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Job search, locus of control, and internal migration

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Job Search, Locus of Control, and Internal Migration*

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Abstract

Internal migration can substantially improve labor market efficiency. Consequently, policy is often targeted towards reducing the barriers workers face in moving to new labor markets. In this paper we explicitly model internal migration as the result of a job search process and demonstrate that assumptions about the timing of job search have fundamental implications for the pattern of internal migration that results. Unlike standard search models, we assume that job seekers do not know the true job offer arrival rate, but instead form subjective beliefs – related to their locus of control – about the impact of their search effort on the probability of receiving a job offer. Those with an internal locus of control are predicted to search more intensively (i.e. across larger geographic areas) because they expect higher returns to their search effort. However, they are predicted to migrate more frequently only if job search occurs before migration. We then test the empirical implications of this model. We find that individuals with an internal locus of control not only express a greater willingness to move, but also undertake internal migration more frequently.

Keywords: Locus of Control, Internal Migration, Mobility, Job Search

JEL codes: J61

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1 Introduction

Internal migration is fundamental to the process of economic adjustment. The large-scale movement of workers in response to relative economic opportunities shapes the nature of economic disparity across geographic regions (see Blanchard and Katz, 1992; Niebuhr *et al.*, 2012) and, in many countries, is a key driver of regional demographic change (e.g. Borjas *et al.*, 1992; Gabriel and Schmitz, 1995). Internal migration in principle reduces labor market rigidities, including structural unemployment, allowing markets to operate more efficiently. Policy makers therefore often wish to support the unemployed in migrating to stronger labor markets, while at the same time discouraging migration in response to more generous welfare benefits (e.g. De Giorgi and Pellizzari, 2009; Valletta, 2013). Incentives to promote internal migration such as lump sum grants, housing vouchers, employment and relocation services, and subsidized moving costs have been used in a variety of countries with mixed success (see Caliendo *et al.*, 2015b, for a review). In particular, while incentives may lead to more internal migration, employment outcomes are not always improved as a result.¹

Economists generally conceptualize internal migration as a fairly standard human capital investment in which individuals (and households) weigh the current costs of migration against the appropriately discounted future returns. Migration occurs whenever the expected benefits outweigh the expected costs. In other contexts, however, traditional models of this sort are increasingly giving way to models with more realistic psychological foundations. The result has been a deeper understanding of the important role that psychological traits (e.g. personality, non-cognitive skills, perceptions of control, etc.) play in most economic decisions. It is important that we begin to also incorporate the key insights of behavioral economics into models of the migration decision. Many psychologists argue, for example, that while unfavorable economic conditions may make emigration either more or less likely, the decision to stay or go rests largely on individual personality (Boneva and Frieze, 2001). In particular, Frieze and Li (2010) argue that mobility decisions are driven by individuals' desire to change their lives in ways that better satisfy their achievement, power, and affiliation motivations, while Bauernschuster *et al.* (2014) find that better educated and more risk-tolerant individuals are more likely to migrate across cultural (linguistic) regions which, the authors argue, stems

¹Katz *et al.* (2001); Ludwig *et al.* (2005); Kling *et al.* (2007) and Ludwig and Kling (2007), for example, investigate the effectiveness of the Moving to Opportunity (MTO) program – introduced in the 1990s in the U.S. – and find that it successfully relocated families to better neighborhoods and partly improved their health. However, there was no significant effect on either educational or labor market outcomes.

from their lower psychic costs of migration. We need to know more about which psychological traits predispose certain individuals to migrate and why.

The goal of this paper is to advance the literature by incorporating job search and locus of control into an economic model of internal migration. Locus of control can be characterized as “a generalized attitude, belief, or expectancy regarding the nature of the causal relationship between one’s own behavior and its consequences” (Rotter, 1966, p.2). Those believing that life’s outcomes are due to their own efforts have an internal locus of control, while those believing that outcomes are due to external factors (e.g. luck) have an external locus of control. We begin by modelling migration across domestic labor markets as the outcome of a job search process. Because they believe that search effort influences the offer arrival rate, individuals with an internal locus of control are predicted to engage in more intensive, geographically-dispersed job search – and if job search precedes migration – be more likely to migrate as a result. We then empirically test the relationship between locus of control and the propensity to migrate across regions using data from the German Socio-Economic Panel (SOEP). We find that not only do individuals with an internal locus of control express more willingness to migrate, they do in fact migrate more often. Moreover, having an internal locus of control has an effect similar in magnitude to that of key demographic and human capital characteristics such as the presence of children in the household or educational attainment.

Explicitly modeling internal migration as the result of a job search process is an important contribution to the existing migration literature. Research in labor or urban economics frequently models residential location and job search in tandem (e.g. Van den Berg and Gorter, 1997; Van Ommeren *et al.*, 1999; Eliasson *et al.*, 2003). Migration research, on the other hand, typically either ignores any wage uncertainty (Borjas *et al.*, 1992) or simply assumes that migration decisions occur before destination wages are realized (e.g. Harris and Todaro, 1970; Hunt, 2006; Arntz *et al.*, 2011). Consequently, internal migration decisions depend solely on expected (actual) home vs. destination wages and any job search is simply subsumed in the aggregate employment probabilities. This lack of attention to the role of job search is surprising given that it is often disparities in unemployment rates rather than wage levels that empirically drive internal migration (e.g. Treysz *et al.*, 1993; Parikh and van Leuvensteijn, 2002). Importantly, we demonstrate that assumptions about the timing of job search have fundamental implications for the pattern of internal migration that results. Conditional on skills, internal migration in the standard model is predicted to be unidirectional with

high-skilled individuals migrating to regions where their skills are more highly valued and low-skilled individuals migrating in the opposite direction (Borjas *et al.*, 1992). In contrast, modelling internal migration as the result of a job search process implies that those skills that lead to more intensive (or more productive) search in the destination labor market will lead to multidirectional internal migration, i.e. an increased propensity to migrate overall. Moreover, we adopt a more behavioral approach to modelling job search by assuming that job seekers do not know the true job offer arrival rate, but instead form subjective beliefs – related to their locus of control – about the impact of search effort on the probability of receiving a job offer. This provides a theoretical connection between locus of control and internal migration.

Our empirical findings also make an important contribution by adding weight to the emerging literature linking individuals’ perceptions of control to their human capital investments through the returns that they anticipate. In particular, locus of control is related to investments in education (e.g. Wang *et al.*, 1999; Coleman and DeLeire, 2003; Heckman and Kautz, 2012; Mendolia and Walker, 2014b); health behaviors (e.g. Wallston *et al.*, 1978; Stepotoe and Wardler, 2001; Chiteji, 2010; Cobb-Clark *et al.*, 2014; Mendolia and Walker, 2014a); employment-related training (Offerhaus, 2013) and job search (e.g. Caliendo *et al.*, 2015a; McGee, 2015; McGee and McGee, 2011).² To our knowledge, however, only one other study explicitly considers the relationship between locus of control and migration. Toney *et al.* (1985) find no difference in the locus of control of migrant and non-migrant, middle-aged men captured in the U.S. National Longitudinal Survey. We reconsider this issue in a model that minimizes the likelihood of reverse causality and omitted variable bias. Our finding that having an internal locus of control is associated with a higher propensity to migrate across regions represents not only a new stylized fact, but also a potential basis for targeting internal migration incentives.

The outline of the paper is as follows. Section 2 provides an overview of the relevant economic and psychological literature on migration. In Section 3, the theoretical framework linking locus of control to job search and the migration decision is presented. Section 4 describes the data in detail, while in Section 5 we present our main empirical results. Finally, our conclusions and suggestions for future research are discussed in Section 6.

²For an overview of this literature see Cobb-Clark (2015).

2 Literature Review

Economists have a long history of studying migration. Researchers taking a macro perspective typically analyze the relationship between migration flows and macro-economic conditions, while others adopt a micro perspective by focusing on single individuals (or households) and studying the migration decision-making process. Given our research questions, we are particularly interested in the micro-economics literature on internal migration and in the psychological evidence on the psychosocial traits that predispose certain individuals to migrate.³

Drawing on the seminal work of Hicks (1932), Sjaastad (1962), Todaro (1969) and Harris and Todaro (1970), modern economic models of the migration decision are typically based on the maximization of expected income across regions, given migration costs and employment probabilities that are less than one. Seen in this light, it is easy to understand why economists view migration as an important form of human capital investment. Borjas *et al.* (1992) argue, however, that, while perhaps suitable for studying immigration, the above framework is too restrictive to capture internal migration because it predicts that migration flows will be unidirectional, i.e. all individuals have an incentive to move from low- to high-income regions. In response, the authors incorporate the Roy (1951) selection model into the migration decision thus accounting for spatial differences in the return to skill. This extension results in two-way migration flows with high-skilled workers migrating to regions where their skills are more highly valued and low-skilled workers migrating in the other direction. Conditional on skill level, however, migration flows remain unidirectional and, in the face of constant migration costs, this theoretical framework does little to explain why certain individuals might always be predisposed to migrate.

Empirical studies, on the other hand, provide compelling evidence that certain factors are related to individuals' propensity to migrate. These include: age and gender (e.g. Stillwell *et al.*, 1996; Owen and Green, 1992); education and skill level (e.g. Levy and Wadycki, 1974; Arntz, 2010; Wozniak, 2010); individual social networks (e.g. Rainer and Siedler, 2009); marital status (e.g. Graves and Linneman, 1979); employment status (e.g. DaVanzo, 1978) and the business cycle (e.g. Saks and Wozniak, 2011). Internal migration is also a function of the costs of migration and regional disparities in social and economic circumstances as reflected in population size (density) and distance (e.g. Andrienko and Guriev, 2004; Anjomani, 2002;

³For a review of the economics literature on internal migration see e.g. Borjas *et al.* (1992); Greenwood (1997); Lucas (1997); Etzo (2008).

Greenwood, 1997); the cost of living (e.g. Cseres-Gergely, 2004); price differences (e.g. Giannetti, 2003); real wages (e.g. Kennan and Walker, 2011); unemployment rates (e.g. Ederveen and Bardsley, 2003; Alecke *et al.*, 2010); labor demand (Wozniak, 2010); labor productivity (Alecke *et al.*, 2010); public safety (e.g. Sampson and Wooldredge, 1986); social assistance (e.g. Enchautegui, 1997; Giuliatti and Wahba, 2013); climate and environmental quality (e.g. Marchiori and Schumacher, 2011; Andrienko and Guriev, 2004); and local infrastructure (e.g. Andrienko and Guriev, 2004).⁴

Moreover, while economists have extensively studied the social and economic conditions that promote internal migration, other social scientists including sociologists, demographers, and psychologists have a long tradition of analyzing the psychosocial traits that lead some individuals to be more likely to migrate. Toney *et al.* (1985) attribute the first discussion of possible migrant-nonmigrant differences in psychological traits to Thomas (1938), a demographer and sociologist whose seminal work laid the foundation for migration research in the first half of the 1900s (see Greenwood and Hunt, 2003, for a discussion). Early researchers linked migration to a desire for social advancement (Touraine and Ragazzi, 1961) and the fulfillment of their achievement, affiliation, and power motivations (Frieze and Li, 2010). Morrison and Wheeler (1978) coined the term “pioneering personality” to describe individuals who constantly feel the need for novel experiences and thus like to change their residence. Since then researchers have found relationships between migration decisions and both economic preferences such as risk-attitudes (Jaeger *et al.*, 2010; Bauernschuster *et al.*, 2014; Bonin *et al.*, 2009) as well as personality traits such as openness to experiences (Koenig and Cunningham, 2001; Jokela, 2009), extraversion (Jacobs and Koeppl, 1974; Jokela, 2009) and agreeableness (Jokela, 2009).⁵ Finally, there is some evidence that an internal locus of control is associated with a modest increase in the willingness to move (Hines *et al.*, 1974), but not migration itself (Toney *et al.*, 1985).

