

## The price of mobility

### How personality and preferences shape the mobility premium of university graduates

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**Abstract** This paper addresses the question concerning the price of geographic mobility in various labour market and migration scenarios. Pivotal points are expected mobility premiums which are sufficient to tip the scales in favour of moving to a geographically distinct location. These premiums are first derived within a theoretical model, accounting not only for location-specific amenity levels or labour market conditions, but also for heterogeneous personality traits and preferences. Derived hypotheses demonstrate that—in presence of heterogeneous psychic costs or adjustment capabilities—expected mobility premiums can remain distinctly positive even in an unemployment scenario. Furthermore, adjustment capabilities are to a large extent related to earlier mobility experiences, implying that labour mobility is partially learnable.

**Keywords** Compensating differential · Personality traits · Psychic costs of mobility · Adjustment capability

**JEL codes** R23 · J31 · J61

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## 1 Introduction

Since 2010, the German labour market has displayed two distinct trends which are both interrelated with its matching efficiency. On the one hand, the average ratio of registered unemployed to job vacancies, a measure of labour market tightness, is characterised by a downward trend from 3.7 at the end of 2010 to 2.4 in 2017. This is indicative of better job finding perspectives on the aggregate level. On the other hand, according to the Institute for Employment Research's job vacancy survey (IAB 2017), the relative number of job hires associated with difficulties in the recruitment process increased from 29 to 36%. Finding a suitable employee, respectively establishing a successful job match has become more intricate. An insufficient number of applicants was mentioned in 24% of these difficult recruitment attempts in the year 2016, compared to 14% in 2010. Moreover, the share of applicants with too high salary demands rose from 10 to 14% in 2015, and then slightly declined to 12% in 2016 (IAB 2017). Ultimately, locally available labour supply was declared to be insufficient—an issue more pronounced in East Germany—or there was a substantial mismatch of salary expectations.

In reality, impeded geographic job mobility may occur although workers react to regional labour demand differentials: job opportunities and local conditions are jointly relevant criteria, leading to a trade-off (Graves and Linneman 1979; Roback 1982; Clark and Cosgrove 1991; Dalenberg and Partridge 1997; Whisler et al. 2008). In this literature on compensating differentials, the level of amenities, e. g. favourable climatic conditions or cultural offers, determines the required compensating wage premium to induce labour mobility. There is another strand in the literature, estimating monetary returns to labour mobility. Interstate job-to-job changers realise a notable wage premium (Yankow 2003), as do workers moving to metropolitan areas (Glaeser and Maré 2001). In general, the most pronounced returns to geographic mobility can be reaped by the tertiary educated (Lemistre and Moreau 2009; Knapp et al. 2013). Within the wider body of the literature on mobility related wage differentials, the focus typically rests on labour market features, amenities and socio-demographic factors. Individual preferences or personality characteristics, however, have been mostly ignored.

The first contribution of this research is to document that impediments to mobility differ among individuals due to heterogeneous preferences and personality in a wider sense. To this end, I first sketch a theoretical model which integrates heterogeneous individuals into a compensating differential framework. This model serves as starting point for an empirical analysis of how personality traits and preferences, such as proximity to reference persons, impact on expected mobility premiums. This research is not limited to an analysis of observed premiums of those who chose to accept, neglecting all actually occurring, yet undocumented, salary mismatches. Instead, drawing upon a detailed student mobility survey (MESARAS 2013; Weisser 2016a), the overall distribution of ex ante premiums of future university graduates is investigated. Moreover, the expected mobility premiums are analysed for two labour market scenarios (employed vs. unemployed) and two types of mobility (interstate vs. cross-border). The second contribution of this work refers to the previously described salary mismatch in the context of labour migration: I provide estimates of the

minimum compensating wage premium, i. e. the price a firm had to pay, so a specific university graduate would accept an offer in a spatially distinct labour market.

