LOCUS OF CONTROL AND INTERNAL MIGRATION

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Locus of Control and Internal Migration*

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Abstract

We model migration across domestic labor markets (internal migration) as the outcome of a job search process in which job seekers form subjective beliefs about the return search effort that are related to their locus of control. Job seekers with an internal locus of control are predicted to search across larger geographic areas and migrate more frequently as a result. We empirically test the relationship between locus of control and the propensity to migrate 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 also migrate more often.

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.*, 2017, 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

[1] Katz *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 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 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, 2017). 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.

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; Lutgen and van der Linden, 2015). 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; Kennan and Walker, 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., Treyz *et al.*, 1993; Parikh and van Leuvensteijn, 2002). 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, modeling

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 modeling 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; Steptoe and Wardler, 2001; Chiteji, 2010; Cobb-Clark *et al.*, 2014; Mendolia and Walker, 2014a); employment-related training (Offerhaus, 2013; Caliendo *et al.*, 2016) and job search (e.g., Caliendo *et al.*, 2015; McGee, 2015; McGee and McGee, 2016).[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 US 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. Section 6 provides a discussion of our main findings and Section 7 concludes the paper.

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,

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

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.

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.

Given this framework, it is not surprising that empirical economists have largely focused on analyzing the way that migration patterns are shaped by skill levels, networks, migration costs and macro-economic conditions.[3] People's propensity to migrate has been linked to their 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; 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

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

(Wozniak, 2010), labor productivity (Alecke *et al.*, 2010), public safety (e.g., Sampson and Wooldredge, 1986), social assistance (e.g., Enchautegui, 1997; Giulietti 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).

Sociologists, demographers, and psychologists, on the other hand, all have a long tradition of studying the psychosocial traits that lead some individuals to be more likely to migrate irrespective of the economic conditions. 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 Koeppel, 1974; Jokela, 2009) and agreeableness (Jokela, 2009).[4] 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. Early studies simply ignored any uncertainty associated with employment opportunities in either the sending or destination labor market rendering the migration decision to 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. Kennan and Walker (2011), for example, model the optimal migration trajectory in the context of a dynamic search problem with multiple destination choices. Critically, however, migration is assumed to take place before destination wages are realized making the migration decision a function of expected income (see e.g., Treyz *et al.*, 1993; Borjas, 1999; Fuchs-Schündeln and Schündeln, 2009; Alecke *et al.*, 2010; Kennan and Walker, 2011).

[4]See Boneva and Frieze (2001); Frieze and Li (2010) for a review.

Effectively, the job search process boils down to a simple draw from the destination wage distribution.

In contrast, urban and labor economists view residential moves and job changes as being mutually dependent. Lutgen and van der Linden (2015), for example, propose a model in which unemployed job seekers search across multiple regions and decide to migrate whenever they receive an acceptable job offer outside their local labor market. 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 locus of control into an economic model of internal migration that accounts for job search. 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 might 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. 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. Unlike standard job search models, however, 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.[5] We then extend this model to consider the implications of allowing potential migrants to engage in job search related to their locus of control.

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:

$$\begin{aligned} p_A w_{Ai} - p_O w_{Oi} - C &\geqslant 0 \\ (p_A \beta_A - p_O \beta_O) x_i - C &\geqslant 0, \end{aligned} \tag{1}$$

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. 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.[6] There are no administrative (legal) 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

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

[6] This 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.

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. In the literature, bidirectional migration flows are usually introduced by idiosyncratic shocks. This often goes along with the assumption that these shocks are independent of observed characteristics and uncorrelated over time (see e.g. Nenov (2015) for a recent contribution that assumes idiosyncratic preference shocks for the migration decision).

3.2 A Model of Internal Migration with Spatial Job Search

We now consider a model in which employed and unemployed workers move to another region if they receive a job offer in that region which is above their reservation wage.

The probability of receiving a job offer depends on the job search effort s. Empirical researchers typically measure search intensity as: i) the number of applications made within a specific time frame (Caliendo *et al.*, 2015); 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. While the internet has reduced the information cost differential associated with searching in remote vs. local labor markets, workers will have additional knowledge about local firms and better access to local networks, job search agencies, and the like, all of which, everything else equal, facilitate local search. Searching over a greater geographic distance requires that workers increase their search effort. This implies that the geographic distance between the origin and alternative regions will be a function of search intensity with $\frac{\partial D}{\partial s} > 0$.[7]

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 control, i.e. the degree to which they believe that there is a causal link between their own

[7]See Guglielminetti *et al.* (2015) who also develop a model of spatial job search in which search in remote areas is more costly. Job seekers take this into account when making decisions over their search intensity and search range. Based on recent data, Skandalis (2019) provides evidence that job seekers who apply for jobs in reaction to media stories that plants need to hire a lot of workers live relatively far away from the growing plant, while job seekers living close to these plants do not apply for jobs in response to these stories with a higher probability. These findings suggest that information frictions increase with geographical distance.

actions (search) and future outcomes (offer arrivals).

Subjective beliefs are given by $\tilde{\lambda}(s, loc)$, 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. $\frac{\partial^2 \tilde{\lambda}(s,loc)}{\partial s \partial loc} > 0$.

Caliendo *et al.* (2015) present a job search model for unemployed workers which relies on the same assumption, while Ahn (2015) applies the same idea to an on-the-job search model for employed workers. Here we allow individuals to search for jobs both during unemployment and on the job. For simplicity, we assume that the search process does 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.

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 Ahn, 2015; Caliendo *et al.*, 2015):

$$\frac{\partial s^*}{\partial loc} > 0. \tag{2}$$

Given the relationship between search effort and geographic search area, this implies that individuals 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. $\frac{\partial D}{\partial loc} = \frac{\partial D}{\partial s^*} * \frac{\partial s^*}{\partial loc} > 0$. Although we cannot test this directly using SOEP data, we conduct an ancillary analysis of unemployed German job seekers using an alternative data source – the IZA Evaluation Dataset (Arni *et al.*, 2014).[8] We find in Table B.2 that internal job seekers have an average

[8]The IZA Evaluation Dataset contains survey information for a sample of individuals who entered unemployment in 2007 and 2008 in Germany. A nine percent random sample from the monthly unemployment inflows was selected for interview. In wave 1, 17,396 interviews were completed. A detailed discussion of our ancillary analysis including information about the IZA Evaluation Dataset, variable measurement, estimation strategy as well as descriptive statistics and full estimation results can be found in Appendix B.

maximum search distance (234 km) which is larger than that of their external counterparts (130 km). Moreover, estimation of a series of logit models with a rich set of controls reveals that internal job seekers are also significantly more likely to apply for jobs that would require a residential move (see Table B.4). By searching more intensively across a broader geographic region, those with an internal locus of control are expected to be more likely to apply for – and be offered – jobs outside of their local labor markets.

Taken together, our proposed model about spatial job search and internal migration predicts a positive relationship between the locus of control and the probability of moving to another region.

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, population density and unemployment rates.[9]

We restrict our study period to 1999-2015, as regional information are not available after 2015 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 six 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.

We include all person-year observations available from the panel structure of the SOEP and consider this in our estimations using clustered standard errors. Thus, our estimation sample consists of 109,234 observations (53,141 men and 56,093 women) for 16,241 individuals

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

(7,746 men and 8,495 women). See Table A.1 in the Appendix for an overview of the sample loss associated with each selection criteria; Table A.3 summarizes the key descriptive statistics for the sample.

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, 2015). 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 1999-2015.[10] 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, 2009 and 2014. In these three years, respondents were asked *"Could you imagine moving away from here because of family or career reasons?"*. We use this information to create a

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

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 11,003 (17,181) individuals (observations).

4.2 Measuring Locus of Control

In 1999, 2005, 2010 and 2015, 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, 2010 and 2015 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".[11] We conduct an explanatory factor analysis separately by year in order to investigate the way these items load onto latent factors.[12] 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, 2016; 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, 2016). Our locus-of-control index LOC_{it} is therefore increasing in internal locus of control and its distribution is shown in Figure A.1 in the Appendix.[13]

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

[11] This process preserves the relative difference between individuals, 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 2005-2015 seven-point scales.

[12] The loading plots and the detailed results from the factor analysis are available upon request.

[13] A 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).

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, migration in 2011-2014 depends on 2010 locus of control and migration 2015-2016 depends on 2015 locus of control. In addition to the 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, 1.5 percent of the individuals in our sample moved across regions between t and $t+1$ with men (1.5 percent) being slightly more likely to migrate than women (1.4 percent)(see Table 1). Moreover, one in four individuals (25.1 percent) report that they are definitely willing to migrate for family or career reasons, while a further 43.0 percent report that they would consider migrating under some circumstances. Those with an internal locus of control are significantly more likely (1.7 percent) to move across regions than are those who are external (1.3 percent). This pattern is also supported by the kernel densities computed separately for movers and non-movers in Figure A.1 (bottom panel). Similarly, 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 24.0 percent of non-migrants report a willingness to migrate, nearly 71.0 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. 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:

$$P(W_{it} = 1) = P(\theta_1 + \theta_2 LOC_{it} + \theta_3 X_{it} + \theta_4 PT_i + \tau_1 R_{it} + \tau_2 T + \epsilon_{it} > 0) \quad (3)$$

$$P(M_{it+1} = 1) = P(\beta_1 + \beta_2 LOC_{it} + \beta_3 X_{it} + \beta_4 PT_i + \gamma_1 R_{it} + \gamma_2 T + \eta_{it} > 0) \quad (4)$$

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} is locus of control and θ_2 and β_2 are our parameters of interest. We generate interpretable estimates of θ_2 and β_2 by constructing our locus of control measure such that it is predetermined at the time of the migration decision in order to minimize concerns about reverse causality. In addition, we include a detailed set of controls to reduce the potential for unobserved heterogeneity (omitted variable bias) to confound our estimates. Hence, X_{it} includes standard socio-demographic characteristics (such as gender, age, nationality, marital status, number of children, household income, home ownership, and disability status) as well as controls for education (school degree, vocational education, university degree) and job characteristics (current labor force status, occupational classification, tenure and unemployment experience). PT_{it} is a vector of individual personality traits averaged over all years (Big Five traits and risk attitudes). Finally, R_{it} captures regional conditions (dummy for East Germany, unemployment rates, gross value added and population density in the origin region) and T is a vector of year-dummies.

