Labour Economics 35 (2015) 77–92

Contents lists available at ScienceDirect

Labour Economics

journal homepage: www.elsevier.com/locate/labeco

Time preferences and career investments

Thomas van Huizen [a,*], Rob Alessie [b]

[a] Utrecht University, PO 80125, Utrecht 3508 TC , Netherlands
[b] University of Groningen, Netherlands

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.

ARTICLE INFO

Article history:
Received 6 May 2013
Received in revised form 20 March 2015
Accepted 28 March 2015
Available online 7 April 2015

Keywords:
Time preferences
Job search
Work effort
Job mobility

ABSTRACT

This paper examines the role of time preferences in career investments. We focus on the effects of patience 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 predictions, 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.

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. Second, 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 the extent to which 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 demonstrates that time preferences predict important social and economic outcomes. Using a large Swedish sample, Golsteyn et al. (2014) show that a high discount rate measured at age 13 years is negatively associated with educational attainment, labour supply and income later in life. Cadena and Keys (forthcoming) 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. Paserman (2008) and DellaVigna and Paserman (2005) examine the relation between time

* Corresponding author.
E-mail address: T.M.vanHuizen@uu.nl (T. van Huizen).

http://dx.doi.org/10.1016/j.labeco.2015.03.017
0927-5371/

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. These results are consistent with the predictions derived from the hyperbolic 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 is positively related to on-the-job search effort and 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 are more likely to move to other (outside) 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 (e.g., 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 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 more precise than those derived from behavioural proxies. Moreover, we compare the estimation results using the CFC scale with those using an indicator based on behavioural proxies: it appears that the results depend crucially on how heterogeneity in time preferences is captured.

Overall, our findings show that more patient workers 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. 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—given that these gains materialize in the future. These models therefore predict that more patient workers invest more in both 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 activity. We propose an alternative career model where the total level of on-the-job search intensity and work effort is endogenous and both activities are modelled as investments (i.e., generating 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 developed a model where on-the-job search and work effort are substitutes. In their 2-period model, the wage in the second period depends on whether the worker found another 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 examine general equilibrium issues. In contrast to Moen and Rosen (2013), we allow for a discount rate between the two periods and we do not make the assumption 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

[1] Although it is not the focus of their study, Cadena and Keys (2014) also provide evidence that impatient individuals switch more frequently between jobs. Like Drago (2006), the results of Cadena and Keys (2014) are based on the NLSY.

[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.

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 ($0 \le \mu e \le 1$), 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 $[\underline{w}, \overline{w}]$: by definition, promotion offers are higher than the current wage. Similarly, increasing the level of on-the-job search intensity positively affects the probability of receiving an outside offer λs ($0 \le \lambda s \le 1$), with constant λ ($\lambda > 0$). The wage offer x is drawn from a known distribution $F(x)$, which is the cumulative distribution function 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:

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

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 ($0 < \delta \le 1$). 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 potential gains if the worker receives an outside offer. The worker accepts the job offer when the offer is higher than the cutoff point $\hat{w}$ ('reservation wage'). From Eq. (1) we can derive the three first order conditions:

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

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

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

Eq. (2) shows that the 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 on-the-job search. Similarly, the right-hand side of Eq. (3) represents the marginal benefits of work effort, which decline with the probability of leaving the firm $\lambda s(1 - F(\hat{w}))$. Finally, Eq. (4) describes the reservation wage $\hat{w}$, indicating the wage offer at which the worker is indifferent between staying and moving.

Given that the right-hand side of Eq. (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 Eq. (2) can be rewritten as

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

which implies that workers will always exert a positive amount of on-the-job search effort ($s > 0$). Hence, we can rule out corner solutions.

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:

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

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

where $s' = \frac{ds}{d\delta}$, $e' = \frac{de}{d\delta}$. Eq. (6) implies that $c_1''(s)s' > 0$, that is, search effort increases with δ if $e' < 0$. Moreover, one can derive that, when $e' > 0$, search effort is positively related with δ if:

$$\delta < \frac{E(x - \hat{w} \mid x > \hat{w})}{\mu e'(w^p - w)} \tag{8}$$

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 a negative relation between patience and on-the-job search, there may exist a hump-shaped relation between δ and this career investment. However, given $0 < \delta \le 1$, search intensity increases in the entire range of δ when the expected future payoffs from external mobility are relatively large ($E(x - \hat{w} \mid x > \hat{w}) > \mu e'(w^p - w)$).

Next, we can use Eq. (7) to show that patience increases the level of work effort if:

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

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

$$\delta < \frac{1 - \lambda s(1 - F(\hat{w})) + \lambda f(\hat{w})E[x - \hat{w} \mid x > \hat{w}] + c_1''(s)s'(1 - F(\hat{w}))^{-1}}{\lambda s'(1 - F(\hat{w}))} \tag{10}$$

Eq. (10) indicates there may be an inverse U-shaped relation between patience and work effort. 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 patience. Indeed, $e' < 0$ implies $s' > 0$ and $s' < 0$ implies $e' > 0$.

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 $\hat{w}$. Hence, job mobility (i.e., the quit rate) is given by:

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

Eq. (9) shows that the quit rate in this career model is closely related to the quit rate defined in standard on-the-job search models (e.g., Burdett, 1978). However, in our model, the probability of rejecting an offer is given by $F(\hat{w})$ rather than $F(w)$. This is why search models lead to unambiguous predictions on the relation between patience and job mobility, as patience only affects the job arrival rate λs through more intensive job search effort. 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 work effort, the model indicates two opposing effects on the quit rate. A higher level of 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 ($1 - F(\hat{w})$). 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. Discussion

In the model presented above, we made several assumptions. However, one may argue that there are plausible alternative assumptions, for instance, concerning the costs functions. Here we consider several alternative model specifications and potential extensions.

First, although the assumption of convex costs functions is standard in on-the-job search models,[3] it is interesting to consider the case of non-separable cost functions. We could model the costs as $c(i)$, a convex function of total career investments $i = s + e$. Similarly, period utility may be a function of w and $g(l)$, an increasing concave function of leisure $l = T - s - e$ (with exogenous total available time T). Under such alternative assumptions, the two investments are perfect substitutes in terms of costs in period 1. Given that search (work) effort decreases the gains from work (search) effort, workers have no incentive to invest in both activities and will invest in the activity that generates the highest expected payoffs. However, it is clear that, when search and work are perfect substitutes, the model also predicts that more patient individuals invest more in their career (see the online appendix for derivations).

