely to capture other (unobserved) characteristics, such as risk aversion. Future research could exploit more general (self-assessed) psychological constructs such as the CFC scale. Second, empirical research on on-the-job search models has to a large extent ignored on-the-job search behaviour and instead focuses almost completely on job duration and mobility. This study demonstrates that one should be cautious interpreting evidence on job mobility as evidence on on-the-job search (and the other way around).

The results complement recent findings in economics showing that time preferences predict the individual's income level (Golsteyn et al., 2014; Cadena and Keys, 2014), suggesting observed income inequality can to some extent be explained by heterogeneity in the discount rate. In addition to the human capital channel emphasised in previous work, time preferences may affect the fortunes of individuals through the career investment channel. This study provides an alternative explanation for the observed income gap between patient and impatient individuals: impatient workers may lag behind because they invest little in their current job and do not actively engage in on-the-job search activities.

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Appendix A

By taking the total differential of the equations (1), (2) and (3) we obtain the following system of equations:

$$\begin{bmatrix} -c_1''(s) & -\delta\lambda\mu(w^p-w)\big(1-F(\widehat{w})\big) & 0 \\ -\lambda\delta\mu(w^p-w)\big(1-F(\widehat{w})\big) & -c_2''(e) & \lambda\delta\mu s(w^p-w)\,f(\widehat{w}) \\ 0 & -\mu(w^p-w) & 1 \end{bmatrix}\begin{bmatrix} s' \\ e' \\ \widehat{w}' \end{bmatrix}$$

$$= -\begin{bmatrix} \lambda\int_{\widehat{w}}^{\overline{w}}\big[x-\big(w+\mu e(w^p-w)\big)\big]dF(x) \\ \mu(w^p-w)(1-\lambda s(1-F(\widehat{w}))) \\ 0 \end{bmatrix}$$

where $s' = \frac{ds}{d\,\delta}$, $e' = \frac{de}{d\,\delta}$ and $\widehat{w}' = \frac{d\widehat{w}}{d\,\delta}$. According to the last equation $\widehat{w}' = \mu(w^p-w)e'$So, we can simplify this system of equations as follows:

$$\begin{bmatrix} c_1''(s) & \delta\lambda\mu(w^p-w)\big(1-F(\widehat{w})\big) & 0 \\ \lambda\delta\mu(w^p-w)\big(1-F(\widehat{w})\big) & c_2''(e) & -\lambda\delta\mu s(w^p-w)\,f(\widehat{w}) \end{bmatrix}\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & \mu(w^p-w) \end{bmatrix}\begin{bmatrix} s' \\ e' \end{bmatrix}$$

$$= \begin{bmatrix} \lambda\int_{\widehat{w}}^{\overline{w}}\big[x-\big(w+\mu e(w^p-w)\big)\big]dF(x) \\ \mu(w^p-w)(1-\lambda s(1-F(\widehat{w}))) \end{bmatrix}$$

or

$$\begin{bmatrix} c_1''(s) & \delta\lambda\mu(w^p-w)\big(1-F(\widehat{w})\big) \\ \lambda\delta\mu(w^p-w)\big(1-F(\widehat{w})\big) & c_2''(e)-\lambda\delta\mu^2 s(w^p-w)^2\,f(\widehat{w}) \end{bmatrix}\begin{bmatrix} s' \\ e' \end{bmatrix}$$

$$= \begin{bmatrix} \lambda\int_{\widehat{w}}^{\overline{w}}\big[x-\big(w+\mu e(w^p-w)\big)\big]dF(x) \\ \mu(w^p-w)(1-\lambda s(1-F(\widehat{w}))) \end{bmatrix}$$

The right hand side of the first equation are greater than 0. Moreover, $c_1''(s) > 0$; $\delta\lambda\mu(w^p-w)\big(1-F(\widehat{w})\big) > 0$. Therefore, it is not possible that $s' < 0$ and $e' < 0$. The first and second equation can be rewritten as equation (6) and (7) respectively. Furthermore, the first equation implies a negative relationship between s' and e'. First, consider on-the-job search. To derive (8), we can simply rewrite (6) to:

$$c_1''(s)s' = \lambda\big(1-F(\widehat{w})\big)\Big(E\big[x-\big(w+\mu e(w^p-w)\big)|\,x>\widehat{w}\big]-\delta e'\mu(w^p-w)\Big) \quad \text{(A1)}$$

which is positive when the term multiplied by $\lambda\big(1-F(\widehat{w})\big)$ is positive. This leads to (8). Second, the equation for work effort can be formulated as:

$$c_2''(e)e' = \mu(w^p-w)$$
$$\big\{1-\lambda s\big(1-F(\widehat{w})\big)+\mu(w^p-w)\lambda\delta\,f(\widehat{w})e'-\lambda\delta\big(1-F(\widehat{w})\big)s'\big\} \quad \text{(A2)}$$

which implies that $c_2''(e)e' > 0$ if the term multiplied by $\mu(w^p - w)$ is positive. One can now obtain equation (9) by plugging in the following equation (which is the equivalent of (6)):

$$e' = \frac{\lambda \int_{\hat{w}}^{\bar{w}} [x - (w + \mu e(w^p - w))] dF(x) - c_1''(s)s'}{\delta \lambda \mu (w^p - w)(1 - F(\hat{w}))} \quad \text{(A3)}$$

Appendix B - CFC items

Table B1 Correlation matrix

	CFC01	CFC02	CFC03	CFC04	CFC05	CFC06	CFC07	CFC08	CFC09	CFC10	CFC11
CFC01	-										
CFC02	0.0357										
CFC03	0.0200	0.6144*									
CFC04	0.0181	0.3042	0.4536*								
CFC05	0.0284	-0.0132*	0.0557*	0.3284*							
CFC06	0.0029*	-0.0950*	-0.0360*	0.1723*	0.3057*						
CFC07	0.0432	0.2778*	0.3161*	0.1358*	-0.0685*	-0.0859*					
CFC08	0.0175*	0.2999*	0.2445*	0.1411*	-0.0152*	-0.2029*	0.2469*				
CFC09	0.0372	0.3340*	0.3528*	0.1734*	0.0196*	-0.1087	0.3162*	0.4268*			
CFC10	-0.0010	0.1328*	0.1477*	0.3728*	0.1808*	0.1049*	0.0315*	0.1762*	0.0902*		
CFC11	0.0266	0.1449*	0.1868*	0.3867*	0.1818*	0.1580*	0.1975*	0.0790*	0.0945*	0.4799*	-

Note: The correlation coefficients are based on the group of workers used in the job search analyses (N=7180). When all respondents are included, a similar pattern arises. * $p<0.0001$

Table B3 Factor analysis: all FUTURE items

Variable	Factor loadings	Uniqueness	Scoring coef.
CFC01	0.4754	0.7741	0.12748
CFC02	0.5684	0.6770	0.17430
CFC03	0.6984	0.5122	0.28303
CFC04	0.2898	0.9160	0.06566
CFC05	0.1360	0.9815	0.02877
CFC06	0.3093	0.9043	0.07099
CFC07	0.3089	0.9046	0.07088
CFC08	0.3489	0.8783	0.08244
CFC09	0.5299	0.7192	0.15291
CFC10	0.5844	0.6584	0.18421
CFC11	0.6488	0.5790	0.23252

Note: All eleven CFC items are included in the factor analysis, which is estimated with maximum likelihood. The results presented in the table represent estimates retaining the first factor.

Table B1 Factor analysis: patience proxies

Variable	Factor loadings	Uniqueness	Scoring coef.
Life insurance	0.0753	0.9943	0.04697
Savings account	0.1640	0.9731	0.10462
Non-smoker	0.5838	0.6592	0.54958
Non-drinker	0.2399	0.9425	0.15794

Appendix C – Controls

Table B1 Controls: descriptives

Variable	Mean	Std. Dev.
Age	45.779	9.634
Nr of children	1.058	1.190
Unemployment rate	5.565	1.494
Tenure	14.538	11.233
Married	0.697	0.460
Education level:		
Pre-vocational (VMBO) or below	0.252	0.434
Pre-university (HAVO/VWO)	0.088	0.283
Senior vocational (MBO)	0.238	0.427
Vocational college (HBO)	0.276	0.447
University	0.145	0.352
Permanent	0.961	0.195
Civil servant	0.201	0.401
Region:		
North	0.111	0.314
East	0.204	0.403
South	0.278	0.448
West	0.407	0.491

Note: The descriptives presented here are for the sample used in the job search intensity analyses (N=7180; see

Table 4).