All 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). Some of our controls (e.g. employment history or education) may themselves be a function of locus of control. We will investigate the robustness of our results by leaving out these potentially endogenous regressors from our regressions in Section 5.3.

Equations 3 and 4 are estimated using logit models with standard errors clustered at the person level. All estimated effects are presented as average marginal effects in percentage points. 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). Controlling for personality traits and risk aversion leads to an increase in the estimated effects of locus of control (see columns 3 vs. 5 and 4 vs. 6 respectively).

Insert Table 2 about here.

Specifically, each standard deviation increase in individuals' internal control tendencies results in a one percentage point (p.p.) 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 2.5 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, 25.1 percent of our estimation sample reports being prepared to migrate implying that the disparity associated with locus control amounts to a difference of approximately 10.0 percent. This is of the same order of magnitude as having an university degree (3.3 p.p), being a white-collar worker (2.3 p.p.), or being married (-3.1 p.p.) and is larger than the effect associated with having an additional 1,000 Euro in household income (0.4 p.p) (see Table A.4 in the Appendix for full estimation results). The relationship between willingness to move and locus of control is generally stronger for men than for women. Men with an internal locus of control, i.e. those above the median, are 3.4 percentage points more likely to report being willing to move (relative to those with an external locus of control) while the effect for women is only 1.6 percentage points.

Insert Table 3 about here.

Turning to Table 3, we see that 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 0.2 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 1.5 percent. Thus, the estimated effect of an internal locus of control translates into a 13.0 percent higher probability of moving. This is comparable to the effect of an additional child in the household (-0.3 p.p.) and is larger than the effect of two more years of unemployment experience (-0.2 p.p.) (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.

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. For example, controlling for personality traits (Big Five) and risk aversion does not change the estimated effect of the binary indicator for the full sample (column 6 vs. 4). The effect for the continuous measure slightly decreases and becomes insignificant, but is qualitatively very similar (column 5 vs. 3). For the sample of men the point estimates are even increasing after controlling for personality traits and risk aversion, while they are decreasing in the sample of women. 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).

Secondly, the overall relationship between internal migration and locus of control is largely driven by men. Men with an internal locus of control are not only more likely to report a willingness to move than are men with an external locus of control, they are on average also 17.3 percent (0.3 p.p.) more likely to migrate than external men. At the same time locus of control is not significantly related to the migration behavior of women.[14] These

[14]Interestingly, in our anciliary analysis of unemployed job-seekers, the effect of locus of control is stronger

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.*, 2015), employment-related training (Offerhaus, 2013; Caliendo *et al.*, 2016), selection into jobs with performance appraisal (Heywood *et al.*, 2017), and entrepreneurship (Hansemark, 2003).

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 and a significantly negative 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, being a home-owner or having more than three 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 population density.

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, iii) the exclusion of potentially endogenous variables and iv) controls for earlier moves. Our focus is on the estimated association of our dichotomous measure of internal locus of control with actual migration decisions. All sensitivity results are summarized in Table 4 and are based on the full specification (column 6 in Table 3).

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 four-way

on the migration decisions of women than those of men (see Table B.4). This is likely driven by the selectivity of women into the IZA sample. Whereas 66 percent of the women in the SOEP are married/live with a partner, this is true for only 44 percent of women in the IZA data, making them less likely to be "tied movers".

classification of internal locus of control, namely low ($< 25^{th}$ percentile), lower medium (25^{th} - 50^{th} percentile), upper medium (50^{th} - 75^{th} percentile) and high ($> 75^{th}$ 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 (Panel A, (3) in Table 4). Finally, although it can be argued that locus of control is relatively stable in adulthood, we nevertheless want to investigate whether our results hold if we rely only on between individual rather then also within individual variation in locus of control. Consequently, we re-estimate our models using only the first available measure of locus of control for each individual. The estimated effects using this alternative imputation are even more pronounced than in the baseline specification (see Panel A, (4) 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, 2009 and 2014. 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 migrate is closely linked to actual migration behavior. Individuals who report a willingness to move have a probability of actually migrating that is fully 1.1 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 a specification that uses a three-way categorical measure of the willingness to move, rather than a simple indicator.

Additionally, 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. The inclusion of these endogenous controls in the analysis is likely to introduce selectivity bias (see e.g., Angrist and Pischke, 2008, p.34). To

gauge the importance of these endogenous controls, we re-estimate our models excluding educational attainment and employment information from the regression (Panel C in Table 4). 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 0.2 to 0.3 percentage points, which is equivalent to an increase from 13 percent to 20.8 percent. For men the increase is from 0.3 to 0.4 percentage points (17.2 percent to 26.3 percent) and for women the increase is from 0.1 to 0.2 percentage points (from 8.8 percent to 14.7 percent), making the association significant.

Finally, we investigate whether our results change when we control for previous migration. Having moved once in life probably makes a second move more likely. This is why we include the number of earlier moves as a control into the model (see Panel D in Table 4).[15] As expected, having moved before is associated with a positive increase in the probability of moving again. However, the estimated effect for LOC is stable and only changes slightly. Previous migration behavior is likely to be correlated with unobserved characteristics which affect the migration decision and which are potentially correlated with locus of control. Therefore, the stability of our results makes us confident that locus of control is not only reflecting differences in other unobserved characteristics. Previous migration behavior, however, is obviously an endogenous variable, and therefore we prefer to not include these in our main specifications.

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 Discussion

There is substantial evidence that perceptions of control are related to human capital investment decisions through the returns that individuals expect (see Cobb-Clark, 2015). This makes it quite natural to link locus of control to internal migration through the expected returns to job search as we have done here. This conceptual link is also consistent with descriptive evidence that those with an internal locus of control are significantly: i) more likely to view finding a new job as "easy"; ii) less likely to believe finding a new job will be "difficult"

[15] Earlier moves refer to the total number of observed moves between regions for an individual while being observed in the SOEP.

or "impossible";[16] iii) more likely to migrate for work-related reasons;[17] iv) move over greater distances; and v) are more likely to move across regions (see Table 5). These differences between those with an internal and an external locus of control hold if we control for observed characteristics (see Table A.6). Migrants with an internal locus of control are significantly more likely to make inter-regional moves, leaving them to migrate over significantly greater distances on average.[18]

Insert Table 5 about here.

Despite the logic of the endeavor, however, we cannot completely rule out the possibility that locus of control may operate through some other mechanism. Our theoretical predictions are observationally equivalent, for example, if we instead assume that having an internal locus of control raises the efficiency of job search.

At the same time, our results are not consistent with a model in which locus of control operates solely through labor market productivity, i.e. through wages. Were this the case, internal migration would be driven by differences in the return to control perceptions across labor markets. Those with an internal locus of control would be pulled towards markets with high returns to being internal, while those with an external locus of control would be pulled in the opposite direction. This internal migration would contribute to equalizing the return to locus of control across labor markets until, in equilibrium, we would expect no relationship between locus of control and migration.

Nor does it seem likely that locus of control simply captures the effects of lower migration costs. There is very little reason to believe that the monetary costs of migration (e.g. moving expenses, buying and selling houses, etc.) are related to individuals' locus of control. Bauernschuster *et al.* (2014), however, argue that lower psychic migration costs 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. If internal locus of control affects

[16]The question is asked for employed/self-employed as well as unemployed individuals in a nearly identical way. While unemployed individuals are asked "If you were currently looking for a new job: Is it or would it be easy, difficult, or almost impossible to find an appropriate position?", all other individuals respond to the question "If you lost your job today, would it be easy, difficult, or almost impossible for you to find a new job that is at least as good as your current one?"

[17]Individuals who moved residence are asked to indicate what the reason for their move was with "work reasons" being one of the multiple options.

[18]Moving Distance is a generated variable provided by the SOEP which is based on the address data of the new and old residential location.

internal migration by lowering the psychic costs of migration, internal individuals will have a greater incentive to migrate regardless of the relative timing of migration and job search. However, to the extent that self-assessed willingness to move captures heterogeneity in the psychic costs of migration, our empirical results imply 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.

Future research which assessed the empirical support for these alternative explanations and the apparent differences in the behavior of men and women would be useful in furthering our understanding of the mechanisms linking locus of control and internal migration.

7 Conclusions

Internal migration is intrinsically linked to economic opportunity, social conditions, and demographic change, making it one of the most commonly studied phenomenon in the social sciences. Our objective is to develop a more nuanced understanding of the process of internal migration by drawing together several strands of the literature. Specifically, we model internal migration as the result of a job search process. This model implies that those characteristics that facilitate geographically broader job search – such as an internal locus of control – will lead to multidirectional internal migration, i.e. an increased propensity to migrate overall.

This relationship between internal migration and job search 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.