This work focuses on prospective university graduates, since high tertiary education participation rates (King and Ruiz-Gelices 2003) emphasise the relevance of tertiary educated workers as an integral part of the labour force. There is also evidence in favour of a strong interrelation between mobility preferences during studies and post-graduation migratory trajectories (Groen 2004; Busch and Weigert 2010; Parey and Waldinger 2011; Di Pietro 2012). This highlights that analysing mobility-related preferences of university students promises valuable insights into their prospective migration patterns, once they will have entered the labour market. Although the focus on students' mobility premiums enables to investigate interesting research questions, it has caveats as well: the mobility premiums are, in fact, *ex ante* expectations. However, I can demonstrate that these *ex ante* expectations are in line with the literature on mobility-related wage premiums. I further address this issue in the sensitivity analysis. A first specification accounts for the theory of planned behaviour (Ajzen 1991), which advocates behavioural control and strength of intentions as predictors of actual behaviour. In a second specification, I allow expectations to be influenced by labour market readiness. This accounts for the emergence of more or less realistic wage expectations, depending on individual labour market experience.

The remainder of this study is organised as follows: Sect. 2 provides an overview of the literature on post-migration premiums, compensating or agglomeration premiums and individual factors shaping mobility-related decisions. In Sect. 3, the mobility premiums are derived in a theoretical framework, incorporating the concept of personality profiles and individual preferences. Sect. 4 delineates the data source and descriptive statistics. Previously derived hypotheses are tested in Sect. 5 and sensitivity checks supplement earlier results; Sect. 6 concludes.

## 2 Wages, labour mobility and personality in the related literature

### 2.1 Estimates of mobility premiums

Across different countries, labour markets and education groups, the literature offers a range of estimates for mobility-related wage premiums. Compared to non-migrants, the average male inter-district migrant in the UK experiences for several years a distinct real wage gain of 2.4 to 3.8% (Böheim and Taylor 2007). In the US, the wage premium amounts to 8% for interstate job-to-job changers and to 6.8% for displaced workers (Yankow 2003). Hall (2009) delivered a similar finding for native (10%) and foreign-born (10 to 17%) interstate movers.

Higher education, especially, translates into additional returns to migration: French university graduates entering into a 200 kilometre distant labour market realise a 15% premium (Lemistre and Moreau 2009). US college graduates are found to receive a mobility premium for first job-related moves of around 10% (Ham et al. 2011). However, the most pronounced increase is reaped by tertiary educated, five years after the relocation (22.5%, Knapp et al. 2013).

For Germany, Kratz and Brüderl (2013) delivered an estimate of the overall wage gain due to regional migration of 6.8%, comprising a contemporaneous premium of 3.7%. Effects are, however, heterogeneous regarding experience groups and regions: those with fewest experience realise an immediate premium of 1.8%, which almost doubles within the subsequent five years (Lehmer and Ludsteck 2011). Leaving metropolitan areas was found to be associated with a wage decrease of 1.3%, while departing a rural region and moving to a metropolitan area resulted in the highest wage gains over five years (7.5%).

All these estimates are based on samples comprising individuals who received wage offers of sufficient size to induce geographic mobility. Salary mismatches, possibly related to unobserved preferences and personality, remain elusive. Thus, observed mobility premiums are a lower bound for the actual price of mobility across the population.

## 2.2 Mobility premiums as location-specific differentials

Observed wage differentials between locations a labour migrant may choose amongst are explained in a variety of ways. For the purpose of this research, two relevant explanations are given in the literature on compensating differentials and on the urban wage premium.

Moving to a metropolitan area leads to an upwards shift of the migrant's wage profile and a persistently steeper income profile (Glaeser and Maré 2001). A large extent of this urban wage premium may be related to the fact that cities attract a disproportionately large share of high-skilled workers (Yankow 2006). Especially 'power-couples', where both spouses are at least college-educated, seem to be attracted to locations offering higher quality of business environment (Chen and Rosenthal 2008). This sorting outcome might be amplified by complementarities of skills and city size (Glaeser and Resseger 2010)—the urban income premium thus varies in relation to population size, though crowding into urban areas might also diminish returns to education (Adamson et al. 2004).