Appendix D - Estimation results

Table D1 On-the-job search intensity

	Shirking (Ordered probit)	Shirking (Ordered probit	Overtime (Ordered probit)	Overtime (Ordered probit)
Patience	-0.153***	0.811**	0.191***	-0.0726
	(0.0440)	(0.318)	(0.0307)	(0.205)
Patience sq.		-0.115***		0.0316
		(0.0370)		(0.0251)
Age	-0.0133	-0.0177	0.000616	0.00127
	(0.0233)	(0.0235)	(0.0196)	(0.0196)
Age squared	0.0103	0.0147	-0.00577	-0.00648
	(0.0257)	(0.0258)	(0.0222)	(0.0222)
Married	-0.116	-0.119	0.0928	0.0922
	(0.0800)	(0.0798)	(0.0661)	(0.0662)
Nr of children	-0.0136	-0.0155	-0.0173	-0.0166
	(0.0304)	(0.0303)	(0.0247)	(0.0246)
Education†:	-0.0521	-0.0477	0.202**	0.202**
pre-university	(0.118)	(0.117)	(0.0957)	(0.0957)
Education:	0.123	0.113	0.250***	0.252***
senior vocational	(0.0872)	(0.0867)	(0.0724)	(0.0725)
Education:	0.0454	0.0419	0.522***	0.523***
vocational college	(0.0850)	(0.0849)	(0.0757)	(0.0756)
Education:	-0.0525	-0.0427	0.632***	0.630***
university	(0.0990)	(0.0992)	(0.0902)	(0.0902)
Unemployment rate	0.00857	0.0143	0.0182	0.0170
	(0.0384)	(0.0380)	(0.0355)	(0.0355)
Permanent contract	-0.0550	-0.0631	-0.0192	-0.0178
	(0.0967)	(0.0951)	(0.0915)	(0.0915)
Civil servant	-0.0816	-0.0742	-0.100	-0.103*
	(0.0778)	(0.0770)	(0.0616)	(0.0616)
Tenure	0.00303	0.00320	-0.00716***	-0.00716***
	(0.00281)	(0.00279)	(0.00271)	(0.00272)
Region: north	-0.169	-0.173	-0.140	-0.139
	(0.107)	(0.105)	(0.106)	(0.106)
Region: east	-0.146*	-0.141*	-0.00368	-0.00465
	(0.0806)	(0.0807)	(0.0681)	(0.0682)
Region: south	-0.161**	-0.155*	0.0682	0.0677
	(0.0811)	(0.0806)	(0.0675)	(0.0674)
Pseudo-R^2	0.0107	0.0129	0.0488	0.0491
Log pseudo-likelihood	-4864	-4853	-5565	-5563
Chi-square‡	-	6.52**	-	0.13
N	1014	1014	2088	2088
NT	3930	3930	7011	7011

Note: The shirking variable is available from 2004 onwards, which explains the lower number of observations in the estimations. The coefficients on year dummies are suppressed in the table. Robust and clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

† Reference category: Pre-vocational (VMBO) or below.

‡ The Chi-square statistics reported here refer to the joint significance of the patience and patience squared variables.