In light of this empirical evidence, it is interesting that the migration literature is virtually silent on the role of job search *per se* in internal migration decisions.⁶ Early studies simply ignored any uncertainty associated with employment opportunities in either the sending or

⁴For an overview see e.g. Etzo (2008).

⁵See Boneva and Frieze (2001); Frieze and Li (2010) for a review.

⁶An exception is Kennan and Walker (2011) who model the optimal migration trajectory in the context of a dynamic job search problem with multiple alternative destination choices. Another exception is Lutgen and van der Linden (2015) who propose an equilibrium search model with unemployed workers deciding to search locally or in two regions. In their model, worker move to another region if they receive an acceptable job offer from this region.

destination labor market rendering the migration decision a simple comparison of wage levels in the two locations. Since Todaro (1969) and Harris and Todaro (1970), it has become more common (though not universal) to assume that post-migration employment is not guaranteed. Critically, however, migration is assumed to take place before destination wages are realized making the migration decision a function of expected wages (see e.g. Treysz *et al.*, 1993; Borjas, 1999; Fuchs-Schündeln and Schündeln, 2009; Alecke *et al.*, 2010). Effectively, the job search process boils down to a simple draw from the destination wage distribution.

In contrast, urban economists view residential moves and job changes as being mutually dependent. Models of job search thus incorporate the inherent tradeoffs associated with either commuting or moving in the event an acceptable job offer is received (see Rouwendal, 1999; Van Ommeren *et al.*, 1999, 2000a; Eliasson *et al.*, 2003; Buchinsky *et al.*, 2014). Commuting time involves disutility, leading workers to trade off higher wages (Van den Berg and Gorter, 1997; Van Ommeren *et al.*, 2000b) or make job changes (Zax, 1991; Zax and Kain, 1991) in exchange for lower commuting costs. Importantly, Zax (1994) shows that while job changes and residential moves can be substitutes in the case of intra-regional (local) mobility, they are most likely complements in the case of inter-regional (long-distance) mobility because commuting is not a viable option.

In what follows, we draw these strands of the literature together by incorporating job search and locus of control into an economic model of internal migration. The result is a more nuanced understanding of the process of internal migration, and the important role that job search and psychosocial traits like locus of control play in migration decisions.

3 Theoretical Framework

We begin with a conceptual framework in which households migrate from one geographic region to the next whenever the expected benefits of migration exceed the expected costs. We abstract from the choice of migration destination in order to focus on the discrete decision to stay or to go. Migration is modelled as a function of relative incomes, rather than relative utilities, in order to avoid the unnecessary complexity of considering migration based on regional amenities. Given our research focus, we pay particular attention to the benefits deriving from differences in labor market opportunities rather than from disparity in prices or social benefits.

Our interest is in understanding internal migration as the outcome of a job search process.

However, we are agnostic about the relative timing of migration and job search, considering migration that occurs both before and after wages are realized. Geographic regions are assumed to be non-overlapping, ruling out commuting as a substitute for migration when inter-regional job changes occur. Finally, individuals are assumed to be rational. However, unlike standard job search models, we assume that individuals have subjective beliefs – related to their locus of control – about the impact of search effort on the job offer arrival rate.

This section proceeds as follows. Drawing on Borjas *et al.* (1992), we first discuss a standard model of internal migration which ignores job search.⁷ We then extend this model to consider the implications of allowing potential migrants to engage in job search related to their locus of control. Finally, we consider the importance of the relative timing of job search and migration for the pattern of internal migration that results.

3.1 Internal Migration Ignoring Job Search

Following Borjas *et al.* (1992), individuals are assumed to have a single productive skill (x_i) which has return β_O in the origin labor market (O) and β_A in the alternative labor market (A). Thus, wages in the origin are given by: $w_{Oi} = \beta_O x_i$ and in the alternative region $w_{Ai} = \beta_A x_i$. Unlike Borjas *et al.* (1992), we assume that employment is uncertain and individuals receive a wage offer only with probability p_A in labor market A and p_O in labor market O. Households migrate whenever the net returns to migration are positive, that is whenever:

$$p_A w_{Ai} - p_O w_{Oi} - C \geq 0 \tag{1}$$

$$(p_A \beta_A - p_O \beta_O) x_i - C \geq 0, \tag{2}$$

where C corresponds to a fixed cost of migration. Migration does not change individuals' skill levels, rather people migrate from O to A whenever the expected returns to their skill are higher in A (net of migration costs) than in O . Thus, the return to migration is generated by spatial differences in the returns to productive skills (β) and the probability of receiving a wage offer (p).

It is interesting to consider what this model implies about the nature of migration flows.

⁷See also Hunt (2006); Fuchs-Schündeln and Schündeln (2009); Arntz *et al.* (2011) who adopt this framework.

As Borjas *et al.* (1992) note, migration flows are predicted to occur in two directions: highly-skilled individuals have an incentive to migrate to regions in which skill is more highly valued and low-skilled individuals have an incentive to migrate in the opposite direction. Conditional on skill level (x_i) migration flows are unidirectional.⁸ There are no barriers to internal migration as there would be across international borders. Thus, the internal migration of workers is expected to contribute to equalizing the return to skill across domestic labor markets until, in equilibrium, there is no incentive for further migration (see Borjas, 2000). Nothing in this simple framework explains why migrants with a particular skill x_i have a predisposition to migrate irrespective of their origin location.

3.2 A Model of Spatial Job Search

In a standard job search model, job offers are assumed to arrive for a given search effort s with arrival rate $\lambda(s)$. The arrival rate depends positively on individuals' search effort and the marginal return to search effort is decreasing ($\lambda' > 0$ and $\lambda'' < 0$). Job offers are drawn from a known wage distribution $F(w)$, and job seekers face search costs $c(s)$. Search costs are increasing in the search effort ($c' > 0$ and $c'' > 0$). The optimal job search effort s^* depends positively on its expected returns.

Empirical researchers typically measure search intensity as: i) the number of applications made within a specific time frame (Caliendo *et al.*, 2015a); ii) the amount of time spent on search (McGee, 2015); or iii) the number of search channels utilized (van den Berg and van der Klauuw, 2006; van den Berg *et al.*, 2009). Instead, we argue that search effort can be characterized by the geographic distance D between the home region and the location of the potential employer. This seems to us to be plausible as workers usually have more knowledge about local firms and better access to local networks, job search agencies, and the like. Consequently, it will be easier for them to search for a job in their local area implying that workers must increase their search effort in order to search over a greater geographic distance, i.e. $\frac{\partial D}{\partial s} > 0$.

Unlike in the standard job search model, we assume that individuals do not know the exact relationship between their own search effort s and the job offer arrival rate $\lambda(s)$. Instead, we assume that each person has a subjective belief about the impact of his or her search effort on the job offer arrival rate. This subjective belief is characterized by individuals' locus of

⁸This is trivially true here because we consider only one type of skill, but would also be true if we allowed for a "skill profile". Conditional on each element of that skill profile, migration would be unidirectional.

control, i.e. the degree to which they believe that there is a causal link between their own actions (search) and future outcomes (offer arrivals). Subjective beliefs are given by $\lambda^*(s, loc)$, and those with an internal locus of control believe that an increased search effort results in a relatively large increase in the job offer arrival rate. The expected marginal return to search effort is therefore increasing in internal locus of control, i.e. $\frac{\partial^2 \lambda^*(s, loc)}{\partial s \partial loc} > 0$.

Individuals search for jobs both during unemployment and on the job. For simplicity, we assume that the search processes do not differ between employed and unemployed workers. The job offer arrival rate $\lambda(s)$ and search costs $c(s)$ are the same for employed and unemployed workers. This implies that individuals accept every job offer with a wage above the unemployment benefit level b in case of unemployment and above the current wage w in case of employment. Therefore, the reservation wage simply corresponds to the current benefit level and wage, respectively.⁹

In our model, the discounted expected utility of having a job with wage w is given by:

$$V_e(w) = \frac{1}{1 + rdt} [(w - c(s))dt + (1 - qdt - \lambda(s)f(loc)dt)V_e(w) + qdtV_u + \lambda(s)f(loc)dt(\int_0^w V_e(w)dF(x) + \int_w^\infty V_e(x)dF(x))] \quad (3)$$

where r is the real instantaneous rate of interest, dt describes a short interval of time t , and the job separation rate is q . The discounted expected utility of having a job with wage w is equal to the income received in the period ($w dt$) minus the costs of on the job search $c(s)$ plus the discounted expected utility flow. With subjective probability $(1 - qdt - \lambda(s)f(loc)dt)$ it is $V_e(w)$ because the worker is neither displaced nor does he or she receive an alternative job offer. With probability qdt this is V_u , the discounted expected utility from unemployment. And with subjective probability $(\lambda(s)f(loc)dtP(x \geq w))$ the worker changes to a new job with a wage above the current wage w . With subjective probability $\lambda(s)f(loc)dtP(x < w)$ the worker receives a job offer with a wage below the current wage w .

The discounted expected utility of being unemployed and receiving unemployment benefits

⁹For a similar model in the context of job-to-job transitions see Ahn (2015). For a model in which unemployed job seekers choose their reservation wage and search effort depending on their locus of control see Caliendo *et al.* (2015a).

b is given by:

$$V_u = \frac{1}{1 + rdt} [(b - c(s))dt + (1 - \lambda(s)f(loc)dt)V_u + \lambda(s)f(loc)dt(\int_0^b V_u dF(x) + \int_b^\infty V_e(x)dF(x))] \quad (4)$$

The discounted expected utility of being unemployed is equal to the income received in the period (bd) minus the costs of on the job search $c(s)$ plus the discounted expected utility flow. With subjective probability $(1 - \lambda(s)f(loc)dt)$ it is V_u because the worker does not receive a job offer. With subjective probability $\lambda(s)f(loc)dtP(x \geq b)$ the worker changes to a new job with a wage above the benefit level b . With subjective probability $(\lambda(s)f(loc)dtP(x < b))$ the worker receives a job offer with a wage below the benefit level b .