The literature on compensating differentials (Graves and Linneman 1979; Graves 1983) stresses a trade-off between local non-traded goods (amenities) and wages (or rents). Observable wage differences in a regional equilibrium can then be interpreted as compensating differentials—compensating for endowment differences between origin and destination in other relevant non-pecuniary dimensions. Wages in large crime-ridden cities in the US, for instance, comprise a higher compensating earnings component (Roback 1982). The reverse was detected for climatically more favourable sites: a higher number of sunny days is associated with lower earnings. In the US, favourable climatic conditions are robust predictors of population growth, rising house prices (Rappaport 2007), real wages and interstate migration (Huffman and Feridhanusetyawan 2007). These findings might not be completely transferable to Germany: Arntz (2010) detected only a modest relevance of amenities. Influential factors were mostly related to labour market perspectives and varied by skill group: highly skilled individuals were more incentivised by wage differentials, less skilled individuals were more responsive to unemployment rates. Aside from economic opportunities and hedonic amenities (e. g. climate, leisure and cultural offers, cf. Clark

and Cosgrove 1991), public infrastructure (Dalenberg and Partridge 1997; Colombo and Stanca 2014) and publicly provided services (Clark et al. 2003; Welch et al. 2007) were identified as further relevant amenities.

Findings related to this research's population show that graduate degree holders have a general preference for staying in urban areas or at places where labour demand in the public sector is higher (Faggian and McCann 2009). In addition, they favour locations offering richer natural amenity levels. High costs of living or inadequate job opportunities, in turn, weaken a metropolitan area's appeal to university graduates (Venhorst et al. 2011).

### 2.3 Individual traits and valuations in the migration decision-making process

The literature on the impact of individual traits (beyond standard socio-economic factors) and preferences on migration outcomes is sparse.

There is evidence that the Big-Five traits openness and extraversion, indicating a more pronounced ability to establish new connections, are associated with an increased migration probability (Jokela 2009) or a higher inclination towards future mobility (Canache et al. 2013). Over and above, risk-loving individuals are more likely to migrate in general (Jaeger et al. 2010; Nowotny 2010), and also when controlling for cultural distance (Bauernschuster et al. 2014). In this regard, moving to a destination most culturally different from the origin was associated with a wage premium of around 4% (Falck et al. 2014). The price of mobility, i.e. monetary measures of unobserved costs of German intrastate migration can be higher and correspond to a monthly income premium of € 4000, and of € 7000 for interstate migration (Schündeln 2014).

With respect to the importance of amenities, findings indicate that the valuation of amenities might be subjective, e.g. depending on educational attainment (Dalmazzo and de Blasio 2011): individuals with the highest formal education tend to report highest levels of satisfaction with amenities in the municipality. Potential returns to mobility might also be valued differently because time preferences vary across individuals (Frederick et al. 2002). Ultimately, this impacts on migration intentions (Van Dalen and Henkens 2012) and affects optimal job search intensity (DellaVigna and Paserman 2005).

Beyond economics, and related to the literature on wellbeing, there is also a discussion how personality might affect migration-related mental processes. Individually discerned persistent dis-amenities or stressors in the accustomed environment, translating into lower levels of subjective wellbeing, might provoke a migratory reaction to provide relief (Nowok et al. 2013). In this sense, migration then serves as remedy to regain a previously higher level of wellbeing within the process of hedonic adaption (Graham and Oswald 2010). Alternatively, migratory behaviour might be "initiated and perpetuated by an ex ante aspiration gap reflecting people's desire to realise economic, social, human or political opportunities" (Czaika and Vothknecht 2014, p. 3). These concepts can be linked to the literature on compensating differentials: seeking to (re-) gain access to the desired levels of certain amenities might induce individuals to accept a negative mobility premium in a geographically distinct labour market.

### 3 Modelling the mobility premium

In the following section I sketch a simple labour migration model, which integrates heterogeneous personalities into a compensating differential framework. This allows the derivation of testable hypotheses and serves as guidance for the empirical analysis.

The decision to migrate is a deliberate process, integrating over various individually relevant dimensions. Eventually, returns to mobility have at least to compensate for associated costs, such that expected utility from moving to an alternative destination  $D$  is at least equal to the expected utility from staying at the origin  $O$ :

$$E[U_D] \geq E[U_O] \quad (1)$$

In this context, the mobility premium  $\Delta$  would be the minimum additional surplus related to mobility, which ensures that Eq. 1 holds. Within this research, and referring to labour mobility, the mobility premium  $\Delta$  is interpreted as wage-related monetary incentive to induce geographically mobile behaviour.