Second, the probability of receiving a promotion may be modelled as stochastic so there exists a probability $\mu e \cdot \lambda s$ that the worker receives both a promotion and an outside job offer. When the worker obtains an outside offer x, he evaluates this offer against w or w^p. In that case, the probability that the outside wage will be compared with the current wage rather than the promotion wage is a decreasing function of the individual's work effort. Similarly, the likelihood that a promotion offer is rejected ($w^p < x$) increases with on-the-job search intensity. In line with our central model, this implies that the marginal gains from work (search) effort decline with the intensity of search (work). Such a model leads to qualitatively similar predictions: work effort e increases with δ if s decreases with δ and s increases with δ if e decreases with δ. Moreover, it can be shown that both s and e increase with δ when δ is sufficiently low (see the online appendix for derivations).

Third, the model assumes that firms are not able to make counter offers once an outside offer is received. Following on-the-job search models that allow for wage renegotiations (Postel-Vinay and Robin, 2002; Dey and Flinn, 2005; Cahuc et al., 2006), workers reject the outside offer if its value is below the counter offer made by the current employer. On-the-job search may in that way lead to wage growth ('promotions') within the current firm. However, as these counteroffers depend on the productivity of the worker, they are likely to be positively related to work effort. Allowing for wage renegotiations introduces additional gains from both search and work effort. It is therefore not obvious how this affects the results.

Finally, the model captures the role of time preferences in a rather basic way. A potential extension could be to allow for present-biased time preferences, which seem to be consistent with a substantial amount of experimental and field evidence (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 (Laibson, 1997). This may be relevant as one of the most important predictions of hyperbolic discounting models is that individuals have a tendency to postpone investment activities (O'Donoghue and Rabin, 1999). Moreover, 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) proposes a theoretical model of search and work effort that allows for hyperbolic discounting. The hypothesis that distinguishes between exponential and hyperbolic discounting is based on sophistication (the extent 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 is therefore difficult to distinguish empirically between exponential and hyperbolic discounting in career models. We therefore focus 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 DNB Household Survey (DHS). This Dutch longitudinal survey has been collected annually by CentERdata since 1993. Around 2500 households participate in the panel each year. All household members aged 16 or older complete the questionnaire online.[4]

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 of the DHS. We select male employees aged 23–60 and exclude 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 that they perceive as temporary. In addition, many questions refer to the period prior to the interview (e.g., the number job applications during the past 2 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 almost 7000 observations (over 2000 individuals).

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).[5] This psychological construct aims to capture the individual's orientation towards the future. Respondents use a 7-point scale to indicate to what 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).[6]

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).

[3] See, for instance, Chrisensen et al. (2005). Moen and Rosen (2013) assume a convex cost function of search effort, but a linear cost function of work effort. Moreover, Drago's model uses a U-shaped cost function of search effort. Given the assumption that total costs of effort ($s + e$) is exogenous in his model, such a cost function is similar to two convex and separable cost functions.

[4] 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.

[5] 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.

[6] 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.

Table 1
Time preferences: descriptive statistics.

Name	Description	Mean	SD	Patience[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)	4.37	1.50	−
CFC05	Whether something is convenient determines my decisions to a large extent	3.62	1.30	−
CFC06	I am prepared to sacrifice my current well-being in order to achieve objectives in the future	3.71	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	4.92	1.24	+
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	1.24	+
CFC09	I generally ignore warnings about future problems because I assume that these problems will be solved by then	4.69	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	1.33	−
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 ($N = 6792$).
[a] This column indicates the expected relation between the 11 original CFC items and patience (δ).

Table 2
Patience measure: summary statistics.

	Mean	SD	Percentiles				
			5	25	50	75	95
Patience [$N = 6792$]	4.20	0.72	3	3.73	4.18	4.64	5.36

Assuming time preferences are stable, we use lagged information for the 2008 and 2010–2013 waves.[7]

We would expect that CFC01, CFC02 and CFC06–08 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, etc.) so higher values of the items indicate higher levels of patience. After recoding, most correlations between the items are positive and highly 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 (rescaled) items as a measure of patience.[8] Table 2 shows some descriptives of this measure. The average (median) patience level is 4.2 (4.18). Over 80% of the individuals are within a one unit range of the average. 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 the measure is a reliable indicator of the individual's time preference.

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, it may 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% of the workers state that they are 'shirkers' (answer 'accurate' or 'very accurate'). Given the small number of respondents reporting the answer 'very accurate', we merged the categories 'accurate' and 'very accurate' for the analysis. 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) demonstrates 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 overtime hours and found a positive relationship between overtime hours and the incidence of promotion (Francesconi, 2001; Booth et al., 2003; Pannenberg, 2005).

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 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 3 hours more than their contract indicates. Less than 5% of the workers state that they work less than their contractual working hours. The correlation between the shirking variable and the number of overtime hours is small (-0.0227) and insignificant, but has the expected sign.

3.4. On-the-job search intensity

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 (e.g., Bloemen, 2005); (2) a dummy indicating whether the worker has applied for a job in the past 2 months; (3) the number of job applications made by the worker during the last 2 months (e.g., Van der Klaauw and van Vuuren, 2010); (4) the number of job search channels used by the worker in the last 2 months (e.g., DellaVigna and Paserman, 2005).[9] The latter may be interesting

[7] The results are robust to excluding the 2008–2013 waves.
[8] As a robustness check, several alternative measures have been used in the empirical analyses (see Section 4.4).
[9] Employed respondents are asked the following question: "Are you currently looking for another job?" Potential answers are as follows: "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).

Table 3
Work effort.

	Freq.	Percent
Statement: 'I shirk my duties' (N = 3612)		
Very inaccurate	1392	38.54
	1317	36.46
	552	15.28
	273	7.56
Very accurate	78	2.16
Overtime hours (N = 6657)		
Contract hours > actual hours	306	4.60
Contract hours = actual hours	2513	37.75
Contract hours < actual hours	3838	57.65
	Mean	SD
Actual hours—contract hours	3.166	4.429

as previous empirical findings indicate that the number of search methods is positively related to the time spent searching per day (Krueger and Mueller, 2008).