We can rewrite equations (3) and (4):

$$rV_e(w) = w - c(s) - q(V_e(w) - V_u) + \lambda(s)f(loc) \int_w^\infty [V_e(x) - V_e(w)]dF(x) \quad (5)$$

$$rV_u = b - c(s) + \lambda(s)f(loc) \int_b^\infty [V_e(x) - V_u]dF(x) \quad (6)$$

Taking the first derivatives of (5) and (6) with respect to s for the optimal search effort s_e^* of employed and s_u^* of unemployed workers, respectively, gives:

$$c'(s_e^*) = \lambda'(s_e^*)f(loc) \int_w^\infty [V_e(x) - V_e(w)]dF(x) \quad (7)$$

$$c'(s_u^*) = \lambda'(s_u^*)f(loc) \int_b^\infty [V_e(x) - V_u]dF(x) \quad (8)$$

Equations 7 and 8 imply that individuals choose their optimal search effort by equating the marginal costs of job search with the marginal benefits associated with additional search. The benefit of additional search is the increased probability of receiving a job offer paying more than the current wage or the unemployment benefit level, respectively. One can easily show that – because they expect a higher return to their search effort – individuals who have a more internal locus of control search more intensively than those with a more external locus of control (see Appendix B).

$$\frac{\partial s_e^*}{\partial loc} > 0 \quad \text{and} \quad \frac{\partial s_u^*}{\partial loc} > 0 \quad (9)$$

Given the relationship between search effort and geographic search area, this implies that in-

dividuals with a more internal locus of control will send more applications to other geographic regions than individuals with a more external locus control, i.e. $\frac{\partial D}{\partial loc} = \frac{\partial D}{\partial s^*} * \frac{\partial s^*}{\partial loc} > 0$. By searching more intensively across a broader geographic region, those with an internal locus of control are more likely to apply for – and be offered – jobs outside of their origin labor market.

3.3 Internal Migration in the Face of Job Search

What are the implications of job search for internal migration? Let us first assume that individuals migrate before destination wages are realized. Ex ante, the impact of any post-migration job search is simply captured in the aggregate employment probabilities conditional on their optimal search effort $p_A(s^*)$ and $p_O(s^*)$.¹⁰ Because individuals' search intensity depends on their locus of control, these employment probabilities will also be a function of their locus of control. We can therefore rewrite equations (1) and (2) as follows:

$$p_A(s^*(loc))w_{Ai} - p_O(s^*(loc))w_{Oi} - C \geq 0 \quad (10)$$

$$(p_A(s^*(loc))\beta_A - p_O(s^*(loc))\beta_O)x_i - C \geq 0 \quad (11)$$

In this simple case, workers migrate whenever – conditional on their skill level x_i – their expected wages are higher in the alternative labor market. In perfectly competitive labor markets, with perfect information and no mobility costs, the process of internal migration leads the returns to skill and employment probabilities to adjust so that in equilibrium expected wages equalize across geographic locations. That is $(p_A(s^*(loc))\beta_A - p_O(s^*(loc))\beta_O) = 0$ and there is no further incentive for workers to migrate. Importantly, this process of labor market adjustment operates similarly in more realistic models that account for location-specific factors like the supply of land, local amenities, and housing costs in the migration decision. Roback (1982), for example, retains the assumption of perfect competition, but models internal migration in the context of identical workers with homogenous preferences over nominal wages, housing costs, and local amenities. Similarly, Moretti (2011) extends this framework by introducing idiosyncratic preferences for locations which also determine the degree of labor mobility. In both cases, internal migration is driven not by expected wages, but by a compar-

¹⁰Job search may also affect individuals' expected wage paths. Those who search more will have a faster wage growth over time, because they have a higher probability of finding a job with a higher wage than their current wage level. However, this will be the case in both labor markets A and O .

ison of the indirect utility obtainable in different locations. As before, however, labor market competition ensures that the spatial movement of workers continues until they are indifferent between locations, and there is no longer an incentive to migrate (Moretti, 2011).¹¹

Thus, when migration occurs before job search and the realization of wages, the process of internal migration reduces the return to migration – whether measured in terms of expected wages or utility – until in equilibrium workers have no incentive to migrate. Consequently, there is nothing in this economic framework to explain why some individuals might have a permanent incentive to migrate. In contrast, many other social scientists believe that some individuals have personalities that predispose them to migrate (Touraine and Ragazzi, 1961; Morrison and Wheeler, 1978; Boneva and Frieze, 2001; Frieze and Li, 2010).

Let us now consider internal migration that occurs only as the result of a successful job search. Because individuals with an internal locus of control perceive higher returns to their search effort, they search more intensively across a broader geographic area, i.e. $\frac{\partial D}{\partial loc} > 0$. The job offer arrival rate increases with search intensity implying that those with an internal locus of control will receive job offers in the alternative labor market more frequently than those with an external locus of control. Consequently, having an internal locus of control results in a greater propensity to migrate. Unlike the previous case, when job search precedes migration disparity in the search behavior of individuals with an internal locus of control predisposes them to have an incentive to migrate – even when the labor market is in equilibrium.

Does migration occur before any job search or is the reverse true? The reality, of course, is that both can occur and we are unaware of any evidence indicating whether one dominates the other. In the case of immigrants and refugees, for example, both pull (e.g. family reunification) and push factors (e.g. natural disasters, persecution, civil wars, etc.) are almost certain to lead some individuals to migrate before they know their destination labor market outcomes. It is more likely, however, that internal migration is the consequence of a successful job search. Van Ommeren *et al.* (1999), for example, note that while researchers typically make an assumption about the sequential ordering of the decision to change residences or to change jobs, there are sound theoretical reasons to expect that job moves trigger residential moves, but not the reverse. This is because there is a high probability that any increase in commuting

¹¹The theoretical prediction that internal migration contributes to eliminating regional disparities has empirical support. Blanchard and Katz (1992), for example, find that the main mechanism that re-establishes labor market equilibrium after a demand shock appears to be labor mobility rather than job creation or job migration. Similarly, Topel (1986) carefully accounts for the dynamics of wage and employment changes and finds that positive shocks to labor demand increase nominal wages in a local labor market. Interestingly, this is not only true for current but also expected future demand shocks.

costs associated with a job change can be reduced by a residential change. There is a much lower probability that any increase in commuting costs stemming from a residential move can be mitigated through a job change. We believe that this logic is particularly compelling in our case because we are explicitly focused on inter-regional migration involving substantial commuting costs across labor markets. Nonetheless, migration in our data will encompass both phenomena. To the extent that migration before job search dominates, we expect there to be little relationship between migration and locus of control. To the extent that job search prior to migration dominates, we expect that an internal locus of control will be associated with an increased propensity to migrate across labor markets.

4 Data

The data come from the German Socio-Economic Panel (SOEP) which is an annual representative panel study that collects detailed information about the socio-economic circumstances of approximately 22,000 individuals living in 12,000 households in Germany (see Wagner *et al.*, 2007, for details). These data are useful for our purposes because they provide measures of locus of control (and other personality traits) and identify the geographic location of the households in which individuals are living. Specifically, residential location is identified by geocodes which correspond to local planning regions (“Raumordnungsregionen”) which broadly correspond to labor markets. This allows us to merge SOEP data with information on regional economic conditions, e.g. GDP, unemployment rates, etc.¹²

We restrict our study period to 1999-2011, as geocodes are not available after 2011 and locus of control is first observed in 1999. Our population of interest is individuals between the ages of 25 and 55 who are not pensioners, on maternity leave, or in the military. We necessarily make a number of sample restrictions. Specifically, we exclude respondents with item non-response for the key variables of interest. We lose approximately 6.0 percent of our sample because we are unable to observe migration behavior, while item non-response in any one of the eight items underpinning the locus of control scale decreases our sample size by approximately one third. Our estimation sample consists of 87,469 observations (42,774 men and 44,695 women) for 13,817 individuals (6,622 men and 7,195 women). See Table A.1 for an overview of the sample loss associated with each selection criteria.

¹²These data come from the INKAR database provided by the Federal Institute for Research on Building, Urban Affairs and Spatial Development.

4.1 Measuring Internal Migration

Our indicator for internal migration is based on SOEP geocodes which allow us to classify each household’s residential location into one of 96 separate regions. Although these regions do not correspond to official local government areas, they are the basis for the federal German government’s regional planning. In particular, they capture urban centers (along with their associated catchment areas) and are defined on the basis of commuting flows (see BBSR, 2012). Researchers typically use the planning region as the unit of analysis when investigating issues such as geographic disparity in labor market conditions (e.g. Dütsch and Struck, 2014), employment growth (e.g. Fritsch and Noseleit, 2013) and regional mobility patterns (e.g. Jaeger *et al.*, 2010; Arntz, 2010). We use these regions to identify inter-regional mobility that corresponds to a change in labor markets. Specifically, our indicator of internal migration takes the value 1 if the household’s geocode changes between t and $t + 1$; and 0 otherwise.

INSERT FIGURE 1 ABOUT HERE.

Figure 1 depicts the average net migration flow (per 1,000 inhabitants) between regions in Germany over the period 1999-2011.¹³ While most regions in East Germany are characterized by net out-migration (light shading), the major cities – such as Berlin, Munich, Hamburg and Frankfurt – as well as the surrounding areas are characterized by net in-migration (dark blue areas). This is consistent with previous findings. In particular, Arntz (2010) and Niebuhr *et al.* (2012) conclude that although the migration flow from East to West Germany began declining in 2001, it remains quite pronounced. Relative to other countries in the European Union, regional mobility in Germany is relatively high (Bonin *et al.*, 2008), though it is low in comparison to non-European countries such as the United States or Australia (Puhani, 2001; Bonin *et al.*, 2008).

In addition to actual migration, we also observe self-assessed willingness to move in 1999 and 2009. In these two years, respondents were asked “*Could you imagine moving away from here because of family or career reasons?*”. We use this information to create a binary indicator that takes the value 1 for individuals responding “yes”; and 0 for individuals responding “it depends” or “no”. We observe self-assessed willingness to move for 9,773 (12,519) individuals (observations).

¹³The pattern is similar if we rely on SOEP data rather than on the INKAR administrative data suggesting that our SOEP estimation sample is comparable.

4.2 Measuring Locus of Control

In 1999, 2005 and 2010, SOEP respondents were asked how closely a series of 10 statements (items) characterized their views about the extent to which they influence what happens in life. A four-point Likert response scale ranging from 1 ('applies fully') to 4 ('does not apply') was used in 1999, while in 2005 and 2010 possible responses corresponded to seven-point Likert scale ranging from 1 ('disagree completely') to 7 ('agree completely'). A list of these items can be found in Table A.2. In order to harmonize the scales, 1999 item responses are reversed and "stretched".¹⁴ We conduct an explanatory factor analysis separately by year in order to investigate the way these items load onto latent factors.¹⁵ The pattern of factor loadings is similar in all three years. Items 1 and 6 clearly load onto the first factor – which we interpret as internal locus of control – while items 2, 3, 5, 7, 8 and 10 clearly load onto the second factor – interpreted as external locus of control. Items 4 and 9 do not clearly load onto one factor or the other and are discarded.