For the subsequent modelling approach I assume individuals to be partially myopic. Hence, an individual's decision whether to migrate or not will now be an outcome of a decision-making process referring to a limited planning horizon of one period, for instance, representing a specific stage of life.

#### 3.1 The mobility premium in a compensating differential framework

Overall utility of a representative individual depends on the consumption of a homogeneous commodity  $x$  and the availability of an amenity  $a_L$ , the latter being specific to a given location  $L$ . The consumption level of commodity  $x$  is location-specific, since it is determined by location-specific income levels  $I_L$  and prices  $p_L$ . This gives as modified version of Eq. 1:

$$E \left[ \left( \frac{I_D}{p_D} \right)^\alpha a_D^{1-\alpha} \right] \geq E \left[ \left( \frac{I_O}{p_O} \right)^\alpha a_O^{1-\alpha} \right] \quad (1')$$

Expected utility is modelled as the above Cobb-Douglas type function for three reasons: analytical convenience, constant returns to scale, and over-proportional weight of low commodity or amenity levels. The second aspect ensures that higher levels of consumption or amenities actually translate into higher utility levels. The latter models strong incentives to avoid extremely low or unbalanced consumption and amenity levels.

The representative individual faces uncertainty regarding location-specific labour market outcomes: with probability  $\pi_{UO}$ , 'bad luck' leads to job loss at the beginning of the planning horizon. In this case, subsequent efforts to find new employment in location  $O$  are successful with probability  $\pi_{EO}$ . The corresponding location-specific wage income  $w_O$  is assumed to be equal to the one received before. If

job search remains unsuccessful, the resulting income consists of unemployment benefits  $\eta_O w_O$ . The expected utility for the staying option is thus

$$E [U_O] = \left( \frac{(1 - \pi_{UO}) w_O + \pi_{UO} (\pi_{EO} w_O + (1 - \pi_{EO}) \eta_O w_O)}{p_O} \right)^\alpha a_O^{1-\alpha}. \tag{2}$$

Irrespective of an initial job loss at origin, the individual has the opportunity to look for (new) employment at alternative destinations  $D$ , resulting in ‘try-your-luck’ migration.<sup>1</sup> This endeavour is successful with probability  $\pi_{ED}$ , leading to a realised wage income of  $w_D = w_O(1 + \Delta)$ , and thus,  $w_D$  may differ from the previous wage level at the origin. As moving would also be possible if job hunting remained unsuccessful, the associated income consisted of unemployment benefits, once again calculated as replacement rate  $\eta_D$  times previous wage income. If origin and destination were both subject to the same legislation,  $\eta_O = \eta_D = \eta$  results. This specification accommodates cross-border moves as well, however, settling without having previously worked in a destination country would imply non-eligibility to unemployment benefits ( $\eta_D = 0$ ).<sup>2</sup>

A moving person incurs fixed expenditures  $C$  and distance dependent monetary moving costs  $f(d_{OD})$ .<sup>3</sup> Taken together, these considerations yield the specification for expected utility at the destination:

$$E [U_D] = \left( \frac{\pi_{ED} (1 + \Delta) w_O + (1 - \pi_{ED}) \eta_D w_O - C - f(d_{OD})}{p_D} \right)^\alpha (a_D)^{1-\alpha}. \tag{3}$$

Substituting Eqs. 2 and 3 into Eq. 1, and solving for the mobility premium finally gives

$$\Delta \geq \frac{1}{\pi_{ED}} \left[ \left( \frac{p_D}{p_O} \right) \left( \frac{a_O}{a_D} \right)^{\frac{1-\alpha}{\alpha}} ((1 - \pi_{UO}) + \pi_{UO} (0\pi_{EO} + (1 - \pi_{EO}) \eta_O)) + \frac{C + f(d_{OD})}{w_O} + \eta_D (\pi_{ED} - 1) \right] - 1. \tag{4}$$

The minimum premium to induce geographic mobility displays several key features (cf. Table 1), known from the compensating differential literature: relatively higher prices or lower (perceived) availability of amenities at the destination require a higher level of compensation. Furthermore, higher costs of migration (relative to previous wage levels) or more generous unemployment benefits result in a higher minimum mobility premium.