Tables 4 and 5 present information on these search intensity variables. About 18% of the workers is either thinking about looking or seriously searching for another job. Over a quarter of these employed job searchers report that they are seriously searching for another job. One out of 13 workers applied for a job in the last 2 months (almost half of the employed job seekers). 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 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 of all workers	Percentage of job seekers
Search attitude (N = 6795)			
Not looking for another job	5606	82.54	–
Considering looking for another job	890	13.10	75.04
Seriously searching for another job	296	4.36	24.96
Applied for a job in the past 2 months (N = 6748)			
No	6233	92.37	54.86
Yes	515	7.63	45.14
Number of applications in the past 2 months (N = 6748)			
0	6233	92.37	54.86
1	251	3.72	22.00
2	128	1.90	11.22
3	43	0.64	3.77
4	35	0.52	3.07
5	18	0.27	1.58
≥6	40	0.59	3.51
Different search channels			
Answered advertisements	391	5.76	32.97
Placed advertisements	9	0.13	0.76
Asked employers	120	1.77	10.12
Asked friends/relatives	227	3.34	19.14
Through job centre	42	0.62	3.54
Temporary employment agency	42	0.62	3.54
Reading advertisements	531	7.82	44.77
Other way	214	3.15	18.04
Number of search channels (N = 6792)			
0	5845	86.06	20.15
1	532	7.83	44.86
2	256	3.77	21.59
3	118	1.74	9.95
≥4	41	0.60	3.46

Table 5
Number of channels and applications.

Variable	Obs.	Mean	SD
No. channels (all workers)	6792	0.2320	0.6691
No. channels (job seekers)	1186	1.3288	1.0521
No. applications (all workers)	6748	0.1849	0.9442
No. applications (job seekers)	1141	1.0938	2.0629

Table 6
Correlations between search effort variables.

	Search attitude	Applied	No. applications
Applied (Y/N)	0.6929		
	(0.3563)		
No. applications	0.5282	0.6815	
	(0.3824)	(0.5832)	
No. channels	0.7859	0.7127	0.5882
	(0.3477)	(0.4508)	(0.4418)

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

3.5. Mobility

The model presented in Section 2 leads to ambiguous predictions on the relation between time preferences on the one hand and job mobility and promotions on the other hand. These relations therefore remain an empirical question. While respondents are not asked directly whether or not they moved to another job, by using data on the length of tenure and exploiting the panel structure of the data, we can 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 324 (6.6%) 'movers' and 4591 (93.4%) 'stayers' can be identified.

Unfortunately, the DHS does not contain data on promotions. Although the DHS includes retrospective data on annual wages received during the previous calendar year, we do not use this information in the analysis as measurement error seems to be a serious concern. In principle, we can use wage data from wave $t + 1$ and $t + 2$ to derive whether the worker experienced a substantial increase in his annual wage between the calendar year of wave t and wave $t + 1$. When the worker spent the entire two-year period at the current employer, we may interpret this as a promotion. However, it appears that whether or not the worker uses a written statement to answer the wage questions is a major determinant of receiving a substantial wage raise at the current employer: this points out that measurement error in the wage data is a problem. It may therefore not be surprising that models estimating the relation between patience and the probability of experiencing a promotion lead to inconsistent results.[10]

[10] If we select workers who report that they have used a written source to provide the wage data, the number of observations drops considerably (to around 1300, or 500 individuals). Estimations based on this restricted sample show generally positive relations between patience and the probability of receiving a promotion. In some model specifications, these relations are positive and significant.

Table 7
Marginal effects of patience: work effort.

	Shirker (ordered probit)		Overtime (ordered probit)	
Average ME	−0.0261***	−0.0210***	0.0716***	0.0714***
	(0.00757)	(0.00710)	(0.0117)	(0.0117)
MEs at patience percentile:				
5	−0.0324***	0.0247	0.0741***	0.0427*
	(0.0112)	(0.0171)	(0.0124)	(0.0244)
25	−0.0284***	−0.00689	0.0737***	0.0619***
	(0.00887)	(0.0115)	(0.0124)	(0.0138)
50	−0.0260***	−0.0260***	0.0727***	0.0732***
	(0.00749)	(0.00814)	(0.0121)	(0.0125)
75	−0.0237***	−0.0404***	0.0713***	0.0834***
	(0.00619)	(0.00803)	(0.0116)	(0.0164)
95	−0.0202***	−0.0476***	0.0680***	0.0960***
	(0.00432)	(0.00742)	(0.0103)	(0.0248)
Include patience sq.	No	Yes	No	Yes

Note: Entries represent average marginal effects of ordered probit models on the outcome that the worker is defined as a shirker or works overtime hours. Standard errors in parentheses (clustered at the individual level).
*** $p < 0.01$.
* $p < 0.1$.

4. Results

4.1. Work effort

In order to examine the relation between 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), job-related factors (type of contract, civil servant, tenure), province unemployment rate, three region dummies and year dummies (see Appendix C for descriptive statistics).

Table 7 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 indicate the marginal effects of patience on the probability of being a shirker (see Section 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 patient workers have a lower 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.[11]

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. Since higher values represent lower effort, this indicates a U- rather than an inverse U-shaped relation. This is confirmed by the marginal effects estimated at different patience levels. The estimation results for overtime work also show no evidence of a negative relation between patience and the probability of working overtime at higher patience levels. In fact, the relation becomes stronger in the upper part of the patience distribution. Overall, the findings are in line with the prediction that more patient workers invest more in work effort.

4.2. On-the-job search intensity

We estimate the relation between time preferences and search effort using different estimation methods: the equations 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.[12] The main findings are presented in Table 8 (see Appendix D for the coefficients of all independent variables). In all models, the average marginal effects of patience on search intensity 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 intensity becomes more ambiguous among the most patient workers. This is especially the case in the models estimating the number of applications: the marginal effects seem to be concentrated at lower patience levels.

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 negative effects of patience on job search intensity. In all specifications 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.

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-to-job transition between the current and the consecutive wave. The estimation results are presented in Table 9 and Appendix D. 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 for lower levels of patience). 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

[11] Instead 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).

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

Table 8
Marginal effects of patience: search intensity.