Consistent with the previous literature (see, e.g., Piatek and Pinger, 2015; Cobb-Clark *et al.*, 2014), we use a two-step process to create a continuous locus of control index. First, we reverse the scores for items 2, 3, 5, 7, 8 and 10 so that all eight items are increasing in internal locus of control. Second, for each year, we use factor analysis to extract a single factor and mean standardize it. This has the advantage of allowing us to avoid simply weighting each item equally, as averaging would, and instead allow the data to drive how each item is weighted in the overall index. Simple averaging risks measurement error and attenuation bias (Piatek and Pinger, 2015). Our locus-of-control index LOC_{it} is therefore increasing in internal locus of control.¹⁶

There is evidence that locus of control is relatively stable for the working-age population (see e.g. Cobb-Clark, 2015; Cobb-Clark and Schurer, 2013). Nevertheless, in order to minimize concerns about potential reverse causality, we ensure that our locus of control index is always measured prior to the period in which we observe the migration decision. That is, migration in 2000 - 2004 depends on 1999 locus of control, migration in 2006 - 2009 depends on 2005 locus of control, and migration in 2011 depends on 2010 locus of control. In addition to the

¹⁴This process preserves the standard deviation, but allows for changes in the mean. The process results in values of 1, 3, 5 or 7 so that a '1' on the 1999 four-point scale, for example, becomes a '7' on the 2005 and 2010 seven-point scales.

¹⁵The loadingplots and the detailed results from the factor analysis are available upon request.

¹⁶A test of internal consistency yields a Cronbach's α reliability statistic (Cronbach, 1951) between 0.66 and 0.68 indicating that the eight items are reliable which is in line with previous studies (Richter *et al.*, 2013).

continuous measure, we also create an indicator of “internal” locus of control which takes the value 1 for those with locus of control indexes above the median; and 0 otherwise. Finally, we test the robustness of our results to different specifications of this indicator in Section 5.3.

4.3 Locus of Control and Internal Migration

Overall, 1.45 percent of the individuals in our sample moved across regions between t and $t + 1$ (see Table 1). Men (1.5 percent) are slightly more likely to migrate than are women (1.4 percent). Moreover, one in four individuals (25.6 percent) report that they are definitely willing to migrate for family or career reasons, while a further 40.9 percent report that they would consider migrating under some circumstances. Men are slightly more willing to migrate than are women, while those with an internal locus of control are significantly more likely to express a willingness to migrate and significantly less likely to rule migration out.

INSERT TABLE 1 ABOUT HERE.

Is an expressed willingness to migrate related to actual migration behavior? We consider this question and find that both men and women who do in fact migrate between t and $t + 1$ are significantly more likely to have reported a willingness to migrate in t . Specifically, while only 25 percent of non-migrants report a willingness to migrate, nearly 70 percent of migrants did the same in the period prior to their move (see Table A.3 in the Appendix).

5 Empirical Approach and Results

5.1 Estimation Strategy

Our theoretical model predicts that internal migration and internal locus of control will be positively related if job search precedes migration and unrelated if job search follows migration. We have no prior about the relative timing of job search and migration, making the link between locus of control and migration an empirical question. Consequently, we employ a reduced-form approach to estimate the association between individuals’ locus of control and their propensity to: i) express a willingness to migrate; and ii) to actually migrate across regions. Specifically, our estimation equations are as follows:

$$P(W_{it=1}) = P(\theta_1 + \theta_2 LOC_{it} + \theta_3 X_{it} + \theta_4 PT_i + \tau_1 R_{it} + \tau_2 T + \epsilon_{it} > 0) \quad (12)$$

$$P(M_{it+1} = 1) = P(\beta_1 + \beta_2 LOC_{it} + \beta_3 X_{it} + \beta_4 PT_i + \gamma_1 R_{it} + \gamma_2 T + \eta_{it} > 0) \quad (13)$$

where i indexes individuals, t indexes time, and W_{it} and M_{it+1} capture the stated willingness to migrate (at time t) and actual migration behavior (between t and $t + 1$) respectively. Further, LOC_{it} captures locus of control, R_{it} captures regional conditions (dummy for East Germany, unemployment rates, and gross value added in the origin region), T is a vector of year-dummies, and X_{it} is a vector of control variables including socio-demographic characteristics (gender, age, education, nationality, marital status, number of children, household income, home ownership, and disability status) as well as job characteristics (current labor force status, occupational classification, tenure and unemployment experience). Finally, PT_{it} is a vector of individual personality traits averaged over all years (Big Five traits and risk attitudes). These factors have been shown to be important in explaining internal migration (see e.g. Kennan and Walker, 2011; Ederveen and Bardsley, 2003; Jokela, 2009; Alecke *et al.*, 2010; Jaeger *et al.*, 2010). Descriptive statistics for the variables in our analysis are reported in Table A.3 in the Appendix.

Our objective is not to achieve causal estimation, but rather to generate interpretable estimates of the association between internal locus of control and internal migration (θ_2 and β_2). We account for a detailed set of controls in order to reduce the potential for unobserved heterogeneity to confound our estimates, while locus of control is measured so that it is predetermined at the time of the migration decision in order to minimize concerns about reverse causality.

Equations (12) and (13) are estimated using a logit models with standard errors clustered at the person level. We estimate three alternative specifications. The first controls only for year and regional indicators (T and R_{it}). The second adds controls for socioeconomic and job characteristics (X_{it}), while the third also controls for Big-Five personality traits and risk attitudes (PT_{it}). Models are estimated separately by gender using one of two alternative measures of locus of control: i) a continuous measure; and ii) an indicator for having a locus of control greater than the median, i.e. being internal. Table 2 (willingness to move) and Table 3 (actual internal migration) provide an overview of the key results, while full estimation results for our preferred specification – including all groups of control variables – are available in Tables A.4 and A.5 in the Appendix.

5.2 Locus of Control and Internal Migration

Individuals with an internal locus of control are more likely to report that they would consider moving for family or career reasons. Moreover, this relationship is robust to the inclusion of a detailed set of controls (see Table 2). Specifically, each standard deviation increase in individuals' internal control tendencies results in a 1.2 percentage point increase in the likelihood that individuals respond "yes" when asked if they are willing to migrate (see column 5). Those with an internal locus of control, i.e. those above the median, are 2.69 percentage points more likely to report being willing to move relative to those with an external locus of control (see column 6). Unfortunately, previous evidence linking locus of control to a willingness to migrate is virtually nonexistent making it difficult to compare results. The exception is early research by Hines *et al.* (1974) who also find a positive correlation between internal locus of control and self-assessed willingness to migrate in a very small sample ($n=53$) of undergraduate students. Our results provide evidence that this finding is pervasive in a much broader population. Overall, 25.6 percent of our estimation sample reports being prepared to migrate implying that the disparity associated with locus control amounts to a difference of approximately 10.5 percent. This is of the same order of magnitude as two additional years of education (0.014), being a white-collar worker (0.025), or being married (-0.031) and is larger than the effect associated with having children in the household (-0.005) or an additional 1,000 Euro in household income (0.006) (see Table A.4 in the Appendix for full estimation results).

INSERT TABLE 2 ABOUT HERE.

Moreover, individuals with an internal locus of control are also more likely to migrate between labor market regions from one year to the next than are those with an external locus of control. Specifically, individuals who are internal have a 0.207 percentage point higher probability of moving each year than do external individuals (column 6). While small, this effect is economically meaningful given that the annual rate of internal migration on average is only 1.45 percent. Thus, the estimated effect of an internal locus of control translates into a 14.3 percent higher probability of moving. This is comparable to the effect of an additional child in the household (-0.003) and is larger than the effect of being self-employed (0.002) or having an additional year of education (0.0017, see Table A.5). Our continuous measure of locus of control is also positively associated with increased migration (column 5), however,

this association is not quite significant at conventional levels. These findings are in contrast to those of Toney *et al.* (1985) who find no relationship between geographical mobility and locus of control for middle-aged, white men captured in the U.S. National Longitudinal Survey.

INSERT TABLE 3 ABOUT HERE.

The relationships between migration and the other independent variables are very much in line with prior expectations and the earlier literature (see Tables A.4 and A.5). Age has a significant U-shaped effect on willingness to move but – controlling for all other variables – has no significant effect on the probability of internal migration. Although the effect of locus of control on internal migration differs by gender, men are not, *ceteris paribus*, significantly more likely to migrate. Rather being married, having children, being a home-owner or having more than ten years of job tenure are all associated with significantly less willingness to move and lower propensities to actually migrate. On the other hand, self-assessed willingness to move as well as actual internal migration are significantly higher for the more educated, the unemployed, white-collar workers as well as people in West Germany. Interestingly, the probability of internal migration is negatively related to regional gross value added, while individuals' self-assessed willingness to move increases with regional gross value added.

There are several important things to note about these empirical results. First, the relationship between internal migration and locus of control is largely unaffected by the inclusion of a wide range of additional controls. Thus, locus of control has important additional explanatory power in models of the migration decision over and above that associated with both personality traits and more traditional economic drivers including job characteristics, regional economic conditions, family structure, and preference parameters (e.g. risk-attitudes).

Second, our results are consistent with job search preceding internal migration for the majority of individuals. In particular, our theoretical model predicts that locus of control will be unrelated to internal migration if individuals migrate prior to engaging in job search. In contrast, we find a positive relationship between the propensity to migrate and having an internal locus of control suggesting that migration for many individuals results from successful job search. Interestingly, Van Ommeren *et al.* (1999) reach a similar conclusion arguing that it is theoretically more plausible that job search precedes migration than the reverse.

Third, the overall relationship between internal migration and locus of control is largely driven by men. Men with an internal locus of control are 3.6 percentage points more

likely to report a willingness to move than are men with an external locus of control, while the corresponding gap amongst women is both smaller and statistically insignificant. Moreover, while internal men are on average 18.5 percent (0.278 percentage points) more likely to migrate than external men, locus of control is not significantly related to the migration behavior of women. These gender differences are consistent with a growing literature showing that there is a gender-specific relationship between locus of control and many labor market outcomes including wages (Semykina and Linz, 2007), occupational attainment (Cobb-Clark and Tan, 2011), job search (Caliendo *et al.*, 2015a) and entrepreneurship (Hansemark, 2003).

5.3 Sensitivity Analysis

We conducted a sensitivity analysis in order to test the robustness of our results to: i) different measures of locus of control, ii) controls for willingness to move and iii) the exclusion of potentially endogenous variables. Our focus is on the estimated association of our dichotomous measure of internal locus of control with actual migration decisions (i.e. the specification in column 6 in Table 3). All sensitivity results are summarized in Table 4 and are based on the full specification (column 6 in Table A.5).

INSERT TABLE 4 ABOUT HERE.

We begin by considering whether our estimates are driven by the choice of the median as the threshold for identifying those with an internal locus of control. Specifically, we re-estimated our models using: i) mean locus of control as a threshold; and ii) a three-way classification of internal locus of control, namely low ($< 33^{rd}$ percentile), medium (33^{rd} - 66^{th} percentile) and high ($> 66^{th}$ percentile). Our results are robust to these alternative measures (see Panel A, (1) and (2) in Table 4). Moreover, we replaced our preferred measure of locus of control which relies on factor weights with an alternative based on an equal weighting (simple average) of the underlying eight locus of control items. We find that our results continue to hold using this alternative measure and are even more pronounced for men (Panel A, (3) in Table 4).