Compliance with Ethical Standards

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Tables and Figures

Table 1: Descriptives of Outcome Variables by Locus of Control

	All	Externals	Internals	t-test p-values
All				
Internal Migration between t and $t+1$	0.0146	0.0127	0.0165	0.000
	[109,234]	[54,720]	[54,514]	
Could Imagine Moving Away				
No	0.32	0.33	0.31	0.007
It Depends	0.43	0.44	0.42	0.069
Yes	0.25	0.23	0.27	0.000
	[17,181]	[8,559]	[8,622]	
Men				
Internal Migration between t and $t+1$	0.0148	0.0129	0.0166	0.000
	[53,141]	[25,599]	[27,542]	
Could Imagine Moving Away				
No	0.31	0.32	0.30	0.042
It Depends	0.43	0.44	0.42	0.074
Yes	0.26	0.24	0.28	0.000
	[8,362]	[4,014]	[4,348]	
Women				
Internal Migration between t and $t+1$	0.0144	0.0125	0.0165	0.000
	[56,093]	[29,121]	[26,972]	
Could Imagine Moving Away				
No	0.33	0.33	0.32	0.086
It Depends	0.43	0.44	0.43	0.443
Yes	0.24	0.23	0.25	0.006
	[8,819]	[4,545]	[4,274]	

Source: Socio-Economic Panel (SOEP), waves 1999-2015, version 33, doi:10.5684/soep.v33, own calculations.
Notes: All numbers are shares unless stated otherwise.
Number of observations in square brackets.
Last column contains the p-values of the t-test for mean equality between Externals and Internals.

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

	(1)	(2)	(3)	(4)	(5)	(6)
All Individuals						
LOC Factor (std.)	1.171***		0.859**		1.030***	
	(0.351)		(0.354)		(0.369)	
LOC Factor > Median		2.910***		2.052***		2.462***
		(0.685)		(0.684)		(0.695)
Observations	17,181	17,181	17,181	17,181	17,181	17,181
Pseudo R^2	0.015	0.015	0.057	0.057	0.065	0.065
Men						
LOC Factor (std.)	1.742***		1.380***		1.678***	
	(0.508)		(0.515)		(0.543)	
LOC Factor > Median		3.759***		2.885***		3.443***
		(0.998)		(0.993)		(1.008)
Observations	8,362	8,362	8,362	8,362	8,362	8,362
Pseudo R^2	0.024	0.024	0.071	0.071	0.081	0.081
Women						
LOC Factor (std.)	0.545		0.387		0.450	
	(0.484)		(0.485)		(0.501)	
LOC Factor > Median		1.941**		1.320		1.629*
		(0.938)		(0.937)		(0.958)
Observations	8,819	8,819	8,819	8,819	8,819	8,819
Pseudo R^2	0.008	0.008	0.052	0.052	0.059	0.060
Year Fixed-Effects	✓	✓	✓	✓	✓	✓
Regional Controls	✓	✓	✓	✓	✓	✓
Socio-Economic Controls			✓	✓	✓	✓
Personality Controls					✓	✓

Source: Socio-Economic Panel (SOEP) 1999-2015, version 33, doi:10.5684/soep.v33, own calculations.
Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Marginal effects are reported in percentage points.
Standard Errors in parentheses. Standard Errors are clustered on person-level.
Full estimation results for specification (6) can be found in table A.4, in Appendix A.
The full estimation results for specifications (1) - (5) can be obtained from the authors.

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

	(1)	(2)	(3)	(4)	(5)	(6)
All Individuals						
LOC Factor (std.)	0.152***		0.072*		0.064	
	(0.042)		(0.043)		(0.046)	
LOC Factor > Median		0.365***		0.189**		0.189**
		(0.082)		(0.081)		(0.083)
Observations	109,234	109,234	109,234	109,234	109,234	109,234
Pseudo R^2	0.004	0.004	0.127	0.127	0.130	0.130
Men						
LOC Factor (std.)	0.123**		0.067		0.077	
	(0.062)		(0.066)		(0.070)	
LOC Factor > Median		0.355***		0.225*		0.250**
		(0.120)		(0.123)		(0.126)
Observations	53,141	53,141	53,141	53,141	53,141	53,141
Pseudo R^2	0.005	0.005	0.118	0.118	0.120	0.121
Women						
LOC Factor (std.)	0.172***		0.075		0.052	
	(0.056)		(0.056)		(0.061)	
LOC Factor > Median		0.365***		0.150		0.125
		(0.113)		(0.108)		(0.111)
Observations	56,093	56,093	56,093	56,093	56,093	56,093
Pseudo R^2	0.006	0.006	0.147	0.147	0.150	0.151
Year Fixed-Effects	✓	✓	✓	✓	✓	✓
Regional Controls	✓	✓	✓	✓	✓	✓
Socio-Economic Controls			✓	✓	✓	✓
Personality Controls					✓	✓

Source: Socio-Economic Panel (SOEP) 1999-2015, version 33, doi:10.5684/soep.v33, own calculations.
Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Marginal effects are reported in percentage points.
Standard Errors in parentheses. Standard Errors are clustered on person-level.
Full estimation results for specification (6) can be found in table A.5, in Appendix A.
The full estimation results for specifications (1) - (5) can be obtained from the authors.

Table 4: Sensitivity Analysis (Marginal Effects): Internal Migration between t and $t+1$

	All	Men	Women
Baseline Results			
LOC Factor > Median	0.189**	0.251**	0.126
	(0.083)	(0.127)	(0.111)
Observations	109,234	53,141	56,093
A. Alternative LOC Specifications			
(1) Alternative Dichotomous Variable			
LOC Factor > Mean	0.177**	0.268**	0.124
	(0.083)	(0.125)	(0.111)
(2) Finer Distinction			
$(LOC_{P25}, LOC_{P50}]$	0.052	-0.014	0.136
	(0.111)	(0.161)	(0.154)
$(LOC_{P50}, LOC_{P75}]$	0.226*	0.238	0.152
	(0.118)	(0.179)	(0.153)
$(LOC_{P75}, LOC_{max}]$	0.209*	0.247	0.262
	(0.118)	(0.180)	(0.159)
(3) Simple Index LOC Calculation[a]			
LOC Index > Median	0.170**	0.256**	0.082
	(0.085)	(0.126)	(0.113)
(4) First LOC Observation[b]			
LOC Index > Median	0.212**	0.365***	0.111
	(0.085)	(0.125)	(0.116)
Observations	109,234	53,141	56,093
B. Willingness to Move as Intermediate[c]			
LOC Factor > Median	0.153*	0.241*	0.071
	(0.084)	(0.127)	(0.113)
Dummy for Willingness to Move (imp.)	1.130***	0.925***	1.287***
	(0.093)	(0.133)	(0.131)
Observations	105,446	51,027	54,222
C. Excluding Potentially Endogenous Control Variables[d]			
LOC Factor > Median	0.303***	0.389***	0.212*
	(0.082)	(0.125)	(0.112)
Observations	109,234	51,224	54,222
D. Control for Earlier Moves			
LOC Factor > Median	0.164**	0.243**	0.086
	(0.080)	(0.121)	(0.106)
Number of Earlier Moves	0.605***	0.665***	0.523***
	(0.043)	(0.066)	(0.057)
Observations	109,234	53,141	56,093
Year Fixed-Effects	✓	✓	✓
Regional Controls	✓	✓	✓
Socio-Economic Controls	✓	✓	✓
Personality Controls	✓	✓	✓

Source: Socio-Economic Panel (SOEP), waves 1999-2015, version 33, doi:10.5684/soep.v33, own calculations.

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Marginal effects are reported in percentage points. Standard Errors in parentheses. 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 + I10)]/8 where R indicates that all external items are reversely coded.

[b] The LOC is imputed forward from the first LOC observation available for the individual in the SOEP, i.e. 1999 or later if individuals enter the sample after 1999 or have a missing LOC in 1999.

[c] 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, the observation from 2009 is imputed into the years 2010 - 2013 and the observation from 2014 is imputed into the year 2015.

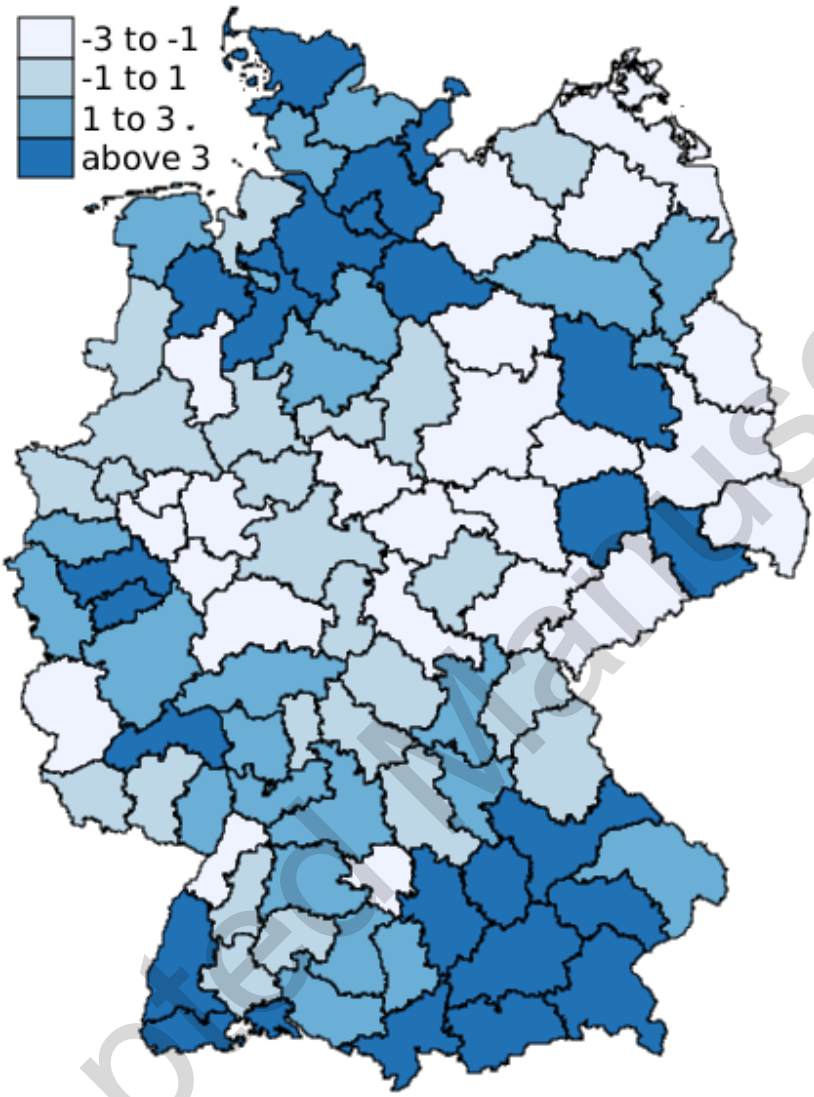
[d] In this specification we exclude all controls for education and labor-market situation and history.