	Search attitude				
	Considering searching	Seriously searching	Applied for a job	No. applications	No. channels
Average ME	0.0134***	0.00764**	0.0132**	0.0307*	0.0340**
	(0.00519)	(0.00301)	(0.00572)	(0.0175)	(0.0142)
MEs at patience percentile:					
5	0.0127***	0.00639***	0.0112***	0.0251**	0.0283***
	(0.00465)	(0.00207)	(0.00399)	(0.0113)	(0.00960)
25	0.0131***	0.00711***	0.0124**	0.0283*	0.0315***
	(0.00502)	(0.00260)	(0.00498)	(0.0147)	(0.0120)
50	0.0134**	0.00758**	0.0131**	0.0305*	0.0336**
	(0.00522)	(0.00296)	(0.00564)	(0.0172)	(0.0138)
75	0.0136**	0.00808**	0.0139**	0.0329*	0.0359**
	(0.00539)	(0.00334)	(0.00634)	(0.0199)	(0.0157)
95	0.0139**	0.00891**	0.0153**	0.0372	0.0400**
	(0.00560)	(0.00401)	(0.00750)	(0.0250)	(0.0192)
Include patience sq.	No	No	No	No	No
	Search attitude				
	Considering searching	Seriously searching	Applied for a job	No. applications	No. channels
Average ME	0.0131***	0.00780**	0.0131**	0.0310*	0.0338**
	(0.00509)	(0.00307)	(0.00567)	(0.0173)	(0.0142)
MEs at patience percentile:					
5	0.00169	0.000879	0.00194	0.0307	0.0227
	(0.0104)	(0.00537)	(0.0112)	(0.0283)	(0.0266)
25	0.00832	0.00446	0.00781	0.0315	0.0284
	(0.00617)	(0.00326)	(0.00659)	(0.0197)	(0.0181)
50	0.0126**	0.00703**	0.0120**	0.0315*	0.0327**
	(0.00503)	(0.00281)	(0.00531)	(0.0172)	(0.0144)
75	0.0172***	0.0100***	0.0168**	0.0311	0.0375**
	(0.00618)	(0.00373)	(0.00701)	(0.0245)	(0.0164)
95	0.0248**	0.0163**	0.0266*	0.0295	0.0467
	(0.0111)	(0.00807)	(0.0155)	(0.0512)	(0.0337)
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).
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

suggest that the job acceptance effect is important. The empirical results on mobility suggest that neither the positive job arrival effect nor the negative job acceptance effect dominates. Furthermore, this 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 job mobility. The combined findings may therefore be hard to reconcile with such models but are consistent with a model that allows for both career advancement within the current firm and mobility to outside employers.

Table 9
Marginal effects of patience: job mobility.

Average ME	−0.00162	−0.00193
	(0.00526)	(0.00520)
MEs at patience percentile:		
5	−0.00166	−0.0162
	(0.00551)	(0.0136)
25	−0.00164	−0.00722
	(0.00537)	(0.00659)
50	−0.00162	−0.00244
	(0.00527)	(0.00477)
75	−0.00161	0.00216
	(0.00518)	(0.00566)
95	−0.00159	0.0100
	(0.00504)	(0.0112)
Include patience sq.	No	Yes

Note: Standard errors in parentheses (clustered at the individual level).

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 the selection and aggregation method of the CFC items. 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 CFC04 and CFC05 have low factor loadings. Excluding these three items increases the Cronbach reliability scale to 0.767 and the average interitem covariance to 0.528. Alternatively, we used an aggregate patience measure using the factor scores of the first factor of all CFC items (or 8 items, 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 wage. However, job search may not always be voluntary: some employees may be searching for other jobs because they anticipate dismissal in the near future. We use information about why employed job searchers are looking for another job to test whether involuntary job search drives the results.[13] It appears that our main results do not change substantially when involuntary job searcher are excluded from the analyses, although the results become somewhat stronger overall. 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 and search intensity, but 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 aversion may be correlated with our measure for time preferences and potentially affects job search and mobility. To test this alternative explanation, we included a measure of risk preferences in the analyses as an additional control.[14] When measures for health and risk preferences are included, the marginal 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 several 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 life insurance, holds a savings account, smokes cigarettes and frequently consumes alcoholic beverages (see

[13] 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".

[14] 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.

Table 10
Job mobility and patience proxies.

Average ME	−0.0116**	−0.00978*	−0.0104*	−0.00797
	(0.00554)	(0.00548)	(0.00598)	(0.00591)
MEs at patience percentile:				
5	−0.0134*	−0.0111	−0.0118	−0.00887
	(0.00721)	(0.00695)	(0.00764)	(0.00726)
25	−0.0130*	−0.0108	−0.0115	−0.00867
	(0.00683)	(0.00661)	(0.00726)	(0.00696)
50	−0.0112**	−0.00945*	−0.0101*	−0.00777
	(0.00512)	(0.00510)	(0.00560)	(0.00561)
75	−0.0108**	−0.00918*	−0.00979*	−0.00759
	(0.00479)	(0.00481)	(0.00528)	(0.00534)
95	−0.0106**	−0.00901*	−0.00960*	−0.00747
	(0.00458)	(0.00462)	(0.00507)	(0.00517)
N	5001	4911	4252	4169
Exclude involuntary job seekers	No	Yes	No	Yes
Control for risk aversion	No	No	Yes	Yes

Note: Standard errors in parentheses (clustered at the individual level).
** $p < 0.05$.
* $p < 0.1$.

Appendix B for details). These proxies are standardized to have a mean of zero and a standard deviation of one for the entire male population.[15] As an aggregate patience proxy measure, we retain the first factor scores of these four proxies. The correlation between the patience measure based on the CFC items and the patience proxy measure is positive (0.065) and highly significant.

When we estimate the models presented above using this patience measure, we obtain inconsistent results. For the work effort models, the coefficients have the expected 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 average marginal effects as well as the marginal effects evaluated at different levels of patience are positive (Table 10). This is consistent with the predictions and results of Drago (2006).

These findings point out that the results depend critically on the way patience is measured. The differences between the results using our patience measure versus those using behavioural proxies are 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 indicate no clear relation between the patience measure 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 Section 4.4), the effect of patience on job mobility disappears (last column of Table 10). Although this may also be due to a drop in the number of observations, 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 theoretical model does not lead to unambiguous predictions on the association between the discount rate and job mobility. The intuition is that patient workers are more likely to find another job but also invest more in their current job and—anticipating a promotion—are more critical about potential outside job offers. 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 indicates an inverse U-shaped relation between patience and the two career investments. Furthermore, our findings do not indicate that patience is significantly associated with job mobility. These results are in sharp contrast with the hypotheses and empirical findings from previous studies (Drago, 2006; Cadena and Keys, forthcoming), 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, this result seems to be driven by involuntary job mobility and risk aversion rather than heterogeneity in time 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, forthcoming), 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 engage actively in on-the-job search activities.

Acknowledgements

The authors thank the editor Christopher Flinn, Janneke Plantenga, Daniel Possenriede, an anonymous referee and participants of the EALE conference, TIBER Symposium, IAREP/SABE conference, TKI seminar, NAKE research day and IZA European Summer School for helpful comments and suggestions. Financial support from Stichting Instituut Gak (Project 'Levensloop, sociale zekerheid en arbeidsmarkt'; grant number 2005-409) is gratefully acknowledged.