Next we consider the following question: To what extent is the relationship between internal locus of control and internal migration operating through a heightened willingness to move? We consider this question by including a control for self-assessed willingness to move in our model of actual migration behavior (see Panel B in Table 4). Unfortunately, willingness

to move is only observed in 1999 and 2009. Therefore, to retain as much sample as possible we impute self-assessed willingness to move between observation periods using the most-recently available measure. This effectively requires us to maintain the strong assumption that willingness to move is stable across years. We find that, not surprisingly, willingness to migration is closely linked to actual migration behavior. Individuals who report a willingness to move have a probability of actually migrating that is fully 1.05 percentage points higher. Nonetheless, controlling for willingness to move has only a marginal effect on the magnitude of the association between our indicator of internal locus of control and internal migration. We find similar results in specification that use a three-way categorical measure of the willingness to move, rather than a simple indicator.

Finally, a large literature demonstrates that personality traits, including locus of control, are related to individuals' human capital acquisition (see, e.g., Coleman and DeLeire, 2003; Heckman *et al.*, 2006). Thus, many of our human capital measures, in particular education and employment histories, may themselves be a function of individuals' perceptions of control via decisions made in the past. This implies that $\hat{\beta}_2$ captures only the direct association between locus of control and internal migration and not the total association which also includes these indirect effects. To assess the importance of these indirect effects, we re-estimate our models excluding educational attainment and employment histories (unemployment experience and tenure in current/last job) from the regression (Panel C in Table 4). Not surprisingly, we find that the relationship between internal migration and internal locus of control becomes stronger. Specifically, the estimated association of internal locus of control with actual migration behavior increases from 0.21 to 0.28 percentage points, which is equivalent to an increase from 14.3 percent to 19.2 percent. For men the increase is from 0.28 to 0.34 percentage points (18.5 percent to 22.4 percent) and for women the increase is even larger from 0.13 to 0.20 percentage points (from 9.0 percent to 14.5 percent), leaving the overall effect of internal locus of control marginally significant with a p -value of 0.101.

Taken together, these sensitivity tests indicate that our estimates of the positive relationship between internal migration and internal locus of control are robust to a range of specification issues.

6 Conclusions

The insights of behavioral economics have the potential to deepen our understanding of a range of economic behaviors, including job search and migration decisions. We model internal migration as the result of a job search process and demonstrate that the relative timing of job search, i.e. either before or after migration, has important implications for the nature of migration flows. When migration precedes job search, migration flows will be unidirectional conditional on skill as in Borjas *et al.* (1992). High-skilled workers will have an incentive to move to markets with high returns to skills, while low-skilled workers tend to migrate in the opposite direction. On the other hand, when job search precedes migration, those characteristics, skills, traits, etc. that facilitate geographically broader job search will be associated with a higher propensity to migrate.

This relationship between job search and internal migration provides an important conceptual framework for understanding the psychological evidence that certain traits predispose individuals to migrate. In particular, we explicitly model individuals' subjective beliefs about the returns to job search as a function of their locus of control. Those with an internal locus of control search more intensively, across a wider geographic area, and therefore have a higher propensity to migrate. We then test the empirical implications of our model and find that those with an internal locus of control both report being more willing to migrate and in fact do migrate more often. This positive relationship between locus of control and internal migration constitutes a new stylized fact and indicates that, for many individuals, job search is likely to precede migration. Given this, providing incentives for more intensive job search across a wider geographical area – particularly when targeted towards those with an external locus of control – may be more useful in increasing internal migration rates than are standard relocation initiatives.

Despite these important insights, there remains a great deal we do not yet fully understand about the relationship between individuals' psychosocial traits and their propensity to migration. There is substantial evidence that individuals' perceptions of control are related to their human capital investment decisions through the returns they expect (see Cobb-Clark, 2015). Consequently, it seems quite natural to link locus of control to internal migration through the expected returns to job search as we have done here. Our theoretical predictions remain unchanged, however, if we instead assume that having an internal locus of control raises the efficiency of job search: If job search precedes migration, those with an internal

locus of control continue to have a higher propensity to migrate.

At the same time, we also cannot rule out the potential for locus of control to be linked to internal migration through lower psychic costs of migration. Bauernschuster *et al.* (2014), for example argue that lower psychic costs of migration lie behind the higher migration rates of highly-educated and risk-tolerant individuals, while Moretti (2011) models worker heterogeneity in preferences for location which can be conceptualized in our context as a psychic (opportunity) cost of migration. Lower migration costs would lead those with an internal locus of control to be more likely to migrate irrespective of the relative timing of migration and job search. To the extent that self-assessed willingness to move captures heterogeneity in the psychic costs of migration, however, our results indicate that differences in psychic migration costs do not provide a complete explanation for predisposition of those with an internal locus of control to migrate across labor markets. Nonetheless, future research which assessed the empirical support for these alternative explanations would be useful in furthering our understanding of internal migration.

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Tables and Figures

Table 1: Descriptives of Outcome Variables by Locus of Control

	All	Externals	Internals
All			
Internal Migration between t and $t + 1$	0.0145 [87,469]	0.0127 [43,736]	0.0163*** [43,733]
Could Imagine Moving Away			
No	0.3348	0.3438	0.3258**
It Depends	0.4091	0.4160	0.4023
Yes	0.2561 [12,509]	0.2402 [6,233]	0.2718*** [6,276]
Men			
Internal Migration between t and $t + 1$	0.0150 [42,774]	0.0130 [20,422]	0.0168*** [22,352]
Could Imagine Moving Away			
No	0.3233	0.3303	0.3170
It Depends	0.4075	0.4199	0.3962*
Yes	0.2692 [6,140]	0.2498 [2,922]	0.2868*** [3,218]
Women			
Internal Migration between t and $t + 1$	0.0140 [44,695]	0.0125 [23,314]	0.0157*** [21,381]
Could Imagine Moving Away			
No	0.3459	0.3558	0.3352
It Depends	0.4107	0.4126	0.4088
Yes	0.2434 [6,369]	0.2317 [3,311]	0.2560** [3,058]

Source: Socio-Economic Panel (SOEP), waves 1999-2011, version 29, doi:10.5684/soep.v29, own calculations.

Notes: All numbers are shares unless stated otherwise.

Number of observations in square brackets.

Significance stars in the last column refer to significance level of t-test for mean equivalence between Externals and Internals: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Logit Estimation Results: Willingness to Move (Marginal Effects)

	(1)	(2)	(3)	(4)	(5)	(6)
	b/se	b/se	b/se	b/se	b/se	b/se
All Individuals						
LOC Factor (std.)	0.01121*** (0.00401)		0.00871** (0.00404)		0.01168*** (0.00425)	
LOC Factor > Median		0.02839*** (0.00788)		0.02099*** (0.00788)		0.02686*** (0.00806)
Observations	12509	12509	12509	12509	12509	12509
Pseudo R^2	0.014	0.015	0.056	0.057	0.066	0.066
Men						
LOC Factor (std.)	0.01593*** (0.00577)		0.01464** (0.00583)		0.01963*** (0.00615)	
LOC Factor > Median		0.03543*** (0.01138)		0.02921** (0.01135)		0.03630*** (0.01160)
Observations	6140	6140	6140	6140	6140	6140
Pseudo R^2	0.023	0.023	0.069	0.069	0.078	0.078
Women						
LOC Factor (std.)	0.00536 (0.00554)		0.00387 (0.00556)		0.00554 (0.00582)	
LOC Factor > Median		0.01563 (0.01087)		0.01161 (0.01086)		0.01693 (0.01114)
Observations	6,369	6,369	6,369	6,369	6,369	6,369
Pseudo R^2	0.008	0.008	0.054	0.054	0.065	0.065
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Regional controls	Yes	Yes	Yes	Yes	Yes	Yes
Socio-economic controls	No	No	Yes	Yes	Yes	Yes
Personality controls	No	No	No	No	Yes	Yes

Source: Socio-Economic Panel (SOEP), waves 1999-2011, version 29, doi:10.5684/soep.v29, own calculations.

Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Standard Errors are clustered on person-level.

Full estimation results for specifications (5) and (6) can be found in table A.4, in Appendix A.

The full estimation results for specifications (1) - (4) can be obtained from the authors.

Table 3: Logit Estimation Results: Internal Migration between t and $t + 1$ (Marginal Effects)

	(1)	(2)	(3)	(4)	(5)	(6)
	b/se	b/se	b/se	b/se	b/se	b/se
All Individuals						
LOC Factor (std.)	0.00145*** (0.00045)		0.00084* (0.00047)		0.00075 (0.00050)	
LOC Factor > Median		0.00353*** (0.00090)		0.00209** (0.00089)		0.00207** (0.00092)
Observations	87469	87469	87469	87469	87469	87469
Pseudo R^2	0.004	0.004	0.119	0.119	0.123	0.123
Men						
LOC Factor (std.)	0.00132** (0.00068)		0.00096 (0.00072)		0.00100 (0.00076)	
LOC Factor > Median		0.00361*** (0.00132)		0.00257* (0.00135)		0.00278** (0.00138)
Observations	42774	42774	42774	42774	42774	42774
Pseudo R^2	0.005	0.006	0.112	0.112	0.117	0.117
Women						
LOC Factor (std.)	0.00150** (0.00059)		0.00072 (0.00060)		0.00052 (0.00065)	
LOC Factor > Median		0.00323*** (0.00124)		0.00140 (0.00120)		0.00126 (0.00124)
Observations	44,695	44,695	44,695	44,695	44,695	44,695
Pseudo R^2	0.005	0.005	0.137	0.137	0.143	0.143
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Regional controls	Yes	Yes	Yes	Yes	Yes	Yes
Socio-economic controls	No	No	Yes	Yes	Yes	Yes
Personality controls	No	No	No	No	Yes	Yes

Source: Socio-Economic Panel (SOEP), waves 1999-2011, version 29, doi:10.5684/soep.v29, own calculations.

Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Standard Errors are clustered on person-level.

Full estimation results for specifications (5) and (6) can be found in table A.5, in Appendix A..

The full estimation results for specifications (1) - (4) can be obtained from the authors.

Table 4: Robustness Checks: Internal Migration between t and $t + 1$ (Marginal Effects)

	All	Men	Women
Baseline Results			
LOC Factor > Median	0.00207** (0.00092)	0.00278** (0.00138)	0.00126 (0.00124)
Observations	87,469	42,774	44,695
A. Alternative LOC Specifications			
(1) Alternative Dichotomous Variable			
LOC Factor > Mean	0.00206** (0.00091)	0.00309** (0.00135)	0.00125 (0.00123)
(2) Finer Distinction			
LOC Factor Low (< P33)	ref.	ref.	ref.
LOC Factor Medium (Q33-Q66)	0.00117 (0.00108)	0.00149 (0.00154)	0.00094 (0.00150)
LOC Factor High (> P66)	0.00222* (0.00115)	0.00364** (0.00172)	0.00126 (0.00155)
(3) Simple Index LOC Calculation ^a			
LOC Factor (Index) > Median	0.00199** (0.00093)	0.00338** (0.00138)	0.00062 (0.00126)
Observations	87,469	42,774	44,695
B. Willingness to Move as Intermediate^b			
LOC Factor > Median	0.00161* (0.00092)	0.00258* (0.00137)	0.00061 (0.00124)
Dummy for Willingness to Move (imp.)	0.01054*** (0.00104)	0.00924*** (0.00148)	0.01137*** (0.00146)
Observations	84,181	41,136	43,045
C. Excluding Potentially Endogenous Control Variables^c			
LOC Factor > Median	0.00279*** (0.00092)	0.00336** (0.00136)	0.00203 (0.00124)
Observations	84,181	41,136	43,045
Year dummies	Yes	Yes	Yes
Regional controls	Yes	Yes	Yes
Socio-economic controls	Yes	Yes	Yes
Personality controls	Yes	Yes	Yes

Source: Socio-Economic Panel (SOEP), waves 1999-2011, version 29, doi:10.5684/soep.v29, own calculations..

