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How to cite this publication

Please cite the final published version:

Damgaard, M. T. (2017). Labor market search effort with reference-dependent preferences. *Economics Letters*, 156, 99–101. DOI: [10.1016/j.econlet.2017.04.016](https://doi.org/10.1016/j.econlet.2017.04.016)

Publication metadata

Title:	Labor market search effort with reference-dependent preferences
Author(s):	Damgaard, Mette Trier
Journal:	<i>Economics Letters</i> , 156, 99–101
DOI/Link:	10.1016/j.econlet.2017.04.016
Document version:	Accepted manuscript (post-print)

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Labor market search effort with reference-dependent preferences

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April 3, 2017

Abstract

We incorporate forward-looking reference-dependent preferences into a simple job search framework and show that people with strong aversion to losses may choose *not* to search for a job despite economic incentives to do so. We also discuss the policy implications.

JEL classification: D83, J64

Keywords: Job Search, Loss Aversion, Search Effort, Stochastic Reference Point.

1 Introduction

It is well-known that people's risk attitudes are important for the optimal design of unemployment insurance and other labor market policies (Baily 1978). Typically, the job search literature has focused on risk preferences within the expected utility framework (Pissarides 1974). However, it is well-established that reference dependent theories inspired by Kahneman & Tversky (1979) often provide a more accurate description of people's risk attitudes.

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This raises the question how reference dependence affects search effort. We analyze this question using a simplified version of a model with endogenous search effort. As in theories of disappointment aversion (Bell 1985, Loomes & Sugden 1986, Gul 1992), outcomes are compared to a reference point which depends on the choice to search. In addition, we assume rational expectations such that wage offers are compared to a stochastic reference point coinciding with the wage distribution whereas non-search has unemployment benefits as the referent. Hence we use a choice-acclimating personal equilibrium Kőszegi & Rabin (2007). Job seekers influence their probability of getting a job through their search effort (Lentz & Tranaes 2005), and the model therefore allows for variation in search effort and so-called “discouraged workers” who do not search at all (McCall 1970).

We show that with these assumptions reference dependence may erode search effort even without tangible search costs. That is, people with strong aversion to losses may choose *not* to search despite clear economic benefits of doing so. We emphasize that this prediction does *not* follow from standard expected utility (with or without risk aversion). We also show that non-search behavior is most likely when uncertainty about wage outcomes is high, and when the reference point is stochastic rather than non-stochastic.

Our results provide a new explanation of non-search behavior: psychological search costs implied by reference dependence that increase in the degree of loss aversion. Intuitively, by not searching the job seeker can avoid painful losses from comparing the realized wage offer to other possible but unrealized offers.

Our model also provides a new explanation for the empirical finding of negative duration dependence in the hazard rate out of unemployment (Katz & Mayer 1990). While standard search models struggle to explain this phenomenon (Mortensen 1986), possible explanations include heterogeneity in productivity, deterioration of skills, and a reference point determined by past income as in DellaVigna et al. (forthcoming). We propose a related explanation to DellaVigna et al. (forthcoming): a *stochastic* and *forward-looking* reference point combined with heterogeneity in the degree of loss aversion. Individuals not affected by loss aversion search more actively for work and exit unemployment faster, while individuals with high loss aversion do not search and therefore remain unemployed.

There may be other explanations for non-search behavior, including tangible search

costs, and we do not intend to suggest that reference dependence provides the only explanation. However, if reference dependence plays a role, important policy implications arise. In particular, policies that reduce the variance of wage offers or the perceptions thereof could increase search effort for a *given* wage offer.

2 The model

Suppose that the job seeker first chooses whether to search for a job ($s = 1$) or not ($s = 0$). By searching he gets a wage offer w from the continuous and symmetric wage offer distribution F with support $[\underline{w}; \bar{w}]$ and mean $E[w]$. Conditional on searching, the job seeker then makes a choice to accept the offer ($a = 1$) or not ($a = 0$). We assume that payoffs realize once both decisions have been made, and that the job seeker gets unemployment benefits $b \leq \underline{w}$ if either $s = 0$ or $a = 0$. We abstract from search costs and discounting to focus on the effects of reference dependence.

As in Kőszegi & Rabin (2007) reference dependence is modeled by the instantaneous utility function $u(w|r) = w + \mu(w - r)$, where the first term is the standard “consumption utility” term under expected utility. The second term captures “gain-loss” utility associated with comparing the wage offer w to the reference point r . Both utility components are assumed to materialize when the payoff realizes. As is common in applications (DellaVigna 2009), we consider a piece-wise linear gain-loss utility function of the form

$$\mu(w - r) = \begin{cases} \eta(w - r) & \text{for } w \geq r \\ \eta\lambda(w - r) & \text{for } w < r, \end{cases} \quad (1)$$

where $\eta > 0$ is the weight on gain-loss utility and $\lambda > 1$ measures the degree of loss aversion. The distribution of reference points is denoted by $G(r)$, and we assume that the reference distribution adjusts to the search decision such that $G = F$ if $s = 1$ and $G = b$ if $s = 0$. The assumption that the reference point depends on the choice (here the decision to search) is shared with theories of disappointment aversion (Bell 1985, Loomes & Sugden 1986, Gul 1992). Using the terminology of Kőszegi & Rabin (2007) we solve for a choice-acclimating personal equilibrium, which is appropriate when there is a sufficient time lag between the decision (to search) and uncertainty resolution (the arrival of the wage offer).