[15] The Cronbach alpha is 0.225 and the interitem correlation of 0.068. Although these numbers are low, they are comparable to the ones reported by Drago (2006) and DellaVigna and Paserman (2005).

Appendix A. Mathematical derivations

By taking the total differential of the Eqs. (2), (3) and (4), we obtain the following system of equations:

$$\begin{bmatrix} -c_1''(s) & -\delta\lambda\mu(w^p-w)(1-F(\hat{w})) & 0 \\ -\lambda\delta\mu(w^p-w)(1-F(\hat{w})) & -c_2''(e) & \lambda\delta\mu s(w^p-w)\,f(\hat{w}) \\ 0 & -\mu(w^p-w) & 1 \end{bmatrix} \begin{bmatrix} s' \\ e' \\ \hat{w}' \end{bmatrix} = -\begin{bmatrix} \lambda\int_{\hat{w}}^{\overline{w}}[x-(w+\mu e(w^p-w))]dF(x) \\ \mu(w^p-w)(1-\lambda s(1-F(\hat{w}))) \\ 0 \end{bmatrix}$$

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

$$\begin{bmatrix} c_1''(s) & \delta\lambda\mu(w^p-w)(1-F(\hat{w})) & 0 \\ \lambda\delta\mu(w^p-w)(1-F(\hat{w})) & c_2''(e) & -\lambda\delta\mu s(w^p-w)\,f(\hat{w}) \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & \mu(w^p-w) \end{bmatrix} \begin{bmatrix} s' \\ e' \end{bmatrix} = \begin{bmatrix} \lambda\int_{\hat{w}}^{\overline{w}}[x-(w+\mu e(w^p-w))]dF(x) \\ \mu(w^p-w)(1-\lambda s(1-F(\hat{w}))) \end{bmatrix}$$

or

$$\begin{bmatrix} c_1''(s) & \delta\lambda\mu(w^p-w)(1-F(\hat{w})) \\ \lambda\delta\mu(w^p-w)(1-F(\hat{w})) & c_2''(e)-\lambda\delta\mu^2 s(w^p-w)^2\,f(\hat{w}) \end{bmatrix} \begin{bmatrix} s' \\ e' \end{bmatrix} = \begin{bmatrix} \lambda\int_{\hat{w}}^{\overline{w}}[x-(w+\mu e(w^p-w))]dF(x) \\ \mu(w^p-w)(1-\lambda s(1-F(\hat{w}))) \end{bmatrix}$$

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

$$c_1''(s)s' = \lambda(1-F(\hat{w}))\left(E\left[x-\left(w+\mu e(w^p-w)\right)\middle|\, x>\hat{w}\right]-\delta e'\mu(w^p-w)\right) \tag{A1}$$

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

$$c_2''(e)e' = \mu(w^p-w)\left(1-\lambda s(1-F(\hat{w}))+\mu(w^p-w)\lambda\delta\, f(\hat{w})e'-\lambda\delta(1-F(\hat{w}))s'\right) \tag{A2}$$

which implies that $c_2''(e)e' > 0$ if the term multiplied by $\mu(w^p - w)$ is positive (see Eq. (9)). One can now obtain Eq. (10) by rewriting Eq. (9) and plugging in the following equation (which is the equivalent of (6)):

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

Appendix B. CFC items

Table B1
Correlation matrix.

	CFC01	CFC02	CFC03	CFC04	CFC05	CFC06	CFC07	CFC08	CFC09	CFC10	CFC11
CFC01	–										
CFC02	0.6160*										
CFC03	0.2983*	0.4458*									
CFC04	−0.0168	0.0524*	0.3298*								
CFC05	−0.0895*	−0.0274	0.1786*	0.3079*							
CFC06	0.2836*	0.3214*	0.1412*	−0.0730*	−0.0836*						
CFC07	0.3016*	0.2468*	0.1426*	−0.0171	−0.2005*	0.2534*					
CFC08	0.3330*	0.3548*	0.1753*	0.0145	−0.1051*	0.3185*	0.4221*				
CFC09	0.1309*	0.1492*	0.3752*	0.1804*	0.1074*	0.0298	0.1827*	0.0903*			
CFC10	0.1429*	0.1934*	0.3939*	0.1800*	0.1552*	0.1996*	0.0931*	0.1019*	0.4797*		
CFC11	0.1845*	0.2540*	0.4736*	0.2483*	0.1804*	0.1350*	0.1350*	0.1363*	0.4404*	0.5250*	–

Note: The correlation coefficients are based on the observations used in the job search analyses ($N = 6792$). When all respondents are included, a similar pattern arises.
* $p < 0.0001$.

Table B3
Factor analysis: all FUTURE items.

Variable	Factor loadings	Uniqueness	Scoring coefficient
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 coefficient
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 C1
Controls: descriptives.

Variable	Mean	SD
Age	45.061	8.876
Married	0.693	0.461
Nr of children	1.096	1.195
Unemployment rate	5.549	1.496
Tenure	14.025	10.725
Education level:		
Pre-vocational (VMBO) or below	0.244	0.430
Pre-university (HAVO/VWO)	0.089	0.284
Senior vocational (MBO)	0.243	0.429
Vocational college (HBO)	0.278	0.448
University	0.145	0.353
Permanent	0.963	0.189
Civil servant	0.198	0.399
Region:		
North	0.112	0.315
East	0.204	0.403
South	0.280	0.449
West	0.404	0.491

Note: The descriptives presented here are for the sample used in the job search intensity analyses ($N = 6792$).

Appendix D. Estimation results

Table D1
Estimation results: coefficients.