Table 5: Descriptives: Context of Moving

	All	Externals	Internals	t-test p-values
(1) Difficulty Level of Finding an Appropriate Position				
Easy	0.19	0.15	0.24	0.000
Difficult	0.61	0.62	0.59	0.000
Impossible	0.16	0.19	0.14	0.000
Observations	109,234	54,720	54,514	
(2) Reason of Moving – Sample: All Movers[a]				
Work Reasons	0.13	0.12	0.15	0.001
Observations	6,140	3,065	3,075	
(3a) Moving Distance – Sample: All Movers[a]				
Distance in km	34.40	29.67	39.04	0.000
Observations	7,705	3,814	3,891	
(3b) Share of Regional Movers – Sample: All Movers[a]				
Inter-regional Move	0.19	0.16	0.21	0.000
Observations	7,705	3,814	3,891	

Source: Socio-Economic Panel (SOEP), waves 1999-2015, version 33, doi:10.5684/soep.v33, own calculations.
Notes: All numbers are shares unless stated otherwise. Last column contains the p-values of the t-test for mean equality between Externals and Internals.
[a] The sample consists of all individuals who indicate that they moved residence in the interview in $t + 1$, including all inter- and intra-regional moves.

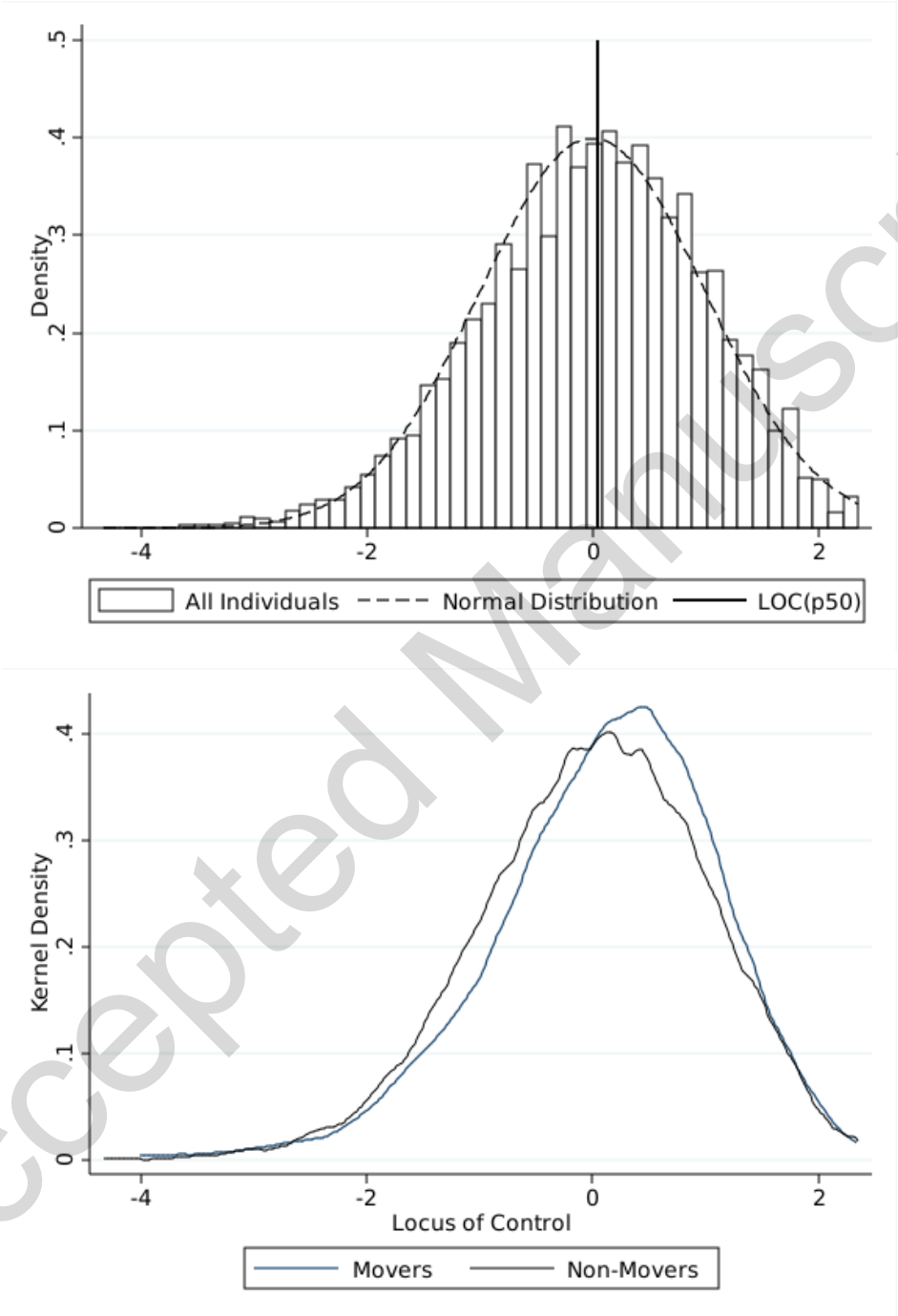
Figure 1: Average Net Migration 1999-2015 in Local Labor Markets, per 1000 inhabitants



Source: INKAR 2018, own illustration

A Appendix

Figure A.1: Distribution of Locus of Control



Source: SOEP waves 1999-2015, version 33, own illustration

Notes: Bottom Panel provides the graphical illustration of the kernel density estimates using the Epanechnikov kernel function separately for Movers and Non-Movers.

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

Step	Estimation Sample	
	Observations	Individuals
Full Sample (1999-2015)	647,304	100,409
Sample Restriction		
- Drop Younger 25, Older 55	279,956	48,833
- Drop Pensioneers, Mat. Leave, Milit. Service	268,190	48,347
Item Non-Response		
- Migration Variable	244,087	45,570
- Locus of Control	138,100	27,419
- Socio-Economic Controls	122,562	25,498
- Personality Control	109,234	16,241
Sub-Sample for Willingness to Move (1999, 2009 & 2014)[a]	17,181	11,003

Source: Socio-Economic Panel (SOEP), waves 1999-2015, version 33, doi:10.5684/soep.v33, own calculations.
Notes: The full sample contains all available SOEP observations between 1999 and 2015 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]	Wave 2005/10/15[b]
Components of locus of control (Mean, 1999 Scale: 1-4, 2005/10/15 Scale: 1-7)		
I1: How my life goes depends on me	3.28	5.50
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	3.42
I4: If one is soc. or polit. active, one can have an effect on social conditions[c]	2.29	3.69
I5: I freq. have the experience that others have a controlling influence over my life (R)	2.00	3.14
I6: One has to work hard in order to succeed	3.46	5.93
I7: If I run up against difficulties in life, I often doubt my own abilities (R)	2.03	3.26
I8: Opportunities I have in life are determined by the social conditions (R)	2.69	4.48
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
Observations	5,419	23,276

Source: Socio-Economic Panel (SOEP), waves 1999-2015, version 33, doi:10.5684/soep.v33, 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	t-test p-value	Non-Migrants	Migrants	t-test p-value	Non-Migrants	Migrants	t-test p-value
Willingness to Migrate[a]	0.24	0.71	0.000	0.25	0.66	0.000	0.23	0.75	0.000
Locus of Control[b]	4.33	4.44	0.000	4.38	4.46	0.014	4.29	4.41	0.000
Socio-Economic Charactersitics									
Age	41.39	34.55	0.000	41.29	34.74	0.000	41.48	34.36	0.000
Married	0.66	0.33	0.000	0.65	0.36	0.000	0.67	0.30	0.000
Number of Children in Household	0.73	0.42	0.000	0.73	0.42	0.000	0.72	0.43	0.000
German	0.92	0.95	0.000	0.92	0.94	0.060	0.92	0.95	0.001
East-Germany	0.27	0.24	0.016	0.27	0.23	0.003	0.27	0.26	0.614
Disabled	0.06	0.04	0.000	0.07	0.04	0.001	0.05	0.03	0.016
Home-Owner	0.52	0.21	0.000	0.52	0.23	0.000	0.51	0.19	0.000
School Degree									
No Degree	0.02	0.01	0.037	0.02	0.01	0.219	0.02	0.01	0.085
Lower Secondary School	0.24	0.14	0.000	0.28	0.17	0.000	0.21	0.11	0.000
Intermediate School	0.37	0.28	0.000	0.33	0.27	0.000	0.41	0.29	0.000
Highschool	0.30	0.55	0.000	0.32	0.52	0.000	0.29	0.57	0.000
Vocational Education									
No Vocational Education	0.28	0.42	0.000	0.27	0.40	0.000	0.29	0.43	0.000
Apprenticeship	0.45	0.36	0.000	0.48	0.41	0.000	0.43	0.31	0.000
Higher Technical College	0.27	0.22	0.000	0.25	0.19	0.000	0.28	0.25	0.093
University or College Degree	0.24	0.37	0.000	0.24	0.36	0.000	0.23	0.39	0.000
Net Household Income in KEUR	3.02	2.60	0.000	3.02	2.70	0.000	3.02	2.51	0.000
Occupational Characteristics									
Labor Market Status									
Employed	0.77	0.72	0.000	0.80	0.73	0.000	0.74	0.71	0.014
Self-Employed	0.08	0.07	0.209	0.10	0.09	0.101	0.06	0.06	0.969
Unemployed	0.07	0.09	0.000	0.07	0.09	0.042	0.07	0.10	0.000
Not Working	0.06	0.04	0.001	0.01	0.02	0.005	0.11	0.07	0.000
In Education	0.01	0.07	0.000	0.01	0.08	0.000	0.01	0.07	0.000
Unemployment Experience in Years	0.98	0.83	0.008	0.92	0.88	0.628	1.05	0.79	0.001
Tenure in Current or Last Job									
$<$ 3 Years	0.32	0.54	0.000	0.27	0.50	0.000	0.37	0.59	0.000
3-9 Years	0.27	0.31	0.000	0.26	0.33	0.000	0.27	0.29	0.177
$\geq$ 10 Years	0.38	0.13	0.000	0.44	0.16	0.000	0.33	0.10	0.000