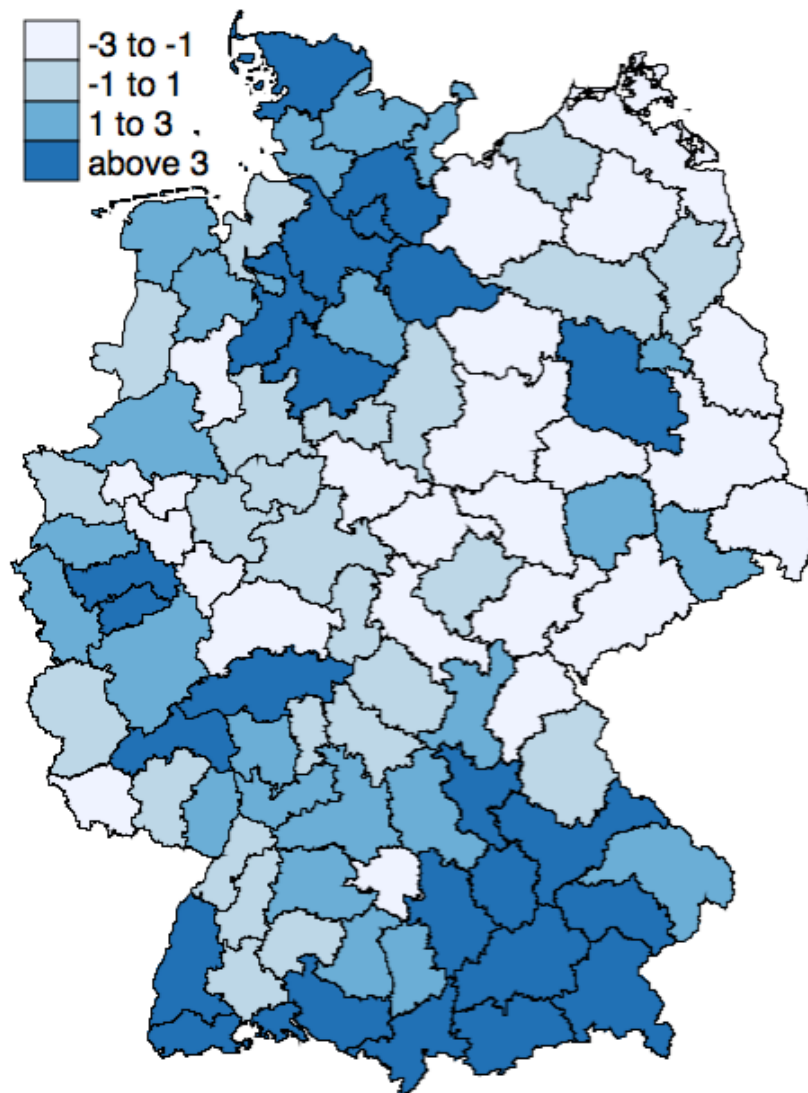
Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ Standard Errors are clustered on person-level. All rows of marginal effects and standard errors are from separate estimations.

^a The Simple Index is calculated by averaging over the item values in the following way: $[I1 + I6 + R(I2 + I3 + I5 + I7 + I8 + I9 + I10)]/8$ where R indicates that all external items are reversely coded.

^b The Willingness to Move variable is imputed forward in order to have a valid observation for all years in the full sample. The observation from 1999 is imputed into the years 2000 - 2008 and the observation from 2009 is imputed into the years 2010 and 2011.

^c In this specification we exclude information on education years, unemployment experience and tenure in current or last job.

Figure 1: Average Net Migration 1999-2011 in Local Labor Markets, per 1000 inhabitants



Source: INKAR 2013, own illustration

A Supplementary Tables and Figures

Table A.1: Sample Selection and Item Non-Response

Step	Estimation Sample	
	Observations	Individuals
Full Sample (1999-2011)	402,440	60,718
Sample Restriction		
- Drop Younger 25, Older 55	176,593	29,628
- Drop Pensioners, Mat. Leave, Milit. Service	169,814	29,249
Item Non-Response		
- Migration Variable	155,502	27,514
- Locus of Control	105,471	17,104
- Socio-Economic Controls	94,044	16,150
- Personality Control	87,469	13,817
Sub-Sample for Willingness to Move (1999 & 2009) ^a	12,519	9773

Source: Socio-Economic Panel (SOEP), waves 1999-2011, version 29, doi:10.5684/soep.v29, own calculations..

Notes: The full sample contains all available SOEP observations between 1999 and 2011 including e.g. children and persons without person questionnaires.

^a The number of observations includes all sample restrictions and item non-responses.

Table A.2: Components of Locus of Control

Variable	Wave	
	1999 ^a	2005/2010 ^b
Number of observations	5,429	17,093
Components of locus of control (Mean, 1999 Scale: 1-4, 2005/10 Scale: 1-7)		
I1: How my life goes depends on me	3.27	5.46
I2: Compared to other people, I have not achieved what I deserve (R)	2.12	3.25
I3: What a person achieves in life is above all a question of fate or luck (R)	2.21	3.43
I4: If one is soc. or polit. active, one can have an effect on social conditions ^c	2.29	3.62
I5: I freq. have the experience that others have a controlling influence over my life (R)	2.00	3.16
I6: One has to work hard in order to succeed	3.46	5.96
I7: If I run up against difficulties in life, I often doubt my own abilities (R)	2.03	3.28
I8: If one is soc. or polit. active, one can have an effect on social conditions (R)	2.69	4.49
I9: Inborn abilities are more important than any efforts one can make ^c	2.93	4.78
I10: I have little control over the things that happen in my life (R)	1.80	2.61

Source: Socio-Economic Panel (SOEP), waves 1999, 2005 and 2010, version 29, doi:10.5684/soep.v29, own calculations.

Notes:

^a In 1999 the LOC was surveyed on a 4-point likert scale from 1 for “Totally Disagree” to 4 for “Totally Agree”. The scale was reversed in the data preparation in order to indicate agreement for high values as it is also the case in the other waves. For the later harmonization, the scale was stretched to the length of a 7-point likert scale.

^b In 2005 and 2010 the LOC was surveyed on a 7-point likert scale from 1 for “I Disagree Completely” to 7 for “Agree completely”.

^c Items 4 and 9 are not included into the prediction of the latent factor.

Items marked with a (R) are reversed prior to factor analysis in order to indicate an internal locus of control for high values.

Table A.3: Selected Descriptive Statistics by Internal Migration Status

	All		Male		Female	
	Non-Migrants	Migrants	Non-Migrants	Migrants	Non-Migrants	Migrants
Willingness to Migrate ^a	0.25	0.69***	0.26	0.66***	0.24	0.73***
Locus of Control ^b	4.09	4.19***	4.14	4.23**	4.04	4.14***
Socio-Economic Characteristics						
Age	40.99	34.76***	40.90	34.95***	41.07	34.56***
Married	0.67	0.36***	0.66	0.39***	0.68	0.33***
Number of Children in Household	0.74	0.45***	0.75	0.46***	0.74	0.45***
German	0.91	0.94***	0.91	0.93	0.91	0.94**
East-Germany	0.27	0.24***	0.27	0.21***	0.27	0.27
Disabled	0.06	0.03***	0.07	0.03***	0.05	0.03**
Home-Owner	0.51	0.20***	0.52	0.22***	0.51	0.18***
Education Years	12.46	13.65***	12.52	13.50***	12.41	13.80***
Net Household Income in KEUR	2.90	2.49***	2.90	2.61***	2.90	2.36***
Labor Force Status						
Employed	0.77	0.71***	0.80	0.73***	0.73	0.70**
Self-Employed	0.08	0.08	0.10	0.09	0.06	0.06
Unemployed	0.07	0.10***	0.07	0.09	0.07	0.11***
Not Working	0.07	0.05***	0.01	0.02***	0.12	0.07***
In Education	0.01	0.07***	0.01	0.07***	0.01	0.06***
Occupational Characteristics						
Unemployment Experience in Years	0.93	0.83***	0.91	0.86	0.95	0.80**
Tenure in Current or Last Job						
< 3 Years	0.33	0.52***	0.27	0.48***	0.38	0.56***
3-9 Years	0.27	0.32***	0.27	0.33***	0.28	0.32**
≥ 10 Years	0.37	0.15***	0.43	0.17***	0.31	0.12***
High Skilled Worker	0.01	0.02	0.02	0.02	0.01	0.02**
Occupational Position						
Blue-Collar Worker	0.26	0.15***	0.36	0.22***	0.16	0.07***
White-Collar Worker	0.44	0.47	0.37	0.39	0.52	0.54
Civil Servent	0.06	0.07**	0.07	0.09*	0.05	0.06
Trainee	0.01	0.02***	0.01	0.02***	0.00	0.03***
Regional Characteristics						
Unemployment Rate in Region	9.99	9.85	9.99	9.65*	9.98	10.05
Gross Value Added in Region	50.27	50.99***	50.19	51.09**	50.35	50.90
Other Personality Variables						
Willingness to Take Risks ^c	4.55	5.06***	5.01	5.39***	4.11	4.72***
Openness ^d	4.46	4.68***	4.35	4.58***	4.56	4.78***
Conscientiousness ^d	5.94	5.84***	5.88	5.79***	6.01	5.89***
Extraversion ^d	4.83	4.88	4.70	4.69	4.95	5.07***
Agreeableness ^d	5.36	5.37	5.19	5.26**	5.52	5.49
Neuroticism ^d	3.88	3.82*	3.64	3.56*	4.11	4.09
Observations	86,201	1,268	42,133	641	44,068	627
Individuals	13,754	1,057	6,594	529	7,160	528

Source: Socio-Economic Panel (SOEP), waves 1999-2011, version 29, doi:10.5684/soep.v29, own calculations.

Notes: All numbers are shares unless stated otherwise.

Stars give results from t-test for mean equivalence: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

^a Willingness to move has only 12,509 observations for 9,763 individuals.

^b For detailed information on the measurement of locus of control see Section 4.2. For this table, locus of control was adjusted to just have positive values by subtracting the lowest possible value.

^c Will. to Take Risks is measured on a Likert-Scale from 0 (= Risk-averse) to 10 (= Risk-prone).

^d Big Five are measured with 3 items each on a Likert-Scale from 1 (= Does not apply at all) to 7 (= Applied to me perfectly). Factors are generated by averaging over the 3 items.

^e Variables are included as averages over all available observations.