	Shirking (Ordered probit)		Overtime (Ordered probit)		Search attitude (Ordered Probit)		Applied for job (Probit)
Patience	−0.154***	0.851***	0.194***	−0.0981	0.0874***	−0.171	0.0968**
	(0.0445)	(0.327)	(0.0320)	(0.216)	(0.0339)	(0.219)	(0.0417)
Patience squared		−0.119***		0.0349		0.0303	
		(0.0380)		(0.0264)		(0.0256)	
Age	0.00837	0.00405	−0.0237	−0.0231	0.122***	0.123***	0.101***
	(0.0308)	(0.0305)	(0.0262)	(0.0262)	(0.0298)	(0.0298)	(0.0358)
Age squared (/100)	−0.0117	−0.00728	0.0233	0.0227	−0.165***	−0.166***	−0.129***
	(0.0349)	(0.0347)	(0.0302)	(0.0302)	(0.0357)	(0.0357)	(0.0419)
Married	−0.110	−0.115	0.0881	0.0875	−0.155**	−0.156**	−0.0896
	(0.0817)	(0.0816)	(0.0682)	(0.0683)	(0.0643)	(0.0640)	(0.0791)
Nr of children	−0.0150	−0.0163	−0.0114	−0.0106	−0.00737	−0.00684	0.000443
	(0.0317)	(0.0317)	(0.0258)	(0.0257)	(0.0252)	(0.0251)	(0.0287)
Education[a]: pre-university	0.0220	0.0233	0.209**	0.209**	0.156	0.155	0.129
	(0.123)	(0.123)	(0.0990)	(0.0990)	(0.100)	(0.0999)	(0.112)
Education: senior vocational	0.149*	0.138	0.265***	0.267***	0.113	0.115	0.160*
	(0.0901)	(0.0895)	(0.0751)	(0.0753)	(0.0778)	(0.0780)	(0.0887)
Education: vocational college	0.0874	0.0817	0.519***	0.521***	0.130	0.132*	0.126
	(0.0871)	(0.0875)	(0.0787)	(0.0786)	(0.0795)	(0.0797)	(0.0907)
Education: university	−0.0102	−0.00119	0.629***	0.626***	0.186**	0.183**	0.175*
	(0.101)	(0.101)	(0.0943)	(0.0942)	(0.0891)	(0.0888)	(0.0992)
Unemployment rate	0.0102	0.0161	0.0233	0.0221	−0.0327	−0.0343	−0.0770*
	(0.0391)	(0.0386)	(0.0365)	(0.0365)	(0.0388)	(0.0387)	(0.0435)
Permanent contract	0.0246	0.0113	0.0264	0.0286	−0.308***	−0.307***	−0.256**
	(0.103)	(0.102)	(0.0918)	(0.0917)	(0.0917)	(0.0923)	(0.116)
Civil servant	−0.0599	−0.0508	−0.0790	−0.0820	0.00756	0.00339	−0.0260
	(0.0786)	(0.0774)	(0.0635)	(0.0636)	(0.0621)	(0.0623)	(0.0672)
Tenure	0.00132	0.00148	−0.00778***	−0.00777***	−0.0147***	−0.0147***	−0.0172***
	(0.00311)	(0.00308)	(0.00295)	(0.00295)	(0.00335)	(0.00334)	(0.00388)
Region: north	−0.151	−0.156	−0.144	−0.143	0.0752	0.0745	0.162
	(0.109)	(0.108)	(0.109)	(0.109)	(0.118)	(0.118)	(0.139)
Region: east	−0.148*	−0.144*	−0.00794	−0.00861	−0.0142	−0.0142	0.0306
	(0.0828)	(0.0829)	(0.0702)	(0.0703)	(0.0695)	(0.0695)	(0.0786)
Region: south	−0.161*	−0.156*	0.0561	0.0557	−0.00202	−0.00276	0.0552
	(0.0835)	(0.0828)	(0.0690)	(0.0689)	(0.0681)	(0.0680)	(0.0749)
Pseudo-R^2	0.0103	0.0127	0.0472	0.0475	0.0569	0.0572	0.0515
Log pseudo-likelihood	−4465	−4454	−5245	−5243	−3602	−3601	−1726
Chi-square[b]	–	22.61***	–	35.40***	–	8.12**	–
N	948	948	2016	2016	2076	2076	2073
NT	3612	3612	6657	6657	6795	6795	6748

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

[a] Reference category: Pre-vocational or below.

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

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

Applied for job (Probit)	No. applications (Poisson reg.)		No. channels (Poisson reg.)		Job mobility (Probit)	
−0.173	0.166*	0.302	0.146**	0.0475	−0.0137	−0.389
(0.293)	(0.0945)	(0.688)	(0.0605)	(0.430)	(0.0443)	(0.298)
0.0314		−0.0157		0.0114		0.0440
(0.0343)		(0.0817)		(0.0487)		(0.0347)
0.103***	0.0912	0.0906	0.176***	0.177***	−0.0266	−0.0259
(0.0357)	(0.0792)	(0.0794)	(0.0548)	(0.0549)	(0.0346)	(0.0347)
−0.130***	−0.107	−0.107	−0.228***	−0.229***	−0.00258	−0.00338
(0.0417)	(0.0945)	(0.0947)	(0.0670)	(0.0672)	(0.0410)	(0.0411)
−0.0908	−0.0511	−0.0506	−0.137	−0.137	−0.00800	−0.00867
(0.0787)	(0.205)	(0.206)	(0.112)	(0.112)	(0.0893)	(0.0891)
0.000846	−0.0353	−0.0353	−0.0395	−0.0396	0.0524	0.0528
(0.0286)	(0.0694)	(0.0694)	(0.0449)	(0.0449)	(0.0330)	(0.0330)
0.127	0.0525	0.0534	0.0688	0.0686	0.136	0.134
(0.113)	(0.327)	(0.326)	(0.174)	(0.174)	(0.118)	(0.118)
0.162*	−0.0235	−0.0246	0.192	0.193	0.116	0.122
(0.0890)	(0.226)	(0.227)	(0.144)	(0.145)	(0.0986)	(0.0988)
0.127	−0.00305	−0.00403	0.284**	0.285**	0.161*	0.164*
(0.0908)	(0.237)	(0.237)	(0.139)	(0.140)	(0.0946)	(0.0946)
0.171*	−0.294	−0.293	0.370**	0.370**	0.394***	0.388***
(0.0988)	(0.240)	(0.239)	(0.154)	(0.154)	(0.109)	(0.109)
−0.0789*	−0.314***	−0.313***	−0.0665	−0.0672	−0.0139	−0.0168
(0.0436)	(0.108)	(0.107)	(0.0655)	(0.0655)	(0.0466)	(0.0466)
−0.254**	−1.039***	−1.040***	−0.438***	−0.437***	−0.673***	−0.668***
(0.117)	(0.233)	(0.233)	(0.152)	(0.153)	(0.132)	(0.131)
−0.0300	−0.323**	−0.322**	−0.0366	−0.0384	−0.0296	−0.0330
(0.0675)	(0.156)	(0.156)	(0.105)	(0.106)	(0.0760)	(0.0760)
−0.0173***	−0.0417***	−0.0417***	−0.0337***	−0.0337***		
(0.00386)	(0.0100)	(0.0100)	(0.00660)	(0.00660)		
0.163	0.433	0.433	0.163	0.163	−0.186	−0.189
(0.139)	(0.296)	(0.296)	(0.178)	(0.178)	(0.137)	(0.138)
0.0305	−0.0825	−0.0821	0.0741	0.0738	−0.0909	−0.0914
(0.0785)	(0.200)	(0.199)	(0.120)	(0.120)	(0.0871)	(0.0871)
0.0540	0.0729	0.0730	−0.0122	−0.0122	−0.0918	−0.0918
(0.0748)	(0.193)	(0.193)	(0.117)	(0.117)	(0.0796)	(0.0796)
0.0518	—	—	—	—	0.0789	0.0796
−1726	−3980	−3980	−4146	−4146	−1100	−1099
6.44**	—	3.38	—	6.18**	—	1.74
2073	2073	2073	2076	2076	1458	1458
6748	6748	6748	6792	6792	4915	4915

Table D2
On-the-job search intensity.