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	All			Male			Female		
	Non-Migrants	Migrants	t-test p-value	Non-Migrants	Migrants	t-test p-value	Non-Migrants	Migrants	t-test p-value
High Skilled Worker	0.18	0.22	0.000	0.26	0.27	0.488	0.11	0.18	0.000
Occupation Position									
Blue-Collar Worker	0.25	0.13	0.000	0.34	0.21	0.000	0.15	0.06	0.000
White-Collar Worker	0.46	0.48	0.130	0.39	0.41	0.244	0.53	0.55	0.266
Civil Servent	0.06	0.08	0.006	0.07	0.09	0.044	0.05	0.07	0.070
Trainee	0.01	0.03	0.000	0.01	0.03	0.000	0.01	0.02	0.000
Regional Characteristics									
Unemployment Rate in Region	9.37	9.30	0.520	9.39	9.25	0.396	9.36	9.34	0.946
Gross Value Added in Region	53.19	53.94	0.005	53.10	53.76	0.083	53.27	54.10	0.027
Population Density in 100 People	5.27	5.98	0.000	5.22	5.66	0.095	5.32	6.28	0.000
Other Personality Variables									
Willingness to Take Risks[c]	4.60	5.04	0.000	5.06	5.36	0.000	4.16	4.73	0.000
Openness[c]	4.48	4.69	0.000	4.37	4.60	0.000	4.58	4.79	0.000
Conscientiousness[c]	5.92	5.78	0.000	5.85	5.71	0.000	5.98	5.85	0.000
Extraversion[c]	4.84	4.90	0.023	4.70	4.71	0.925	4.97	5.08	0.001
Agreeableness[c]	5.35	5.35	0.834	5.19	5.23	0.139	5.51	5.46	0.092
Neuroticism[c]	3.84	3.81	0.184	3.59	3.53	0.114	4.08	4.07	0.838
Observations	107,636	1,598		52,353	788		55,283	810	
Individuals	16,133	1,302		7,698	632		8,435	670	

Source: Socio-Economic Panel (SOEP), waves 1999-2015, version 33, doi:10.5684/soep.v33, own calculations.
Notes: All numbers are shares unless stated otherwise. The p-values refer to a t-test for mean equality between Non-Migrants and Migrants.
[a] Willingness to move has only 17,181 observations for 11,003 individuals.
[b] For this table, locus of control was adjusted to just have positive values by subtracting the lowest possible value.
[c] Willingness to Take Risks is measured on a Likert-Scale from 0 (= Risk-averse) to 10 (= Risk-prone) and the 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.

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

	All	Men	Women
LOC Factor > Median	2.462***	3.440***	1.629*
	(0.695)	(1.006)	(0.957)
Socio-Economic Characteristics			
Age	-1.417***	-2.027***	-0.843
	(0.402)	(0.583)	(0.556)
Squared Age	0.017***	0.024***	0.009
	(0.005)	(0.007)	(0.007)
Female	-0.280		
	(0.851)		
Married	-3.135***	-2.765**	-4.041***
	(0.858)	(1.245)	(1.134)
German	-2.070	0.217	-4.225**
	(1.449)	(2.006)	(1.916)
Number of Children in HH	-0.445	0.620	-1.540**
	(0.424)	(0.598)	(0.608)
Disabled	1.020	0.894	1.145
	(1.444)	(1.956)	(2.030)
Home-Owner	-9.539***	-10.474***	-8.384***
	(0.778)	(1.090)	(1.078)
Net Household Income in KEUR	0.413*	-0.195	0.900***
	(0.224)	(0.331)	(0.319)
Highest School Degree (Ref: Lower or Intermediary School)			
No Degree	-0.597	1.909	-3.083
	(2.326)	(3.280)	(3.391)
Highschool Degree	4.965***	2.494	6.766***
	(1.055)	(1.538)	(1.308)
Vocational Education (Ref: Non)			
Apprenticeship	0.147	0.764	-0.496
	(0.937)	(1.351)	(1.308)
Higher Technical College	1.387	1.856	0.884
	(1.028)	(1.530)	(1.357)
University or College Degree	3.286***	2.461	3.615**
	(1.166)	(1.689)	(1.485)
Occupational Charactersitics			
Unemployment Experience	0.196	-0.039	0.297
	(0.186)	(0.289)	(0.244)
High Skilled Worker	3.379***	4.801***	1.345
	(1.086)	(1.364)	(1.622)
Labor Force Status (Ref: Employed)			
Self-Employed	4.098**	3.885*	5.367**
	(1.611)	(2.010)	(2.269)
Unemployed	5.493***	3.740	7.264***
	(1.814)	(2.431)	(2.263)
Not Working	2.841	12.131***	1.910
	(1.853)	(4.476)	(2.108)
In Education	22.817***	26.792***	13.578***
	(3.643)	(4.141)	(3.972)
Tenure (Ref: 0-2 Years)			
3-9 Years	-2.062**	-1.452	-2.733**
	(0.807)	(1.234)	(1.116)
$\geq$ 10 Years	-4.545***	-4.537***	-5.057***
	(0.920)	(1.365)	(1.318)
Tenure not available	-3.573*	-16.104***	1.128
	(2.099)	(4.783)	(2.664)
Occupation Position (Ref: Blue-Collar)			
White-Collar Worker	2.259**	3.142**	1.911

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Table A.4: *(continued)*

	(1.044)	(1.434)	(1.608)
Civil Servent	1.489	3.480	-1.798
	(1.919)	(2.562)	(2.769)
Trainee	4.693	5.568	3.069
	(3.895)	(5.367)	(4.775)
NACE Industry (Ref: Manufacturing)			
Agriculture	-5.211*	-8.248*	-0.910
	(3.009)	(4.714)	(5.484)
Mining, Quarrying, Energy, Water	-2.766	-1.762	-6.955
	(3.088)	(3.810)	(7.955)
Chemicals, Pulp, Paper	3.033*	3.548	0.693
	(1.844)	(2.297)	(2.911)
Construction	-1.309	-0.489	-2.990
	(1.680)	(2.024)	(3.777)
Iron/Steel	-2.183	-1.758	-4.844
	(1.881)	(2.366)	(3.983)
Textile/Apparel	-2.696	-1.806	-5.467
	(3.965)	(8.178)	(5.205)
Wholesale/Retail	0.244	-0.521	-1.241
	(1.440)	(2.076)	(2.263)
Transport/Communication	1.763	2.933	-1.156
	(1.903)	(2.333)	(3.229)
Public Service	1.748	4.598***	-1.885
	(1.304)	(1.778)	(2.101)
Financial/Private Services	1.714	3.980**	-1.738
	(1.418)	(1.893)	(2.262)
NACE Industry Not Categorized	3.038*	6.676***	-1.649
	(1.677)	(2.345)	(2.463)
Regional Characteristics			
Unemployment Rate	0.059	0.192	-0.044
	(0.163)	(0.236)	(0.223)
Gross Value Added	0.002	0.045	-0.042
	(0.056)	(0.080)	(0.077)
Population Density in 100	0.165***	0.203***	0.117
	(0.053)	(0.077)	(0.072)
East-Germany	-10.911***	-14.912***	-8.649***
	(1.241)	(2.098)	(1.988)
Other Personality Variables			
Will. to Take Risks (std.)	3.395***	3.895***	2.591***
	(0.404)	(0.554)	(0.543)
Openness (std.)	1.469***	1.254**	1.575***
	(0.413)	(0.594)	(0.568)
Conscientiousness (std.)	-0.461	-0.903*	0.136
	(0.378)	(0.544)	(0.523)
Extraversion (std.)	-1.467***	-1.906***	-1.068*
	(0.417)	(0.591)	(0.575)
Agreeableness (std.)	-1.628***	-0.808	-2.398***
	(0.393)	(0.557)	(0.532)
Neuroticism (std.)	0.701*	1.220**	0.229
	(0.401)	(0.567)	(0.540)
Observations	17,181	8,362	8,819

Source: Socio-Economic Panel (SOEP), waves 1999-2015, version 33, doi:10.5684/soep.v33, own calculations.
Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Marginal effects are reported in percentage points.
Standard Errors in parentheses. Standard Errors are clustered on person-level.