Table A.4: Logit Estimation Results: Willingness to Move (Marginal Effects)

	(1)	(2)	(3)	(4)	(5)	(6)
	All	All	Men	Men	Women	Women
	b/se	b/se	b/se	b/se	b/se	b/se
Locus of Control						
LOC Factor (std.)	0.01168*** (0.00425)		0.01963*** (0.00615)		0.00554 (0.00582)	
LOC Factor > Median		0.02686*** (0.00806)		0.03630*** (0.01160)		0.01693 (0.01114)
Socio-Economic Characteristics						
Age	-0.01043** (0.00467)	-0.01032** (0.00467)	-0.01606** (0.00679)	-0.01586** (0.00678)	-0.00521 (0.00642)	-0.00518 (0.00642)
Squared Age	0.00012** (0.00006)	0.00012** (0.00006)	0.00019** (0.00008)	0.00019** (0.00008)	0.00005 (0.00008)	0.00005 (0.00008)
Female	-0.01230 (0.00942)	-0.01221 (0.00942)				
Married	-0.03163*** (0.00989)	-0.03111*** (0.00988)	-0.03775*** (0.01445)	-0.03747*** (0.01445)	-0.03314** (0.01297)	-0.03285** (0.01296)
German	-0.03995** (0.01582)	-0.03943** (0.01578)	-0.01619 (0.02115)	-0.01367 (0.02112)	-0.05935*** (0.02048)	-0.06002*** (0.02044)
Number of Children in HH	-0.00494 (0.00487)	-0.00501 (0.00487)	0.01102 (0.00689)	0.01099 (0.00689)	-0.02041*** (0.00691)	-0.02047*** (0.00691)
Disabled	0.01855 (0.01694)	0.01784 (0.01693)	0.03032 (0.02194)	0.02870 (0.02200)	0.00504 (0.02444)	0.00532 (0.02446)
Home-Owner	-0.09846*** (0.00877)	-0.09849*** (0.00877)	-0.10779*** (0.01248)	-0.10792*** (0.01248)	-0.08914*** (0.01210)	-0.08927*** (0.01210)
Education Years	0.01445*** (0.00175)	0.01439*** (0.00175)	0.01008*** (0.00261)	0.01008*** (0.00261)	0.01812*** (0.00240)	0.01804*** (0.00240)
Net Household Income in KEUR	0.00580** (0.00282)	0.00577** (0.00281)	0.00196 (0.00422)	0.00193 (0.00423)	0.00920** (0.00378)	0.00918** (0.00377)
Occupational Characteristics						
Unemployment Experience	0.00133 (0.00243)	0.00109 (0.00243)	-0.00117 (0.00366)	-0.00170 (0.00367)	0.00178 (0.00329)	0.00174 (0.00329)
High Skilled Worker	-0.03275 (0.03441)	-0.03401 (0.03427)	-0.06342 (0.05348)	-0.06498 (0.05369)	0.02408 (0.05205)	0.02414 (0.05196)
Labor Force Status (Ref:Employed)						
Self-Employed	0.03734** (0.01791)	0.03758** (0.01792)	0.02513 (0.02225)	0.02683 (0.02223)	0.05312** (0.02585)	0.05306** (0.02587)
Unemployed	0.06611** (0.03315)	0.06617** (0.03318)	0.02783 (0.04228)	0.02777 (0.04230)	0.09488** (0.04151)	0.09503** (0.04151)
Not Working	0.04447 (0.03243)	0.04422 (0.03245)	0.11554* (0.06034)	0.11370* (0.06061)	0.04695 (0.03933)	0.04659 (0.03936)
In Education	0.24130*** (0.05170)	0.24199*** (0.05165)	0.27436*** (0.06106)	0.27633*** (0.06108)	0.14566*** (0.05546)	0.14602*** (0.05539)
Tenure (Ref:0-2 Years)						
3-9 Years	-0.02321** (0.00957)	-0.02328** (0.00957)	-0.02346 (0.01457)	-0.02345 (0.01457)	-0.02392* (0.01333)	-0.02398* (0.01333)
≥ 10 Years	-0.05087*** (0.01053)	-0.05103*** (0.01053)	-0.05686*** (0.01579)	-0.05680*** (0.01580)	-0.05276*** (0.01523)	-0.05305*** (0.01525)
Tenure not available	-0.02349 (0.02348)	-0.02416 (0.02343)	-0.09004* (0.05026)	-0.09119* (0.05033)	-0.00537 (0.02884)	-0.00524 (0.02884)
Occupational Position (Ref: Blue-Collar)						
White-Collar Worker	0.02505** (0.01165)	0.02515** (0.01164)	0.03860** (0.01571)	0.03918** (0.01570)	0.01360 (0.01802)	0.01369 (0.01802)
Civil Servent	0.02751 (0.02406)	0.02726 (0.02410)	0.06487** (0.03019)	0.06510** (0.03027)	-0.04316 (0.03552)	-0.04396 (0.03552)
Trainee	0.10681** (0.05092)	0.10771** (0.05089)	0.12045* (0.06961)	0.12374* (0.06999)	0.06923 (0.05387)	0.06954 (0.05383)

NACE Industry (Ref: Manufacturing)						
Agriculture	-0.04598 (0.03458)	-0.04577 (0.03456)	-0.10222** (0.05087)	-0.10223** (0.05078)	0.02049 (0.05663)	0.02006 (0.05675)
Mining, Quarring, Energy, Water	-0.05036 (0.03648)	-0.05034 (0.03641)	-0.03527 (0.04660)	-0.03521 (0.04647)	-0.11794 (0.08718)	-0.11918 (0.08709)
Chemicals, Pulp, Paper	0.01506 (0.02140)	0.01514 (0.02140)	0.01814 (0.02654)	0.01759 (0.02656)	-0.01040 (0.03270)	-0.01008 (0.03272)
Construction	-0.03468* (0.01989)	-0.03417* (0.01988)	-0.01530 (0.02358)	-0.01479 (0.02359)	-0.08426* (0.04673)	-0.08459* (0.04673)
Iron/Steel	-0.03746* (0.02202)	-0.03716* (0.02200)	-0.03757 (0.02653)	-0.03622 (0.02650)	-0.06007 (0.05121)	-0.05984 (0.05121)
Textile/Apparel	-0.06788 (0.04259)	-0.06633 (0.04274)	-0.02042 (0.07908)	-0.01885 (0.07874)	-0.11960* (0.06462)	-0.11887* (0.06472)
Wholesale/Retail	-0.01179 (0.01724)	-0.01115 (0.01723)	-0.01650 (0.02371)	-0.01560 (0.02370)	-0.03155 (0.02633)	-0.03146 (0.02634)
Transport/Communication	-0.01417 (0.02243)	-0.01337 (0.02241)	0.00619 (0.02752)	0.00750 (0.02751)	-0.06826* (0.03858)	-0.06853* (0.03853)
Public Service	-0.00988 (0.01566)	-0.00964 (0.01565)	0.01204 (0.02108)	0.01214 (0.02110)	-0.04606* (0.02433)	-0.04622* (0.02433)
Financial/Private Services	0.00326 (0.01727)	0.00346 (0.01726)	0.03168 (0.02246)	0.03190 (0.02248)	-0.03869 (0.02650)	-0.03903 (0.02649)
NACE Industry Not Categorized	-0.00685 (0.01835)	-0.00596 (0.01835)	0.00498 (0.02447)	0.00671 (0.02444)	-0.03732 (0.02790)	-0.03748 (0.02792)
NACE Industry not available	0.01343 (0.02416)	0.01411 (0.02416)	0.00033 (0.03522)	0.00233 (0.03524)	0.02269 (0.03432)	0.02268 (0.03436)
Regional Characteristics						
Regional Unemployment Rate	0.00251 (0.00184)	0.00250 (0.00184)	0.00570** (0.00267)	0.00571** (0.00267)	-0.00063 (0.00251)	-0.00064 (0.00251)
Gross Value Added in ROR	0.00146** (0.00067)	0.00144** (0.00067)	0.00188* (0.00099)	0.00188* (0.00099)	0.00094 (0.00092)	0.00091 (0.00092)
East-Germany	-0.11176*** (0.01549)	-0.11179*** (0.01548)	-0.16491*** (0.02615)	-0.16453*** (0.02613)	-0.07528*** (0.02415)	-0.07551*** (0.02414)
Other Personality Variables						
Will. to Take Risks (std.)	0.03479*** (0.00453)	0.03498*** (0.00452)	0.03831*** (0.00646)	0.03868*** (0.00645)	0.02998*** (0.00629)	0.03011*** (0.00629)
Openness (std.)	0.01727*** (0.00465)	0.01739*** (0.00465)	0.01668** (0.00706)	0.01663** (0.00707)	0.01736*** (0.00617)	0.01752*** (0.00617)
Conscientiousness (std.)	-0.00414 (0.00432)	-0.00406 (0.00430)	-0.00989 (0.00615)	-0.00894 (0.00612)	0.00358 (0.00614)	0.00341 (0.00612)
Extraversion (std.)	-0.01285*** (0.00469)	-0.01304*** (0.00468)	-0.01996*** (0.00675)	-0.02005*** (0.00675)	-0.00656 (0.00647)	-0.00688 (0.00645)
Agreeableness (std.)	-0.01908*** (0.00441)	-0.01911*** (0.00441)	-0.00848 (0.00625)	-0.00815 (0.00626)	-0.03028*** (0.00617)	-0.03043*** (0.00617)
Neuroticism (std.)	0.01070** (0.00452)	0.01049** (0.00449)	0.01649** (0.00679)	0.01556** (0.00673)	0.00735 (0.00605)	0.00766 (0.00604)
Observations	12,509	12,509	6,140	6,140	6,369	6,369
Pseudo R^2	0.066	0.066	0.078	0.078	0.065	0.065
chi2	834.6	838.0	483.0	482.5	415.2	417.4
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Socio-economic controls	Yes	Yes	Yes	Yes	Yes	Yes
Regional controls	Yes	Yes	Yes	Yes	Yes	Yes
Personality controls	Yes	Yes	Yes	Yes	Yes	Yes

Source: Socio-Economic Panel (SOEP), waves 1999-2011, version 29, doi:10.5684/soep.v29, own calculations.

Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ Standard Errors are clustered on person-level.