	Search attitude (ordered probit)		Applied for job (probit)		No. applications (Poisson reg.)		No. channels (Poisson reg.)	
Patience	0.0874***	−0.171	0.0968**	−0.173	0.166*	0.302	0.146**	0.0475
	(0.0339)	(0.219)	(0.0417)	(0.293)	(0.0945)	(0.688)	(0.0605)	(0.430)
Patience squared		0.0303		0.0314		−0.0157		0.0114
		(0.0256)		(0.0343)		(0.0817)		(0.0487)
Age	0.122***	0.123***	0.101***	0.103***	0.0912	0.0906	0.176***	0.177***
	(0.0298)	(0.0298)	(0.0358)	(0.0357)	(0.0792)	(0.0794)	(0.0548)	(0.0549)
Age squared (/100)	−0.165***	−0.166***	−0.129***	−0.130***	−0.107	−0.107	−0.228***	−0.229***
	(0.0357)	(0.0357)	(0.0419)	(0.0417)	(0.0945)	(0.0947)	(0.0670)	(0.0672)
Married	−0.155**	−0.156**	−0.0896	−0.0908	−0.0511	−0.0506	−0.137	−0.137
	(0.0643)	(0.0640)	(0.0791)	(0.0787)	(0.205)	(0.206)	(0.112)	(0.112)
Nr of children	−0.00737	−0.00684	0.000443	0.000846	−0.0353	−0.0353	−0.0395	−0.0396
	(0.0252)	(0.0251)	(0.0287)	(0.0286)	(0.0694)	(0.0694)	(0.0449)	(0.0449)
Education†: pre-university	0.156	0.155	0.129	0.127	0.0525	0.0534	0.0688	0.0686
	(0.100)	(0.0999)	(0.112)	(0.113)	(0.327)	(0.326)	(0.174)	(0.174)
Education: senior vocational	0.113	0.115	0.160*	0.162*	−0.0235	−0.0246	0.192	0.193
	(0.0778)	(0.0780)	(0.0887)	(0.0890)	(0.226)	(0.227)	(0.144)	(0.145)
Education: vocational college	0.130	0.132*	0.126	0.127	−0.00305	−0.00403	0.284**	0.285**
	(0.0795)	(0.0797)	(0.0907)	(0.0908)	(0.237)	(0.237)	(0.139)	(0.140)
Education: university	0.186**	0.183**	0.175*	0.171*	−0.294	−0.293	0.370**	0.370**
	(0.0891)	(0.0888)	(0.0992)	(0.0988)	(0.240)	(0.239)	(0.154)	(0.154)
Unemployment rate	−0.0327	−0.0343	−0.0770*	−0.0789*	−0.314***	−0.313***	−0.0665	−0.0672
	(0.0388)	(0.0387)	(0.0435)	(0.0436)	(0.108)	(0.107)	(0.0655)	(0.0655)
Permanent contract	−0.308***	−0.307***	−0.256**	−0.254**	−1.039***	−1.040***	−0.438***	−0.437***
	(0.0917)	(0.0923)	(0.116)	(0.117)	(0.233)	(0.233)	(0.152)	(0.153)
Civil servant	0.00756	0.00339	−0.0260	−0.0300	−0.323**	−0.322**	−0.0366	−0.0384
	(0.0621)	(0.0623)	(0.0672)	(0.0675)	(0.156)	(0.156)	(0.105)	(0.106)
Tenure	−0.0147***	−0.0147***	−0.0172***	−0.0173***	−0.0417***	−0.0417***	−0.0337***	−0.0337***
	(0.00335)	(0.00334)	(0.00388)	(0.00386)	(0.0100)	(0.0100)	(0.00660)	(0.00660)
Region: north	0.0752	0.0745	0.162	0.163	0.433	0.433	0.163	0.163
	(0.118)	(0.118)	(0.139)	(0.139)	(0.296)	(0.296)	(0.178)	(0.178)
Region: east	−0.0142	−0.0142	0.0306	0.0305	−0.0825	−0.0821	0.0741	0.0738
	(0.0695)	(0.0695)	(0.0786)	(0.0785)	(0.200)	(0.199)	(0.120)	(0.120)
Region: south	−0.00202	−0.00276	0.0552	0.0540	0.0729	0.0730	−0.0122	−0.0122
	(0.0681)	(0.0680)	(0.0749)	(0.0748)	(0.193)	(0.193)	(0.117)	(0.117)
Pseudo-R^2	0.0569	0.0572	0.0515	0.0518	–	–	–	–
Log pseudo-likelihood	−3602	−3601	−1726	−1726	−3980	−3980	−4146	−4146
Chi-square‡	–	8.12**	–	6.44**	–	3.38	–	6.18**
N	2076	2076	2073	2073	2073	2073	2076	2076
NT	6795	6795	6748	6748	6748	6748	6792	6792

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

Table D3
Job mobility.