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

	All	Men	Women
LOC Factor > Median	0.189**	0.251**	0.126
	(0.083)	(0.127)	(0.111)
Socio-Economic Characteristics			
Age	-0.105**	-0.112	-0.074
	(0.049)	(0.072)	(0.066)
Squared Age	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)
Female	-0.016		
	(0.099)		
Married	-0.626***	-0.453***	-0.833***
	(0.098)	(0.154)	(0.147)
German	0.346**	0.353	0.420
	(0.145)	(0.251)	(0.266)
Number of Children in HH	-0.319***	-0.270***	-0.392***
	(0.063)	(0.088)	(0.091)
Disabled	-0.102	-0.349	0.099
	(0.207)	(0.322)	(0.293)
Home-Owner	-1.140***	-1.319***	-1.268***
	(0.083)	(0.150)	(0.156)
Net Household Income in KEUR	-0.028	0.009	-0.049
	(0.028)	(0.030)	(0.044)
Highest School Degree (Ref: Lower or Intermediary School)			
No Degree	-0.107	-0.153	-0.047
	(0.347)	(0.508)	(0.551)
Highschool Degree	0.526***	0.391**	0.569***
	(0.115)	(0.172)	(0.145)
Vocational Education (Ref: Non)			
Apprenticeship	-0.115	0.047	-0.297**
	(0.102)	(0.141)	(0.151)
Higher Technical College	-0.014	-0.055	0.015
	(0.117)	(0.178)	(0.159)
University or College Degree	0.477***	0.490***	0.375**
	(0.132)	(0.180)	(0.158)
Occupational Characteristics			
Unemployment Experience	-0.082**	-0.035	-0.135***
	(0.033)	(0.051)	(0.040)
High Skilled Worker	0.101	0.039	0.175
	(0.120)	(0.162)	(0.166)
Labor Force Status (Ref: Employed)			
Self-Employed	0.262	0.136	0.582*
	(0.231)	(0.278)	(0.317)
Unemployed	1.343***	0.766***	1.430***
	(0.311)	(0.255)	(0.283)
Not Working	0.741**	1.370***	0.823***
	(0.322)	(0.402)	(0.309)
In Education	1.778***	1.389***	1.258***
	(0.408)	(0.277)	(0.320)
Tenure (Ref: 0-2 Years)			
3-9 Years	-0.150*	-0.095	-0.205*
	(0.084)	(0.125)	(0.120)
$\geq$ 10 Years	-0.800***	-0.845***	-1.161***
	(0.098)	(0.193)	(0.210)
Tenure not available	-0.191	-0.115	-0.218
	(0.205)	(0.383)	(0.288)
Occupation Position (Ref: Blue-Collar)			
White-Collar Worker	0.274**	0.140	0.575**

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Table A.5: *(continued)*

	(0.138)	(0.180)	(0.235)
Civil Servent	0.861***	0.782***	0.717**
	(0.313)	(0.285)	(0.329)
Trainee	1.468***	1.235***	1.028**
	(0.491)	(0.353)	(0.407)
NACE Industry (Ref: Manufacturing)			
Agriculture	0.139	-0.157	0.437
	(0.403)	(0.469)	(0.530)
Mining, Quarrying, Energy, Water	-0.122	-0.034	-0.412
	(0.383)	(0.499)	(0.570)
Chemicals, Pulp, Paper	-0.077	-0.088	-0.199
	(0.235)	(0.292)	(0.363)
Construction	-0.372*	-0.517*	0.186
	(0.207)	(0.271)	(0.442)
Iron/Steel	-0.396*	-0.309	-1.390*
	(0.227)	(0.288)	(0.817)
Textile/Apparel	0.330	-0.145	0.223
	(0.538)	(1.024)	(0.477)
Wholesale/Retail	0.097	0.296	-0.157
	(0.187)	(0.237)	(0.261)
Transport/Communication	-0.134	0.112	-0.632
	(0.237)	(0.288)	(0.406)
Public Service	-0.136	0.127	-0.450*
	(0.160)	(0.199)	(0.247)
Financial/Private Services	-0.117	0.014	-0.315
	(0.168)	(0.214)	(0.258)
NACE Industry Not Categorized	-0.145	-0.179	-0.265
	(0.194)	(0.271)	(0.289)
Regional Characteristics			
Unemployment Rate	0.002	-0.014	0.021
	(0.017)	(0.025)	(0.023)
Gross Value Added	-0.019***	-0.023***	-0.013
	(0.006)	(0.008)	(0.008)
Population Density in 100	-0.001	-0.002	-0.002
	(0.005)	(0.008)	(0.007)
East-Germany	-0.557***	-0.689***	-0.493**
	(0.130)	(0.229)	(0.202)
Other Personality Variables			
Will. to Take Risks (std.)	0.240***	0.134*	0.303***
	(0.051)	(0.070)	(0.068)
Openness (std.)	0.089*	0.183***	-0.005
	(0.047)	(0.067)	(0.066)
Conscientiousness (std.)	0.036	0.058	0.004
	(0.042)	(0.062)	(0.058)
Extraversion (std.)	-0.103**	-0.195***	0.000
	(0.044)	(0.061)	(0.062)
Agreeableness (std.)	-0.010	-0.014	0.007
	(0.045)	(0.066)	(0.059)
Neuroticism (std.)	0.054	0.051	0.060
	(0.044)	(0.063)	(0.058)
Observations	109,234	53,141	56,093

Source: Socio-Economic Panel (SOEP), waves 1999-2015, version 33, doi:10.5684/soep.v33, own calculations.
Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Marginal effects are reported in percentage points.
Standard Errors in parentheses. Standard Errors are clustered on person-level.

Table A.6: Sensitivity Analysis (Marginal Effects): Context of Moving

	All	Men	Women
Panel (A) - Difficulty of Finding a Position (OLS)			
LOC Factor > Median (FA)	-6.942***	-7.260***	-7.071***
	(0.631)	(0.904)	(0.862)
Observations	105,317	52,197	53,120
Panel (B) - Work Related Moves - Sample: All Movers[a]			
LOC Factor > Median	1.308	2.595**	0.422
	(0.920)	(1.311)	(1.290)
Observations	6,140	3,057	3,083
Panel (C1) - Moving Distance in km - Sample: All Movers[a,b]			
LOC Factor > Median	5.052**	3.966	4.560
	(2.319)	(3.214)	(3.295)
Observations	7,705	3,854	3,851
Panel (C2) - Share of Regional Movers - Sample: All Movers[a]			
LOC Factor > Median	1.887*	3.432**	0.008
	(0.990)	(1.428)	(1.340)
Observations	7,705	3,854	3,851
Year Fixed-Effects	✓	✓	✓
Regional Controls	✓	✓	✓
Socio-Economic Controls	✓	✓	✓
Personality Controls	✓	✓	✓

Source: Socio-Economic Panel (SOEP), waves 1999-2015, version 33, doi:10.5684/soep.v33, own calculations.
Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Marginal effects are reported in percentage points unless stated otherwise. Standard Errors in parentheses. Standard Errors are clustered on person-level. All rows of marginal effects and standard errors are from separate estimations.

[a] The sample consists of all individuals who indicate that they moved residence in the interview in $t + 1$, including all inter- and intraregional moves.

[b] Effect of LOC on migration distance in km for the subsample of movers is estimated using as simple OLS estimation.

B Supplementary Anaylsis with IZA Evaluation Dataset

This Section contains a detailed discussion of our ancillary analysis on geographic search range using the IZA Evaluation Dataset. We provide information about the data used, variable measurement, estimation strategy as well as descriptive statistics and full estimation results.

B.1 Data

In order to shed light on one of the key predictions of our theoretical framework, we conduct an ancillary analysis of the relationship between locus of control and individuals' geographic search range. We are interested in knowing whether there is evidence that those job seekers with an internal locus of control search across a broader geographic area. The SOEP data do not provide us with sufficient information on individuals' job-search to conduct this analysis; instead we make use of another German dataset – the IZA Evaluation Dataset. The IZA Evaluation Dataset targets a sample of Germans entering unemployment between June 2007 and May 2008. A 9 percent random sample from the monthly unemployment inflows of approximately 206,000 individuals identified in the administrative records was selected for interview. In wave 1, 17,396 interviews were completed with job seekers who had begun an unemployment spell approximately two months earlier. The data are ideal for our purposes because individuals are interviewed shortly after they become unemployed and are asked detailed questions about their job search and personality traits, including locus of control. We restrict our estimation sample to job seekers who are 25 to 55 years old to be consistent with our main SOEP analysis. We include observations from wave 1 as well as from waves 2 and 3 for those individuals who are still unemployed and searching for a job. This leaves us with in total 7,915 observations of which 6,987 are from wave 1 and an additional 499 (429) observations from wave 2 (wave 3).

Locus of Control In the IZA data, locus of control is measured using the same set of 10 items and on the same Likert scale as in the SOEP. We therefore construct a unidimensional continuous locus of control index in an identical manner as that in our SOEP analysis (see Section 4.2 in the paper for more details). An overview of the descriptive statistics of the LOC items in the data can be found in Table B.1, while Figure B.1 (upper panel) depicts the distribution of the continuous variable.

Geographic Search Range The IZA data also contain a measure of whether survey participants have applied for jobs for which they would have to make a residential move. Job seekers who answer this question with "yes" are considered to engage in "geographically distant" job search. For those who respond that they have applied for jobs that require a residential move, we also know the maximum search distance (in km) and, for a subset of individuals, whether migration would involve moving across state, national or continental boundaries. Table B.2 provides a brief overview of the differences in the geographic range of internal and external job seekers.

Standard mean equality tests indicate that the internal job seekers are significantly more likely to indicate that they have searched for a job that would require them to change residences. This pattern is also supported by the kernel densities computed separately for movers and non-movers in Figure B.1 (bottom panel). The maximum application distance is also significantly higher for internals (922 km) than for externals (753 km). There is an average search distance of 234 km for internals and 130 km for externals if all local (non-distant) searchers are set to zero. Internal job seekers engaged in distant job search are more likely

to search Germany-wide, their external counter parts are more likely to restrict their search to their region or federal state. Although internal job seekers are significantly more likely to say that they are willing to change their residence for a job, there is no significant relationship between the willingness to accept long journeys to work and locus of control. This is consistent with our hypothesis that the relationship between locus of control and migration is mainly driven by search intensity and not by differences in the migration costs of internal vs. external job seekers.