Table D2 On-the-job search intensity

	Search attitude (ordered probit)		Applied for job (probit)		# applications (poisson reg.)		# channels (poisson reg.)	
Patience	0.0944***	-0.129	0.101**	-0.170	0.179*	0.289	0.154**	0.0971
	(0.0337)	(0.218)	(0.0414)	(0.290)	(0.0950)	(0.681)	(0.0603)	(0.430)
Patience squared		0.0263		0.0317		-0.0128		0.00659
		(0.0255)		(0.0338)		(0.0809)		(0.0486)
Age	0.131***	0.132***	0.125***	0.126***	0.183***	0.182***	0.188***	0.189***
	(0.0242)	(0.0243)	(0.0296)	(0.0294)	(0.0615)	(0.0616)	(0.0468)	(0.0469)
Age squared (/100)	-0.175***	-0.175***	-0.156***	-0.158***	-0.217***	-0.216***	-0.243***	-0.244***
	(0.0289)	(0.0289)	(0.0342)	(0.0341)	(0.0720)	(0.0721)	(0.0568)	(0.0570)
Married	-0.155**	-0.156**	-0.0766	-0.0778	-0.0206	-0.0201	-0.144	-0.144
	(0.0638)	(0.0636)	(0.0780)	(0.0777)	(0.202)	(0.203)	(0.113)	(0.113)
Nr of children	-0.00975	-0.00923	-0.00762	-0.00719	-0.0541	-0.0541	-0.0415	-0.0415
	(0.0243)	(0.0242)	(0.0279)	(0.0277)	(0.0679)	(0.0679)	(0.0438)	(0.0438)
Education†: pre-university	0.130	0.129	0.119	0.117	0.0461	0.0469	0.0103	0.0102
	(0.0988)	(0.0987)	(0.111)	(0.112)	(0.323)	(0.323)	(0.174)	(0.174)
Education: senior vocational	0.0857	0.0872	0.155*	0.157*	-0.0289	-0.0297	0.141	0.141
	(0.0770)	(0.0771)	(0.0877)	(0.0879)	(0.225)	(0.225)	(0.144)	(0.144)
Education: vocational college	0.100	0.102	0.114	0.116	-0.0140	-0.0147	0.227	0.228
	(0.0786)	(0.0788)	(0.0897)	(0.0898)	(0.236)	(0.236)	(0.139)	(0.139)
Education: university	0.154*	0.151*	0.162*	0.159	-0.304	-0.303	0.314**	0.314**
	(0.0888)	(0.0884)	(0.0986)	(0.0982)	(0.238)	(0.237)	(0.154)	(0.154)
Unemployment rate	-0.0277	-0.0290	-0.0770*	-0.0788*	-0.319***	-0.319***	-0.0570	-0.0573
	(0.0382)	(0.0382)	(0.0432)	(0.0434)	(0.111)	(0.110)	(0.0650)	(0.0649)
Permanent contract	-0.313***	-0.312***	-0.240**	-0.238**	-1.021***	-1.022***	-0.421***	-0.421***
	(0.0890)	(0.0894)	(0.115)	(0.116)	(0.236)	(0.236)	(0.150)	(0.150)
Civil servant	0.000275	-0.00334	-0.0308	-0.0348	-0.329**	-0.327**	-0.0471	-0.0481
	(0.0616)	(0.0617)	(0.0669)	(0.0672)	(0.156)	(0.157)	(0.105)	(0.106)
Tenure	-0.0156***	-0.0156***	-0.0179***	-0.0179***	-0.0423***	-0.0423***	-0.0348***	-0.0348***
	(0.00326)	(0.00325)	(0.00378)	(0.00376)	(0.00992)	(0.00990)	(0.00656)	(0.00656)
Region: north	0.0689	0.0682	0.160	0.160	0.450	0.450	0.162	0.162
	(0.116)	(0.116)	(0.138)	(0.138)	(0.297)	(0.297)	(0.175)	(0.175)
Region: east	-0.0180	-0.0182	0.0221	0.0219	-0.0972	-0.0967	0.0627	0.0625
	(0.0688)	(0.0688)	(0.0780)	(0.0780)	(0.199)	(0.198)	(0.119)	(0.119)
Region: south	-0.00297	-0.00383	0.0510	0.0496	0.0641	0.0642	-0.00992	-0.00993
	(0.0676)	(0.0676)	(0.0742)	(0.0741)	(0.192)	(0.192)	(0.117)	(0.117)
Pseudo-R^2	0.0671	0.0673	0.061	0.0615	-	-	-	-
Log pseudo-likelihood	-3655	-3654	-1744	-1743	-4032	-4032	-4224	-4224
Chi-square‡	-	0.35	-	0.35	-	0.18	-	0.05
N	2161	2161	2157	2157	2157	2157	2161	2161
NT	7180	7180	7132	7132	7132	7132	7177	7177

Note: The coefficients on year dummies are suppressed in the table. Robust and clustered standard errors in parentheses.
† Reference category: Pre-vocational (VMBO) or below. *** p<0.01, ** p<0.05, * p<0.1
‡ The Chi-square statistics reported here refer to the joint significance of the patience and patience squared variables.

Table D3 Job mobility

Patience	-0.0106	-0.370
	(0.0443)	(0.294)
Patience squared		0.0421
		(0.0342)
Age	-0.0387	-0.0382
	(0.0286)	(0.0287)
Age squared (/100)	0.0123	0.0118
	(0.0338)	(0.0339)
Married	-0.00333	-0.00451
	(0.0868)	(0.0867)
Nr of children	0.0525*	0.0533*
	(0.0313)	(0.0313)
Education†: pre-university	0.125	0.122
	(0.115)	(0.115)
Education: senior vocational	0.115	0.119
	(0.0973)	(0.0974)
Education: vocational college	0.161*	0.163*
	(0.0919)	(0.0919)
Education: university	0.402***	0.396***
	(0.106)	(0.106)
Unemployment rate	-0.0271	-0.0297
	(0.0461)	(0.0460)
Permanent contract	-0.652***	-0.648***
	(0.128)	(0.128)
Civil servant	-0.0369	-0.0402
	(0.0752)	(0.0753)
Region: north	-0.120	-0.122
	(0.134)	(0.134)
Region: east	-0.0519	-0.0526
	(0.0864)	(0.0863)
Region: south	-0.0846	-0.0851
	(0.0789)	(0.0789)
Pseudo-R^2	0.0833	0.0839
Log pseudo-likelihood	-1133	-1132
Chi-square‡	-	1.59
N	1505	1505
NT	5097	5097

Note: The coefficients on year dummies are suppressed in the table. Robust and clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

† Reference category: Pre-vocational (VMBO) or below.

‡ The Chi-square statistics reported here refer to the joint significance of the patience and patience squared variables.