<sup>1</sup> The term is borrowed from O’Connell (1997).

<sup>2</sup> Non-eligibility may also result in case of staying in the same legislation. In the German setting around 2013, this would occur in case of recent graduates who did not have permanent employment subject to social insurance contributions in the last 12 months.

<sup>3</sup> For this exposition, the only requirement is  $\partial f(d) / \partial d > 0$ .

**Table 1** Effects of location-specific model parameters on  $\Delta$ 

	Price levels		Amenity levels		Prob. of job loss	Prob. of finding employment		Unemployment insurance replacement rate	Fixed moving costs	Moving distance	Reference wage income	
	$p_O$	$p_D$	$a_O$	$a_D$	$\pi_{UO}$	$\pi_{EO}$	$\pi_{ED}$	$\eta_O$	$\eta_D$	$C$	$d_{OD}$	$w_O$
$\partial\Delta/\partial m$	-	+	+	-	-	+	-	+	+	+	+	-

Note: '+' represents a positive derivative and '-' a negative derivative of  $\Delta$  with respect to a model parameter  $m$ .

A higher job loss probability is associated with a smaller premium, since the expected value of staying is diminished.<sup>4</sup> Related to job uncertainty at the origin, a higher probability of finding new or alternative employment at a potential destination embodies an insurance effect, diminishing the required mobility premium.<sup>5</sup>

### 3.2 Mobility premiums in presence of a heterogeneous personality

In a first step, I extend the basic model for a representative individual by integrating heterogeneous migration-related costs, e.g. psychic costs (cf. Sjaastad 1962) which are inflicted by abandoning the familiar environment. Following the idea of Schwartz (1973), the latter are incorporated as recurring costs related to the frequency of visits  $\tau_i$ , required to compensate for the perceived psychic strain of leaving the social milieu. This allows to express psychic costs in monetary terms, and thus, yields the modified distance dependent moving cost component  $(1 + \tau_i) f(d_{OD})$ . These psychic costs are likely to vary across individuals and are possibly determined by individuals' extraversion ( $\psi_E$ ) and social preferences ( $\phi_S$ ). More extraverted people will establish a new social network more easily, and thus, travel back less frequently ( $\partial\tau_i/\partial\psi_E < 0$ ). Those with closer social ties to their origin would exert more effort to maintain their connections ( $\partial\tau_i/\partial\phi_S > 0$ ), reflecting also the idea of local social capital affecting migration outcomes (David et al. 2010).

Acculturative stress, in the context of cross-border migration (Berry et al. 1987), or challenges to the integration into a new living environment impose factors to be considered as well. Adjusting to new circumstances takes time and may affect the ability to enjoy amenities. Therefore, the subjectively perceived amenity level at a destination is  $\gamma_i a_D$ , with  $\gamma_i \in ]0,1]$ . This also mirrors aspects of hedonic adaptation (Frederick and Loewenstein 1999; Graham and Oswald 2010), where higher levels of adaptation allow individuals to recover faster from shocks to subjective well-being, thus plausibly lowering overall perceived costs of migration-related discomfort.

Adjustment capability  $\gamma_i$  will be affected by individuals' adaptability to new circumstances ( $\phi_A$ ), such that  $\partial\gamma_i/\partial\phi_A > 0$  holds. Beyond that, Big-Five personality traits are likely to matter as well: those more open to experiences ( $\psi_O$ ) might be more able to benefit from amenities in a new environment ( $\partial\gamma_i/\partial\psi_O > 0$ ). At

<sup>4</sup> For  $\eta_O < 1$  it holds that  $\frac{\partial\Delta}{\partial\pi_{UO}} = \frac{1}{\pi_{ED}} \left[ \left( \frac{p_D}{p_O} \right) \left( \frac{a_O}{a_D} \right)^{\frac{1-\alpha}{\alpha}} (\pi_{EO} + (1 - \pi_{EO}) \eta_O - 1) \right] < 0$ .