Table A.5: Logit Estimation Results: Internal Migration between t and $t + 1$ (Marginal Effects)

	(1)	(2)	(3)	(4)	(5)	(6)
	All	All	Men	Men	Women	Women
	b/se	b/se	b/se	b/se	b/se	b/se
Locus of Control						
LOC Factor (std.)	0.00075 (0.00050)		0.00100 (0.00076)		0.00052 (0.00065)	
LOC Factor > Median		0.00207** (0.00092)		0.00278** (0.00138)		0.00126 (0.00124)
Socio-Economic Characteristics						
Age	-0.00055 (0.00054)	-0.00056 (0.00053)	-0.00098 (0.00080)	-0.00100 (0.00080)	0.00024 (0.00072)	0.00024 (0.00072)
Squared Age	-0.00000 (0.00001)	-0.00000 (0.00001)	0.00000 (0.00001)	0.00000 (0.00001)	-0.00001 (0.00001)	-0.00001 (0.00001)
Female	-0.00077 (0.00106)	-0.00077 (0.00106)				
Married	-0.00567*** (0.00107)	-0.00563*** (0.00106)	-0.00462*** (0.00169)	-0.00463*** (0.00169)	-0.00700*** (0.00153)	-0.00698*** (0.00153)
German	0.00234 (0.00162)	0.00229 (0.00162)	0.00301 (0.00262)	0.00297 (0.00261)	0.00201 (0.00273)	0.00200 (0.00272)
Number of Children in HH	-0.00300*** (0.00066)	-0.00301*** (0.00066)	-0.00236** (0.00094)	-0.00235** (0.00094)	-0.00389*** (0.00094)	-0.00389*** (0.00094)
Disabled	-0.00198 (0.00213)	-0.00201 (0.00213)	-0.00528 (0.00339)	-0.00539 (0.00339)	0.00129 (0.00341)	0.00129 (0.00342)
Home-Owner	-0.01217*** (0.00092)	-0.01218*** (0.00092)	-0.01432*** (0.00167)	-0.01435*** (0.00168)	-0.01359*** (0.00179)	-0.01358*** (0.00179)
Education Years	0.00167*** (0.00019)	0.00166*** (0.00019)	0.00146*** (0.00027)	0.00145*** (0.00027)	0.00177*** (0.00026)	0.00177*** (0.00026)
Net Household Income in KEUR	-0.00052 (0.00035)	-0.00054 (0.00035)	0.00010 (0.00032)	0.00009 (0.00032)	-0.00106* (0.00059)	-0.00107* (0.00059)
Occupational Characteristics						
Unemployment Experience	-0.00069** (0.00035)	-0.00070** (0.00035)	-0.00027 (0.00053)	-0.00028 (0.00053)	-0.00132*** (0.00042)	-0.00133*** (0.00042)
High Skilled Worker	0.00146 (0.00364)	0.00143 (0.00363)	-0.00558 (0.00504)	-0.00556 (0.00503)	0.00943** (0.00450)	0.00946** (0.00450)
Labor Force Status (Ref:Employed)						
Self-Employed	0.00219 (0.00247)	0.00216 (0.00246)	0.00165 (0.00301)	0.00165 (0.00300)	0.00435 (0.00339)	0.00431 (0.00337)
Unemployed	0.00849* (0.00464)	0.00849* (0.00464)	0.00349 (0.00463)	0.00338 (0.00462)	0.01179*** (0.00448)	0.01178*** (0.00449)
Not Working	0.00470 (0.00437)	0.00462 (0.00436)	0.01024* (0.00575)	0.00998* (0.00575)	0.00737 (0.00466)	0.00736 (0.00466)
In Education	0.01485** (0.00631)	0.01477** (0.00628)	0.01077** (0.00486)	0.01059** (0.00485)	0.01172** (0.00483)	0.01173** (0.00483)
Tenure (Ref:0-2 Years)						
3-9 Years	-0.00064 (0.00097)	-0.00064 (0.00097)	-0.00081 (0.00142)	-0.00081 (0.00142)	-0.00054 (0.00137)	-0.00054 (0.00137)
≥ 10 Years	-0.00648*** (0.00114)	-0.00648*** (0.00114)	-0.00789*** (0.00216)	-0.00790*** (0.00216)	-0.00831*** (0.00221)	-0.00831*** (0.00221)
Tenure not available	-0.00020 (0.00267)	-0.00024 (0.00266)	-0.00011 (0.00451)	-0.00003 (0.00450)	0.00014 (0.00339)	0.00009 (0.00339)
Occupational Position (Ref: Blue-Collar)						
White-Collar Worker	0.00248* (0.00146)	0.00246* (0.00146)	0.00138 (0.00192)	0.00134 (0.00192)	0.00458* (0.00245)	0.00458* (0.00244)
Civil Servent	0.00723** (0.00349)	0.00721** (0.00349)	0.00921*** (0.00320)	0.00913*** (0.00320)	0.00233 (0.00392)	0.00231 (0.00391)
Trainee	0.01878*** (0.00622)	0.01881*** (0.00622)	0.01210*** (0.00418)	0.01217*** (0.00419)	0.01335*** (0.00425)	0.01337*** (0.00424)

NACE Industry (Ref: Manufacturing)						
Agriculture	0.00568 (0.00533)	0.00563 (0.00531)	-0.00005 (0.00570)	-0.00010 (0.00568)	0.00886* (0.00531)	0.00882* (0.00531)
Mining, Quarring, Energy, Water	0.00010 (0.00429)	-0.00004 (0.00425)	-0.00201 (0.00576)	-0.00208 (0.00574)	0.00155 (0.00553)	0.00140 (0.00554)
Chemicals, Pulp, Paper	-0.00283 (0.00260)	-0.00282 (0.00260)	-0.00240 (0.00344)	-0.00249 (0.00344)	-0.00436 (0.00438)	-0.00432 (0.00438)
Construction	-0.00419* (0.00234)	-0.00421* (0.00234)	-0.00553* (0.00310)	-0.00555* (0.00310)	0.00182 (0.00481)	0.00182 (0.00481)
Iron/Steel	-0.00231 (0.00273)	-0.00231 (0.00273)	-0.00079 (0.00314)	-0.00079 (0.00314)	-0.01198 (0.00810)	-0.01200 (0.00810)
Textile/Apparel	0.00219 (0.00590)	0.00226 (0.00594)	0.00052 (0.01020)	0.00045 (0.01019)	0.00035 (0.00554)	0.00041 (0.00554)
Wholesale/Retail	0.00068 (0.00211)	0.00071 (0.00211)	0.00207 (0.00266)	0.00214 (0.00265)	-0.00128 (0.00297)	-0.00127 (0.00296)
Transport/Communication	-0.00103 (0.00278)	-0.00105 (0.00277)	0.00237 (0.00322)	0.00236 (0.00321)	-0.00835* (0.00484)	-0.00840* (0.00483)
Public Service	-0.00128 (0.00187)	-0.00128 (0.00186)	0.00088 (0.00224)	0.00088 (0.00224)	-0.00376 (0.00289)	-0.00378 (0.00289)
Financial/Private Services	-0.00021 (0.00200)	-0.00023 (0.00200)	-0.00012 (0.00246)	-0.00016 (0.00246)	-0.00127 (0.00297)	-0.00129 (0.00297)
NACE Industry Not Categorized	-0.00387* (0.00215)	-0.00386* (0.00215)	-0.00243 (0.00304)	-0.00246 (0.00303)	-0.00660* (0.00349)	-0.00661* (0.00349)
NACE Industry not available	-0.00307 (0.00312)	-0.00306 (0.00312)	-0.00416 (0.00408)	-0.00425 (0.00408)	-0.00181 (0.00385)	-0.00180 (0.00385)
Regional Characteristics						
Regional Unemployment Rate	0.00001 (0.00018)	0.00000 (0.00018)	-0.00013 (0.00026)	-0.00014 (0.00027)	0.00017 (0.00025)	0.00017 (0.00025)
Gross Value Added in ROR	-0.00024*** (0.00007)	-0.00024*** (0.00007)	-0.00029*** (0.00010)	-0.00029*** (0.00010)	-0.00019** (0.00009)	-0.00020** (0.00009)
East-Germany	-0.00676*** (0.00151)	-0.00672*** (0.00151)	-0.00940*** (0.00271)	-0.00931*** (0.00271)	-0.00540** (0.00240)	-0.00538** (0.00240)
Other Personality Variables						
Will. to Take Risks (std.)	0.00291*** (0.00057)	0.00292*** (0.00057)	0.00218*** (0.00080)	0.00216*** (0.00080)	0.00349*** (0.00080)	0.00351*** (0.00080)
Openness (std.)	0.00106** (0.00052)	0.00108** (0.00052)	0.00190** (0.00078)	0.00192** (0.00078)	0.00034 (0.00070)	0.00035 (0.00070)
Conscientiousness (std.)	0.00054 (0.00046)	0.00053 (0.00046)	0.00111 (0.00068)	0.00112* (0.00068)	-0.00029 (0.00065)	-0.00029 (0.00064)
Extraversion (std.)	-0.00155*** (0.00048)	-0.00157*** (0.00048)	-0.00273*** (0.00069)	-0.00276*** (0.00069)	-0.00028 (0.00067)	-0.00029 (0.00067)
Agreeableness (std.)	0.00028 (0.00050)	0.00027 (0.00050)	0.00036 (0.00073)	0.00037 (0.00073)	0.00044 (0.00069)	0.00044 (0.00069)
Neuroticism (std.)	0.00060 (0.00049)	0.00063 (0.00049)	0.00074 (0.00075)	0.00077 (0.00074)	0.00072 (0.00066)	0.00073 (0.00064)
Observations	87,469	87,469	42,774	42,774	44,695	44,695
Pseudo R^2	0.123	0.123	0.117	0.117	0.143	0.143
chi2	1705.6	1707.0	880.5	881.8	962.0	962.3
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Regional controls	Yes	Yes	Yes	Yes	Yes	Yes
Socio-economic controls	No	No	Yes	Yes	Yes	Yes
Personality controls	No	No	No	No	Yes	Yes

Source: Socio-Economic Panel (SOEP), waves 1999-2011, version 29, doi:10.5684/soep.v29, own calculations.

Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ Standard Errors are clustered on person-level.

B Theoretical Model

Optimal search effort for unemployed workers

Taking the first derivative of 6 with respect to s gives:

$$c'(s) = \lambda'(s)f(loc) \int_b^\infty [V_e(x) - V_u]dF(x) \quad (B.1)$$

Taking the total differential:

$$\begin{aligned} c''(s)ds &= \lambda''(s)dsf(loc) \int_b^\infty [V_e(x) - V_u]dF(x) \\ &\quad + \lambda'(s)f(loc)dloc \int_b^\infty [V_e(x) - V_u]dF(x) \end{aligned}$$

$$ds(c''(s) - \lambda''(s)f(loc) \int_b^\infty [V_e(x) - V_u]dF(x)) = \lambda'(s)f(loc)dloc \int_b^\infty [V_e(x) - V_u]dF(x)$$

$$\begin{aligned} \frac{ds}{dloc} &= \frac{\lambda'(s)f(loc) \int_b^\infty [V_e(x) - V_u]dF(x)}{(c''(s) - \lambda''(s)f(loc) \int_b^\infty [V_e(x) - V_u]dF(x))} \\ &> 0 \end{aligned} \quad (B.2)$$

Optimal search effort for employed workers

Taking the first derivative of 5 with respect to s gives:

$$c'(s) = \lambda'(s)f(loc) \int_w^\infty [V_e(x) - V_e(w)]dF(x) \quad (B.3)$$

Taking the total differential:

$$\begin{aligned} c''(s)ds &= \lambda''(s)dsf(loc) \int_w^\infty [V_e(x) - V_e(w)]dF(x) \\ &\quad + \lambda'(s)f(loc)dloc \int_w^\infty [V_e(x) - V_e(w)]dF(x) \end{aligned}$$

$$\begin{aligned} \frac{ds}{dloc} &= \frac{\lambda'(s)f(loc) \int_w^\infty [V_e(x) - V_e(w)]dF(x)}{(c''(s) - \lambda''(s)f(loc) \int_w^\infty [V_e(x) - V_e(w)]dF(x))} \\ &> 0 \end{aligned} \quad (B.4)$$