B.2 Estimation Strategy

The choice of control variables was made to match the set of variables in our main estimation as close as possible. Restrictions due to data sensitivity imply that we lack information on regional characteristics, detailed household income, and an indicator of disability. Unfortunately, information on individual's willingness to take risk is collected only for a small subset of respondents and can thus not be included in the main analysis. Our labor market controls include the last occupation before unemployment as well as earlier unemployment experiences. The Big Five are surveyed with a reduced set of items in the IZA data and the construction of these traits is based on this reduced set. Information on home-ownership, highest school degree, highest vocational degree and unemployment experience is only available in wave 1 and is therefore imputed to waves 2 and 3. In order to identify potential non-linearities in the effects of LOC on distant search probabilities indicators for the quartiles of the LOC distribution are included as explanatory variables as an alternative to the continuous measure. Table B.3 provides the key descriptive statistics for the estimation sample.

B.3 Results

The results of the main estimation can be found in Table B.4. For the full estimation results corresponding to the estimations reported in column (7) see Table B.5. Consistent with the predictions of our theoretical framework, internal job seekers are significantly more likely to engage in geographically distant job search. A one standard deviation increase in the extent to which someone is internal increases the probability of distant job search by 1.2 percentage points on average in the full specification (column 7). This effect is largely driven by those individuals who are highly internal. Having a locus of control in the highest quartile increases the probability of geographically distant search by 3.34 percentage points relative to having a locus of control in the lowest quartile (column 9). The baseline probability of geographically distant search is 22 percent, implying that these effects translate into an increase in geographically distant search of about 15 percent. Interestingly, these effects are stronger for women than for men which is consistent with previous evidence that the relationship between locus of control and labor market outcomes is often gender-specific (see Cobb-Clark 2015).

Table B.1: Components of Locus of Control or IZA Eval. Dataset

Variable	mean[a]
Components of locus of control (Mean, Scale: 1-7)	
I1: How my life goes depends on me	6.03
I2: Compared to other people, I have not achieved what I deserve (R)	3.65
I3: What a person achieves in life is above all a question of fate or luck (R)	3.46
I4: If one is soc. or polit. active, one can have an effect on social conditions[b]	3.90
I5: I freq. have the experience that others have a controlling influence over my life (R)	2.88
I6: One has to work hard in order to succeed	6.19
I7: If I run up against difficulties in life, I often doubt my own abilities (R)	3.39
I8: Opportunities I have in life are determined by the social conditions (R)	4.54
I9: Inborn abilities are more important than any efforts one can make[b]	5.22
I10: I have little control over the things that happen in my life (R)	2.71
Observations	7,626

Source: IZA Evaluation dataset own calculations.
Notes:
[a] The LOC was surveyed on a 7-point likert scale from 1 for "I Disagree Completely" to 7 for "Agree completely".
[b] 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 B.2: Descriptives of Outcome Variables by Locus of Control for IZA Eval. Dataset

	All	Externals	Internals	t-test p-values
Distant Search (Dum)	0.22	0.26	0.18	0.000
Maximal Search Distance in km (incl. 0 km)[a]	182.17	234.02	130.33	0.050
	[1,625]	[966]	[659]	
Maximal Search Distance in km (if any)	853.00	921.54	752.54	0.000
	[7,609]	[3,804]	[3805]	
Distant Search Intensity				
Own Town, Region	0.02	0.01	0.03	0.019
In Federal State	0.17	0.13	0.21	0.000
In Germany	0.55	0.58	0.50	0.001
In Europe	0.21	0.21	0.21	0.754
Outside Europe	0.06	0.06	0.06	0.739
	[1,677]	[993]	[684]	
Concessions willing to take				
Long Journey to Work				
No	0.09	0.08	0.10	0.222
Maybe	0.46	0.45	0.46	0.545
Yes	0.46	0.47	0.44	0.192
	[2,051]	[1,075]	[976]	
Change of residence				
No	0.50	0.47	0.52	0.024
Maybe	0.34	0.34	0.35	0.671
Yes	0.16	0.19	0.13	0.000
	[2,048]	[1,073]	[975]	

Source: IZA Evaluation Dataset, own calculations.
Notes: All numbers are shares unless stated otherwise. Number of observations in square brackets. Last column contains the p-values of the t-test for mean equality between Externals and Internals.
[a] Distance is coded to 0 if individual indicates that she did not apply for a job for which she would have to move.

Table B.3: Selected Descriptive Statistics by Internal Migration Status for IZA Eval. Dataset

	All			Male			Female		
	Non-Distant Seeker	Distant Seeker	t-test p-value	Non-Distant Seeker	Distant Seeker	t-test p-value	Non-Distant Seeker	Distant Seeker	t-test p-value
Locus of Control (std.)[a]	3.10	3.38	0.000	3.07	3.34	0.000	3.14	3.40	0.000
Locus of Control > Median	0.47	0.59	0.000	0.46	0.58	0.000	0.49	0.60	0.002
Socio-Economic Characteristics									
Age	39.65	36.19	0.000	39.88	34.60	0.000	39.38	37.12	0.000
Female	0.46	0.63	0.000						
German	0.95	0.95	0.167	0.95	0.95	0.648	0.94	0.95	0.028
Married or living together	0.53	0.30	0.000	0.58	0.22	0.000	0.48	0.34	0.000
Number of Children in Household	0.59	0.31	0.000	0.69	0.23	0.000	0.48	0.37	0.100
East-Germany	0.31	0.30	0.189	0.29	0.32	0.836	0.34	0.29	0.042
Home-Owner	0.39	0.22	0.000	0.41	0.20	0.000	0.36	0.22	0.000
Monthly Net-Income of the HH									
less or equal 1000 EUR	0.23	0.33	0.001	0.20	0.36	0.003	0.27	0.32	0.177
1001 - 2000 EUR	0.41	0.41	0.860	0.38	0.40	0.446	0.45	0.41	0.426
2001 - 3000 EUR	0.28	0.19	0.002	0.32	0.18	0.015	0.24	0.20	0.230
3001 - 4000 EUR	0.08	0.07	0.404	0.11	0.06	0.091	0.05	0.07	0.305
Highest School Degree									
No Degree	0.01	0.01	0.566	0.01	0.00	0.663	0.01	0.01	0.466
Lower Secondary School	0.30	0.19	0.000	0.24	0.10	0.000	0.38	0.24	0.000
Intermediate School	0.45	0.32	0.000	0.50	0.34	0.000	0.40	0.30	0.000
Highschool	0.22	0.47	0.000	0.25	0.55	0.000	0.19	0.43	0.000
Other	0.01	0.01	0.921	0.01	0.00	0.184	0.01	0.02	0.361
Vocational or Higher Education									
No Vocational Education	0.09	0.05	0.006	0.09	0.04	0.025	0.08	0.05	0.102
Apprenticeship	0.59	0.39	0.000	0.56	0.34	0.000	0.62	0.41	0.000
Higher Technical College	0.15	0.16	0.799	0.15	0.12	0.087	0.15	0.18	0.104
University or College Degree	0.13	0.37	0.000	0.15	0.45	0.000	0.11	0.32	0.000
Other Vocational Degree	0.04	0.04	0.324	0.04	0.05	0.196	0.04	0.03	0.686
Last Employment Status before Unemployment									
Regularly Employed	0.73	0.71	0.758	0.68	0.65	0.693	0.80	0.74	0.220
Subsidized Employment	0.07	0.06	0.231	0.06	0.05	0.882	0.07	0.07	0.115
Education, Military Serv. etc.	0.04	0.15	0.000	0.04	0.19	0.000	0.04	0.12	0.000
Parental Leave etc.	0.07	0.01	0.000	0.12	0.02	0.001	0.00	0.00	0.387

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	All			Male			Female		
	Non-Distant Seeker	Distant Seeker	t-test p-value	Non-Distant Seeker	Distant Seeker	t-test p-value	Non-Distant Seeker	Distant Seeker	t-test p-value
Unemployment Experience	2.69	2.79	0.644	2.36	2.57	0.298	3.07	2.92	0.333
Other Personality Variables									
Openness[d]	4.94	5.26	0.000	4.92	5.33	0.000	4.97	5.22	0.000
Conscientiousness[d]	6.25	6.26	0.452	6.33	6.40	0.326	6.17	6.18	0.208
Extraversion[d]	5.09	5.20	0.233	5.18	5.36	0.095	4.99	5.11	0.269
Neuroticism[d]	3.83	3.55	0.000	3.98	3.80	0.047	3.65	3.40	0.000
Observations	5,984	1,679		3,214	622		2,770	1,057	

Source: IZA Evaluation dataset own calculations.
Notes: All numbers are shares unless stated otherwise. The p-values refer to a t-test for mean equality between Non-Distant and Distant Seekers.
[b] For detailed information on the measurement of locus of control see Section 4.2 in the paper. For this table, locus of control was adjusted to just have positive values by subtracting the lowest possible value.
[d] Big Five are measured with a reduced set of items available from the data. See Section S.2 for more details.
[e] Variables are included as averages over all available observations.