Consider first the optimal second stage decision of whether to accept an offer. Conditional on searching and thereby obtaining an offer w , the utility from accepting is

$$\begin{aligned} U(a = 1|G = F, s = 1) &= w + \eta \left[\int_{\underline{w}}^w (w - r) dF(r) + \lambda \int_w^{\bar{w}} (w - r) dF(r) \right] \quad (2) \\ &= w - \eta \left[(\lambda - 1) \int_{\underline{w}}^w F(r) dr - \lambda (w - E[w]) \right], \end{aligned}$$

given that $G = F$ when $s = 1$. The second term of (2) is gain-loss utility with gains experienced for the part of the reference distribution in the interval $[\underline{w}; w)$ and losses experienced in the interval $(w, \bar{w}]$. The utility from rejecting the wage offer is $U(a = 0|G = F, s = 1) = b - \eta \lambda (E[w] - b)$ since rejecting involves a loss compared to every point in the reference distribution. The following intuitive result is easy to verify and is qualitatively similar to the prediction with standard risk aversion.¹

Lemma 1. *Conditional on searching ($s = 1$), the job seeker accepts ($a = 1$) any offer $w \in [\underline{w}; \bar{w}]$.*

In the first stage, searching is optimal when

$$U(s = 1|G = F) = E[w] - \eta(\lambda - 1) \int_{\underline{w}}^{\bar{w}} F(w) [1 - F(w)] dw \geq U(s = 0|G = b) = b,$$

i.e. when the expected utility from searching exceeds that from not searching. Note that the expected utility of searching $U(s = 1|G = F)$ is lower than $E[w]$ due to a negative utility contribution from the gain-loss component. Proposition 1 summarizes our main results:

Proposition 1. *Suppose H is a mean-preserving spread of F and that H is symmetric and continuous and let $U(s = 1|G = E[w])$ denote the expected utility from searching with a non-stochastic reference point equal to $E[w]$, then*

- i) $s = 0$ iff $\eta(\lambda - 1) > \frac{E[w] - b}{\int_{\underline{w}}^{\bar{w}} F(w) [1 - F(w)] dw}$,
- ii) $U(s = 1|G = F)$ is increasing in $E[w]$,
- iii) $U(s = 1|G = F) \geq U(s = 1|G = H)$, and
- v) $U(s = 1|G = F) < U(s = 1|G = E[w])$.

¹Proofs are provided in a supplementary appendix.

Hence, a job seeker with a sufficiently high aversion to losses prefers *not* to search, and if there is variation in loss aversion across the population, then non-search behavior occurs among the most loss averse job seekers. Moreover, the likelihood of non-search behavior is decreasing in the expected value of the wage distribution, increasing in the variance of F , and higher with a stochastic than non-stochastic reference point equal to $E[w]$. Intuitively, a low expected value implies low consumption utility from searching, whereas high variance implies a potentially large utility loss due to gain-loss utility, because losses loom larger than gains. Furthermore, the gain-loss component is lower with a stochastic as opposed to a non-stochastic reference point because *every* wage offer feels both like a loss compared to some points in the reference distribution. Part i) is a variant of the stochastic dominance result discussed by Kőszegi & Rabin (2007).² We emphasize that the results arise despite clear economic incentives to search and no explicit search costs. In contrast, it is easy to show that with standard risk aversion, searching is *always* optimal.

3 Policy discussion and concluding remarks

This paper shows that it matters how risk preferences are specified in models of search effort. People with reference-dependent preferences may in some circumstances choose not to search for work, even when there are clear economic incentives of doing so. Our results suggest that non-search behavior is particularly likely if i) people use a stochastic reference point, and ii) the variance in the wage distribution is large.

This could have important policy implications. First, reductions in unemployment benefits aimed at increasing the economic incentives to search may not be enough to make it optimal for *all* people to search. Taken literally, our results suggest that policies which reduce the variance of possible offers by i) increasing the minimum wage, ii) stipulating a fixed entry wage for the unemployed, or iii) creating a well-defined maximum wage may be more effective for individuals with high levels of loss aversion.

Second, reference dependence makes searching less attractive because of the outcome is uncertain. Hence, incentives to search could be increased by adding outcome uncertainty to the no-search option, e.g. by imposing job offers on inactive job seekers.

²See Proposition 7 in Kőszegi & Rabin (2007).

Naturally, one would need to carefully consider the welfare implications of such a policy, because job seekers would no longer be able to avoid negative utility gain-loss by choosing not to search.

Relatedly, our results suggest that requiring people to submit a certain number of applications could have negative utility effects. This might explain why increases in search requirements have led to significant increases in non-compliance, even in the presence of benefit sanctions (Arni & Schiprowski 2015). One way to cope with search requirements could be to apply for jobs with a zero possibility of getting. Such jobs may be assigned a zero probability in the reference and outcome distributions in which case there will be no expected utility effects.

Our model also allows for situations where people have biased beliefs about the wage distribution, i.e. where F represents the job seeker's *belief* about the wage offer distribution rather than the true distribution. Even if it is difficult to influence the true wage offer distribution, it may be possible to de-bias or influence F (in particular the variance of F) to increase search intensity. For example, by making the average wage highly salient and thus nudge job seekers to use a non-stochastic rather than a stochastic reference point.

Acknowledgments

I thank Johannes Abeler, Martin M. Andreassen, Tor Eriksson, Alexander Koch, Julia Nafziger, Erik Ø Sørensen and an anonymous referee for valuable comments. I am grateful to Købmand Ferdinand Sallings Mindefond for financial support.

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