<sup>5</sup> Given that  $\eta_D$  is sufficiently small, i.e.

$$\eta_D < \left( \frac{p_D}{p_O} \right) \left( \frac{a_O}{a_D} \right)^{\frac{1-\alpha}{\alpha}} ((1 - \pi_{UO}) + \pi_{UO} (\pi_{EO} + (1 - \pi_{EO}) \eta_O)) + \frac{\Gamma_D + (1+\tau)f(d_D)}{w_O}.$$



the same time, acculturative challenges might be increasing in cultural dissimilarity (Falck et al. 2014), which is likely to become more pronounced if proficiency in the local language ( $\Lambda_L$ ) is weak ( $\partial\gamma_i/\partial\Lambda_L > 0$ ). This effect could be partially offset by previous mobility experiences ( $\chi$ , cf. Huber and Nowotny 2013): someone who has already been living abroad is likely to have developed some adjustment strategy and could thus handle unfamiliar circumstances more easily ( $\partial\gamma_i/\partial\chi > 0$ ).

As stated in Sect. 3.1, location-specific economic conditions determine the labour market related parameters, such as job loss probabilities. Individual perception of this likelihood is heterogeneous nevertheless: people neither have perfect information on actual economic statistics nor do they evaluate available information identically, thus the perceived individual job loss probability  $\pi_{UO,i}$  becomes relevant (cf. Van Dalen and Henkens 2012). While individual performance is not supposed to affect employment adversely within this model,<sup>6</sup> a worker scoring higher on the Big-Five trait neuroticism ( $\psi_N$ ) might still overestimate his or her individual job loss probability ( $\partial\pi_{UO,i}/\partial\psi_N > 0$ ). On the other hand, job finding probabilities  $\pi_{EL,i}$  are presumed to depend on the individual effort exerted during job search. Effort levels, for instance, how precisely alternatives are evaluated or how much attention is paid to an application, are supposed to be shaped by the personality traits agreeableness ( $\psi_A$ ) and conscientiousness ( $\psi_C$ ). The latter has been found to be associated to a more intensive job interview preparation (Caldwell and Burger 1998). Risk-attitude ( $\phi_R$ ) is likely to play a role as well (Ekelund et al. 2005; Kern 2015): more risk-loving individuals might consider self-employment as an additional alternative, increasing the overall likelihood of generating income. Furthermore, a patience parameter ( $\phi_P$ ) might be indicative of improved job finding perspectives if this parameter refers to individual willingness to bear higher (search) costs for the sake of increasing expected deferred returns (DellaVigna and Paserman 2005). The basic relations are thus  $\partial\pi_{EL,i}/\partial\psi_C > 0$ ,  $\partial\pi_{EL,i}/\partial\psi_A > 0$ ,  $\partial\pi_{EL,i}/\partial\phi_R > 0$  and  $\partial\pi_{EL,i}/\partial\phi_P > 0$ . Aside from personality parameters, human capital will matter too. Especially language proficiency in the local language ( $\Lambda_L$ ) will boost employment perspectives: language proficiency may facilitate job search, help communicating own qualifications to prospective employers or be a prerequisite in occupations with customer contact (Shields and Price 2002; Dustmann and Fabbri 2003).

Accounting for individual-specific labour market perceptions ( $\pi_{UO,i}, \pi_{EO,i}, \pi_{ED,i}$ ), heterogeneous adjustment capabilities ( $\gamma_i$ ) and psychic costs ( $\tau_i$ ), the mobility premium can be rewritten as

$$\Delta_i \geq \frac{1}{\pi_{ED,i}} \left[ \left( \frac{pD}{pO} \right) \left( \frac{aO}{\gamma_i aD} \right)^{\frac{1-\alpha}{\alpha}} ((1 - \pi_{UO,i}) + \pi_{UO,i} (\pi_{EO,i} + (1 - \pi_{EO,i}) \eta_O)) + \frac{C + (1 + \tau_i) f(d_{OD,i})}{w_O} + \eta_D (\pi_{ED,i} - 1) \right] - 1. \tag{4'}$$

<sup>6</sup> In extreme cases, even shirking would go unpunished. Such an outcome is not at all unrealistic in the presence of strong worker protection.