Table B.4: Logit Estimation Results (Marginal Effects): Geographically Distant Search

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LOC Factor (std.)	4.693***			1.725***			1.195**		
	(0.488)			(0.468)			(0.500)		
LOC > Median		7.822***			2.420***			1.386	
		(0.952)			(0.912)			(0.949)	
Locus of Quartiles (Ref.: $[LOC_{min}, LOC_{P25}]$)									
$(LOC_{P25}, LOC_{P50}]$			4.043***			1.657			1.609
			(1.243)			(1.249)			(1.269)
$(LOC_{P50}, LOC_{P75}]$			7.040***			1.846			1.412
			(1.289)			(1.279)			(1.305)
$(LOC_{P75}, LOC_{max}]$			12.651***			4.798***			3.344**
			(1.348)			(1.305)			(1.383)
Observations	7,663	7,663	7,663	7,663	7,663	7,663	7,663	7,663	7,663
Pseudo R^2	0.014	0.011	0.014	0.156	0.155	0.156	0.164	0.163	0.164
Men									
LOC Factor (std.)	3.667***			1.205**			0.775		
	(0.611)			(0.580)			(0.629)		
LOC > Median		6.117***			1.458			0.620	
		(1.199)			(1.120)			(1.175)	
Locus of Quartiles (Ref.: $[LOC_{min}, LOC_{P25}]$)									
$(LOC_{P25}, LOC_{P50}]$			4.474***			2.684*			2.844*
			(1.536)			(1.560)			(1.588)
$(LOC_{P50}, LOC_{P75}]$			7.514***			2.471			2.265
			(1.617)			(1.573)			(1.626)
$(LOC_{P75}, LOC_{max}]$			9.210***			3.381**			2.235
			(1.663)			(1.609)			(1.732)
Observations	3,828	3,828	3,828	3,828	3,828	3,828	3,828	3,828	3,828
Pseudo R^2	0.013	0.010	0.013	0.225	0.224	0.225	0.233	0.233	0.234
Women									
LOC Factor (std.)	5.118***			2.212***			1.545**		
	(0.748)			(0.724)			(0.774)		
LOC > Median		8.022***			2.524*			1.126	
		(1.455)			(1.431)			(1.477)	
Locus of Quartiles (Ref.: $[LOC_{min}, LOC_{P25}]$)									
$(LOC_{P25}, LOC_{P50}]$			4.271**			2.217			1.933
			(1.948)			(1.937)			(1.974)
$(LOC_{P50}, LOC_{P75}]$			5.991***			1.309			0.588
			(1.993)			(1.987)			(2.018)
$(LOC_{P75}, LOC_{max}]$			14.313***			6.104***			4.160*
			(2.076)			(2.039)			(2.175)
Observations	3,827	3,827	3,827	3,827	3,827	3,827	3,827	3,827	3,827
Pseudo R^2	0.015	0.011	0.015	0.106	0.105	0.107	0.114	0.113	0.114
Year Fixed-Effects	✓	✓	✓	✓	✓	✓	✓	✓	✓
Socio-Economic Controls				✓	✓	✓	✓	✓	✓
Personality Controls							✓	✓	✓

Source: IZA Evaluation Dataset, own calculations.

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Marginal effects are reported in percentage points.

Standard Errors in parentheses. Standard Errors are clustered on person-level.

Full estimation results for specifications (7) can be found in Table B.5.

The full estimation results for specifications (1) - (6) as well as (8) and (9) can be obtained from the authors.

Table B.5: Logit Estimation Results: Geographically Distant Search (Marginal Effects)

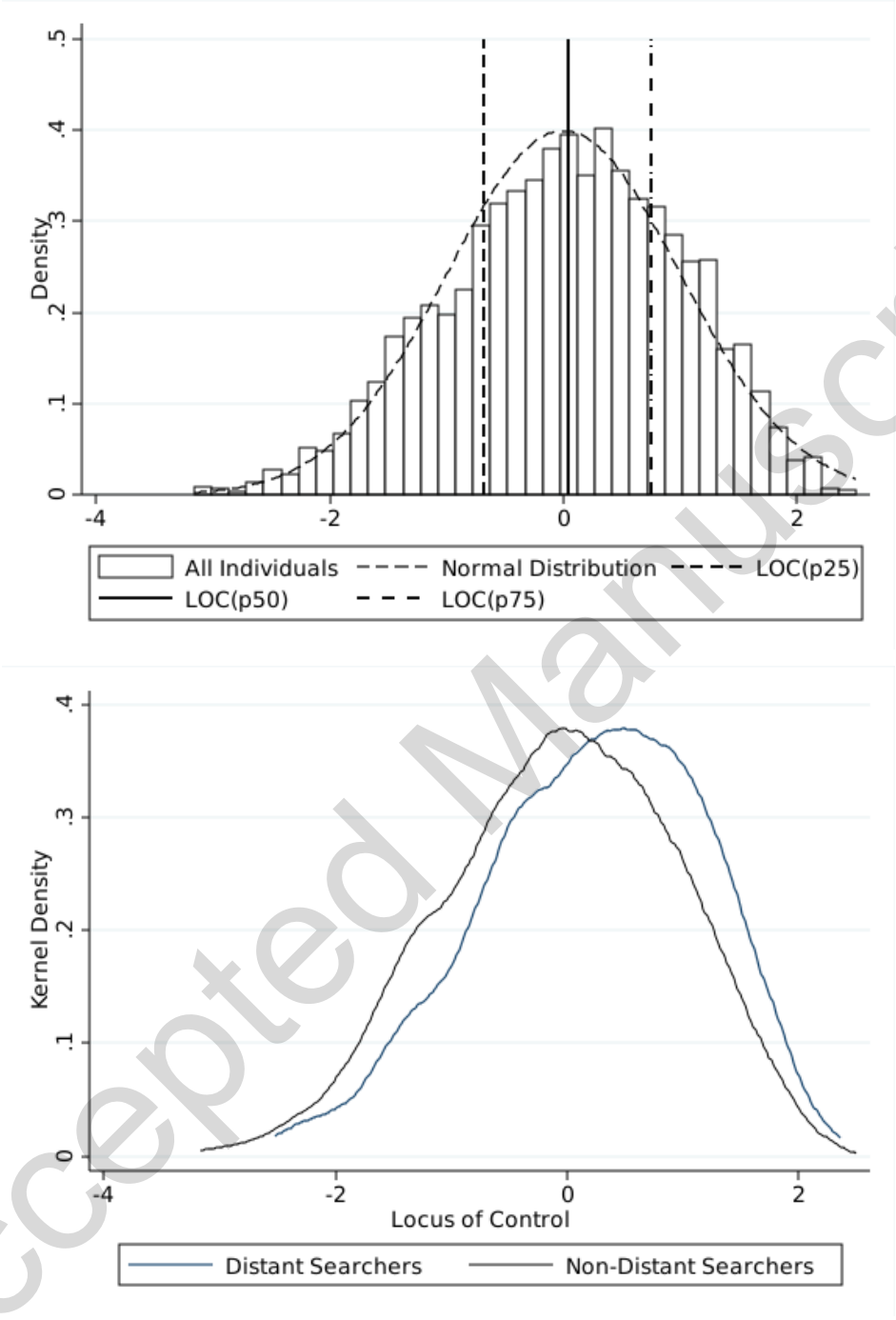
	All	Men	Women
LOC Factor (std.)	1.195**	0.775	1.545**
	(0.500)	(0.629)	(0.774)
Socio-Demographic Characteristics			
Age	-1.339**	-0.909	-1.036
	(0.538)	(0.679)	(0.835)
Squared Age	0.013*	0.006	0.010
	(0.007)	(0.009)	(0.011)
Female	9.713***		
	(0.933)		
German	1.718	-0.512	3.557
	(1.882)	(2.423)	(2.935)
Married	-5.716***	-8.465***	-4.600***
	(1.080)	(1.347)	(1.738)
Number of Children in Household	-2.868***	-6.679***	-0.637
	(0.753)	(1.058)	(1.169)
East-Germany	-0.985	1.378	-2.333
	(0.989)	(1.235)	(1.545)
Home-Owner	-5.739***	-1.592	-8.830***
	(0.996)	(1.283)	(1.511)
Monthly Net-income of the HH (Ref: less or equal 1000 EUR)			
1001 - 2000 EUR	-1.520	-1.051	-1.648
	(1.079)	(1.268)	(1.711)
2001 - 3000 EUR	-4.648***	-5.089***	-3.516*
	(1.282)	(1.509)	(2.059)
3001 - 4000 EUR	-4.331**	-5.160***	-0.625
	(1.701)	(1.893)	(3.067)
Highest School Degree (Ref: Non)			
Lower Secondary School	3.879	1.752	4.546
	(5.338)	(7.504)	(7.904)
Intermediate School	6.117	4.851	6.011
	(5.169)	(6.993)	(7.932)
Highschool	14.083**	8.658	16.416*
	(6.347)	(8.673)	(9.574)
Other School	14.301*	-4.038	20.693*
	(8.349)	(11.351)	(11.432)
Vocational or Higher Education (ref: Non)			
Apprenticeship	3.879**	1.453	4.781*
	(1.889)	(2.516)	(2.802)
Higher Technical College	12.000***	3.539	17.149***
	(2.514)	(3.068)	(3.688)
University or College Degree	23.066***	14.083***	28.694***
	(2.901)	(3.874)	(4.198)
Other Vocational Degree	8.740**	7.115*	7.181
	(3.424)	(4.229)	(5.139)
Last Employment Status before Unemployment (Ref: Reg. Employment)			
Subsidized Employment	1.170	1.146	1.238
	(1.852)	(2.260)	(2.811)
Education, Training, Military Serv.	7.660***	7.901***	6.380**
	(2.034)	(2.376)	(3.195)
Parental Leave etc.	-12.128***	-5.895**	-2.735
	(2.100)	(2.366)	(9.953)
Ealier Unemployment Experience in Months	0.085	0.241	-0.095
	(0.120)	(0.150)	(0.183)
Other Personality Variables			
Openness	2.460***	1.830***	2.904***
	(0.401)	(0.499)	(0.617)

Conscientiousness	0.592	1.162	0.045
	(0.586)	(0.790)	(0.872)
Extraversion	0.213	0.381	0.246
	(0.443)	(0.551)	(0.681)
Neuroticism	-1.052**	-0.642	-1.497**
	(0.411)	(0.510)	(0.638)
Observations	7,663	3,828	3,827

Source: IZA Evaluation Dataset, own calculations.

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

Figure B.1: Distribution of Locus of Control in IZA Eval. Dataset



Source: IZA Evaluation dataset, own illustration.
Notes: Bottom Panel provides the graphical illustration of the kernel density estimates using the Epanechnikov kernel function separately for Distant Searchers and Non-Distant Searchers.