Patience	−0.0137	−0.389
	(0.0443)	(0.298)
Patience squared		0.0440
		(0.0347)
Age	−0.0266	−0.0259
	(0.0346)	(0.0347)
Age squared (/100)	−0.00258	−0.00338
	(0.0410)	(0.0411)
Married	−0.00800	−0.00867
	(0.0893)	(0.0891)
Nr of children	0.0524	0.0528
	(0.0330)	(0.0330)
Education†: pre-university	0.136	0.134
	(0.118)	(0.118)
Education: senior vocational	0.116	0.122
	(0.0986)	(0.0988)
Education: vocational college	0.161*	0.164*
	(0.0946)	(0.0946)
Education: university	0.394***	0.388***
	(0.109)	(0.109)
Unemployment rate	−0.0139	−0.0168
	(0.0466)	(0.0466)
Permanent contract	−0.673***	−0.668***
	(0.132)	(0.131)
Civil servant	−0.0296	−0.0330
	(0.0760)	(0.0760)
Region: north	−0.186	−0.189
	(0.137)	(0.138)
Region: east	−0.0909	−0.0914
	(0.0871)	(0.0871)
Region: south	−0.0918	−0.0918
	(0.0796)	(0.0796)
Pseudo-R^2	0.0789	0.0796
Log pseudo-likelihood	−1100	−1099
Chi-square‡	-	1.74
N	1458	1458
NT	4915	4915

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.
‡The chi-square statistics reported here refer to the joint significance of the patience and patience squared variables.
*** $p < 0.01$.
* $p < 0.1$.

References

Blau, F.D., DeVaro, J., 2007. New evidence on gender differences in promotion rates: an empirical analysis of a cross section of establishments. Ind. Relat. 46 (3), 511–550.

Bloemen, H.G., 2005. Job search, search intensity, and labor market transitions: an empirical analysis. J. Hum. Resour. 40 (1), 232–269.

Booth, A.L., Francesconi, M., Frank, J., 2003. A sticky floors model of promotion, pay, and gender. Eur. Econ. Rev. 47 (2), 295–322.

Borghans, L., Golsteyn, B.H.H., 2006. Time discounting and the body mass index: evidence from the Netherlands. Econ. Hum. Biol. 4 (1), 39–61.

Borghans, L., Duckworth, A.L., Heckman, J.J., Ter Weel, B., 2008. The economics and psychology of personality traits. J. Hum. Resour. 43 (4), 972–1059.

Borjas, G.J., 1981. Job mobility and earnings over the life cycle. Ind. Labor Relat. Rev. 34 (3), 365–376.

Burdett, K., 1978. A theory of employee job search and quit rates. Am. Econ. Rev. 68 (1), 212–220.

Cadena, B.C., Keys, B.J., 2015. Human capital and the lifetime costs of impatience. Am. Econ. J. Econ. Policy (forthcoming).

Cahuc, P., Postel-Vinay, F., Robin, J.-M., 2006. Wage bargaining with on-the-job search: theory and evidence. Econometrica 74 (2), 323–364.

Chrisensen, B.J., Lentz, R., Mortensen, D.T., 2005. On-the-job search and the wage distribution. J. Labor Econ. 23 (1), 31–58.

Daly, M., Harmon, C.P., Delaney, L., 2009. Psychological and biological foundations of time preference. J. Eur. Econ. Assoc. 7 (2–3), 659–669.

DellaVigna, S., 2009. Psychology and economics: evidence from the field. J. Econ. Lit. 47 (2), 315–372.

DellaVigna, S., Paserman, M.D., 2005. Job search and impatience. J. Labor Econ. 23 (3), 527–588.

Dey, M.S., Flinn, C.J., 2005. An equilibrium model of health insurance provision and wage determination. Econometrica 73 (2), 571–627.

Drago, F., 2006. Career consequences of hyperbolic time preferences. IZA Discussion Paper No. 2113, Bonn.

Fouarge, D., Kriechel, B., Dohmen, T., 2014. Occupational sorting of school graduates: the role of economic preferences. J. Econ. Behav. Organ. 106, 335–351.

Francesconi, M., 2001. Determinants and consequences of promotions in Britain. Oxf. Bull. Econ. Stat. 63 (3), 279–310.

Frederick, S., Loewenstein, G., O'Donoghue, T., 2002. Time discounting and time preference: a critical review. J. Econ. Lit. 40 (2), 351–401.

Golsteyn, B.H.H., Grönqvist, H., Lindahl, L., 2014. Adolescent time preferences predict lifetime outcomes. Econ. J. 124, F739–F761.

Halima, B.B., Halima, B.M.A., 2009. Time preferences and job search: evidence from France. Labour 23 (3), 535–558.

Kosteas, V.D., 2009. Job level changes and wage growth. Int. J. Manpow. 30 (3), 269–284.

Krueger, A.B., Mueller, A., 2008. Job search and unemployment insurance: new evidence from time use data. IZA Discussion Paper No.3667, Bonn.

Laibson, D., 1997. Golden eggs and hyperbolic discounting. Q. J. Econ. 112 (2), 443–477.

Landers, R.M., Rebitzer, J.B., Taylor, L.J., 1996. Rat race redux: adverse selection in the determination of work hours in law firms. Am. Econ. Rev. 86 (3), 329–348.

Le Grand, C., Tahlin, M., 2002. Job mobility and earnings growth. Eur. Sociol. Rev. 18 (4), 381–400.

Light, A., McGarry, K., 1998. Job change patterns and the wages of young men. Rev. Econ. Stat. 80 (2), 276–286.

McCue, K., 1996. Promotions and wage growth. J. Labor Econ. 14 (2), 175–209.

Moen, E.R., Rosen, A., 2013. On-the-job search and moral hazard. J. Eur. Econ. Assoc. 11 (6), 1404–1431.

O'Donoghue, T., Rabin, M., 1999. Doing it now or later. Am. Econ. Rev. 89 (1), 103–124.

Pannenberg, M., 2005. Long-term effects of unpaid overtime: evidence from West-Germany. Scot. J. Polit. Econ. 52 (2), 177–193.

Paserman, M.D., 2008. Job search and hyperbolic discounting: structural estimation and policy evaluation. Econ. J. 118 (531), 1418–1452.

Postel-Vinay, F., Robin, J.-M., 2002. Equilibrium wage dispersion with worker and employer heterogeneity. Econometrica 70 (6), 2295–2350.

Postel-Vinay, F., Turon, H., 2010. On-the-job search, productivity shocks, and the individual earnings process. Int. Econ. Rev. 51 (3), 599–629.

Strathman, A., Gleicher, F., Boninger, D.S., Edwards, C.S., 1994. The consideration of future consequences: weighing immediate rewards and distant outcomes of behavior. J. Pers. Soc. Psychol. 66 (4), 742–752.

Topel, R.H., Ward, M.P., 1992. Job mobility and the careers of young men. Q. J. Econ. 107 (2), 439–479.

Van der Klaauw, B., Van Vuuren, A., 2010. Job search and academic achievement. Eur. Econ. Rev. 54 (2), 294–316.

Van Huizen, T., Plantenga, J., 2014. Job search behaviour and time preferences: testing exponential versus hyperbolic discounting. De Economist 162 (3), 223–245.