In this specification, all individual-specific model parameters (index  $i$ ) depend on personality, individual traits or preferences. Equation 4' can now be used to derive hypotheses, which are then tested in Sect. 5.

### 3.3 Scenario and personality-related hypotheses

Within the empirical analysis I will examine expected mobility premiums in four scenarios. These scenarios are defined by the likelihood of being unemployed and whether a cross-border move is considered or not.

1. **Scenario A1: internal try-your-luck migration** ( $\Delta_{A1,i}$ )

The individual can retain the work place at the origin ( $\pi_{UO,i} = 0$ ), but considers moving to an alternative state within the same jurisdiction ( $\gamma_{1,i}(d_1), \eta_D > 0$ ).

2. **Scenario A2: cross-border try-your-luck migration** ( $\Delta_{A2,i}$ )

Though having employment at the origin ( $\pi_{UO,i} = 0$ ), the individual considers migrating to another country ( $\gamma_{2,i}(d_2), \eta_D = 0$ ).

3. **Scenario U1: internal migration to avoid unemployment** ( $\Delta_{U1,i}$ )

If the individual decides to stay, he or she will be unemployed ( $\pi_{UO,i} = 1$ ). A possible alternative to avoid an unemployment spell is to move to another state in the same country ( $\gamma_{1,i}(d_1), \eta_O = \eta_D, \eta_O > 0$ ).

4. **Scenario U2: cross-border migration to avoid unemployment** ( $\Delta_{U2,i}$ )

Being without employment at the origin ( $\pi_{UO,i} = 1$ ), the subject evaluates relocating to another country ( $\gamma_{2,i}(d_2), \eta_O > 0, \eta_D = 0$ ) to find gainful employment.

Typically, the mobility premiums to induce a representative individual to move abroad should be larger than those related to intra-national moves ( $\Delta_{A2} > \Delta_{A1}$  and  $\Delta_{U2} > \Delta_{U1}$ ). This difference comprises of an acculturative premium (related to  $\gamma_2 < \gamma_1$ ) and a compensation for the loss of unemployment insurance abroad.

For any replacement rate  $\eta_O \in ]0,1[$  there results an excess mobility premium ( $\Delta_{A1} > \Delta_{U1}$  and  $\Delta_{A2} > \Delta_{U2}$ ) for the representative employed individual. It compensates for a relatively higher value of staying due to having employment at the origin.

The mobility premiums can take on negative values ( $\Delta_i < 0$ ) across scenarios if they are interpreted as hedonic premiums. This is the case whenever price levels at a destination are sufficiently below those at the origin, increasing consumption possibilities, or the (subjectively perceived) levels of amenities at a destination are sufficiently above those at the origin. This constitutes the direct link to the compensating differential literature.

Table 2 documents the hypothesised relationships between personality ( $p_i$ ) and individual-specific parameters ( $m_i$ ), as well as their expected joint impact on the mobility premiums in case of heterogeneous, instead of representative individuals. More previous mobility experiences, for instance, are assumed to increase individual adjustment capability. The latter is negatively related to mobility premiums, and thus, the overall hypothesised effect of previous mobility experiences on mobility premiums would be negative.

**Table 2** Hypotheses matrix for personality and individual-specific model parameters [re-designed]

	Individual-specific model parameters ( $m_i$ )					Effect of personality parameters on $\Delta_i$
	Psychic cost parameter	Individual adjustment capability	Perceived job loss probability	Job finding probability at origin/destination		
	$\tau_i$	$\gamma_i$	$\pi_{UO,i}$	$\pi_{EO,i}$	$\pi_{ED,i}$	$(\partial\Delta_i/\partial m_i \times \partial m_i/\partial p_i)$
Effect of model parameter on $\Delta_i$ ( $\partial\Delta_i/\partial m_i$ )	+	-	-	+	-	
	Effect of personality parameter ( $p_i$ ) on $m_i$ ( $\partial m_i/\partial p_i$ )					
Risk attitude (career domain, $\phi_R$ )	n.e.	n.e.	n.e.	+	+	$\pm$
Patience ( $\phi_P$ )	n.e.	n.e.	n.e.	+	+	$\pm$
Big-Five: extraversion ( $\psi_E$ )	-	n.e.	n.e.	n.e.	n.e.	-
Big-Five: neuroticism ( $\psi_N$ )	n.e.	n.e.	+	n.e.	n.e.	-
Big-Five: agreeableness ( $\psi_A$ )	n.e.	n.e.	n.e.	+	+	$\pm$
Big-Five: openness ( $\psi_O$ )	n.e.	+	n.e.	n.e.	n.e.	-
Big-Five: conscientiousness ( $\psi_C$ )	n.e.	n.e.	n.e.	+	+	$\pm$
Adaptability ( $\phi_A$ )	n.e.	+	n.e.	n.e.	n.e.	-
Proximity to reference persons ( $\phi_S$ )	+	n.e.	n.e.	n.e.	n.e.	+
Previous mobility experiences ( $\chi$ )	n.e.	+	n.e.	n.e.	n.e.	-
Local language proficiency ( $\Delta_I$ )	n.e.	+	n.e.	(+)	+	(+)-

‘+’ represents a positive derivative and ‘-’ a negative derivative of  $\Delta_i$  ( $m_i$ ) with respect to a model (personality) parameter ‘n.e.’ indicates that no effects are modelled for individuals with heterogeneous personalities and preferences

There is some a priori ambiguity with respect to personality parameters related to job finding probabilities: personality affects job search symmetrically, yet, job finding probability at the origin is positively related to premiums, while the corresponding probability at a destination would lower expected mobility premiums. In fact, these opposite effects could negate each other. If, however, more patient individuals would ask for a significantly lower premium, this can be seen as evidence in favour of them attributing a higher weight to the spatially distinct labour market.

### 4 Data and descriptive statistics

The influence of personality and preferences on the formation of mobility premiums is tested using micro-data from a student mobility survey (MESARAS 2013; Weisser 2016a), which was conducted in October 2013 at the economics depart-

ments of seven adjacent universities in northern and middle Germany.<sup>7</sup> These seven public universities represent the German higher education landscape in terms of size (5000 to 44.000 students), variety of offered curricula, cities (rural, urban and metropolitan) and states (East and West Germany) they are located in. The cross-sectional survey was implemented as self-administered questionnaire and integrated either into the orientation week or a lecture in the first two weeks of the semester. Using administrative enrolment data, a high degree of representativeness could be established (Weisser 2016b).<sup>8</sup> For the participating departments, the sample covered 68.3% of all enrolled first semester students. Thus, except for basic aspects of self-selection into a special study programme, the respondents can be assumed to be rather representative for young adults at the beginning of their (academic) career.

The focus on economics and business programmes,<sup>9</sup> in turn, resulted from practical and methodological considerations. For one, these programmes are (amongst) the most frequently chosen programmes in the population of freshmen in 2013 (Destatis 2014). This implies that the sample represents a substantial share of the student population, and thus, a meaningful sample size could be realised.<sup>10</sup> Moreover, programmes' curricula are diverse, such that they may appeal to individuals with diverse interests. Eventually, this study's sample should allow to draw conclusions with respect to future graduates who can be seen as generalists, employable in many fields of the labour market.

In order to obtain a more precise picture of respondents' migratory profile, the survey comprised a number of items directly assessing individuals' inclination towards various forms of mobility, related preferences, and previous mobility experiences. Some of these, such as individual intentions to move and the perceived riskiness of moves will be used in robustness checks, implemented to address the fact that the investigated mobility premiums are *ex ante* measures. In addition to individual characteristics, such as personality traits and personal valuations, the survey elicited postal codes to map episodes of geographic mobility. This approach allows to identify individuals' current residence, and thereby to isolate a geographic reference point to which amenity levels at a destination may be compared to.

Having sketched the relevance of location-specific conditions in the above described model, the empirical analysis explicitly takes these components into account. All location-specific data, e. g. economic and demographic conditions, originate from the 'INKAR online' database (BBSR 2014). The chosen reference year is 2012, the most recent year before the survey took place. Extracted data furnishes information on GDP per capita, a price level proxy and unemployment on the district level.

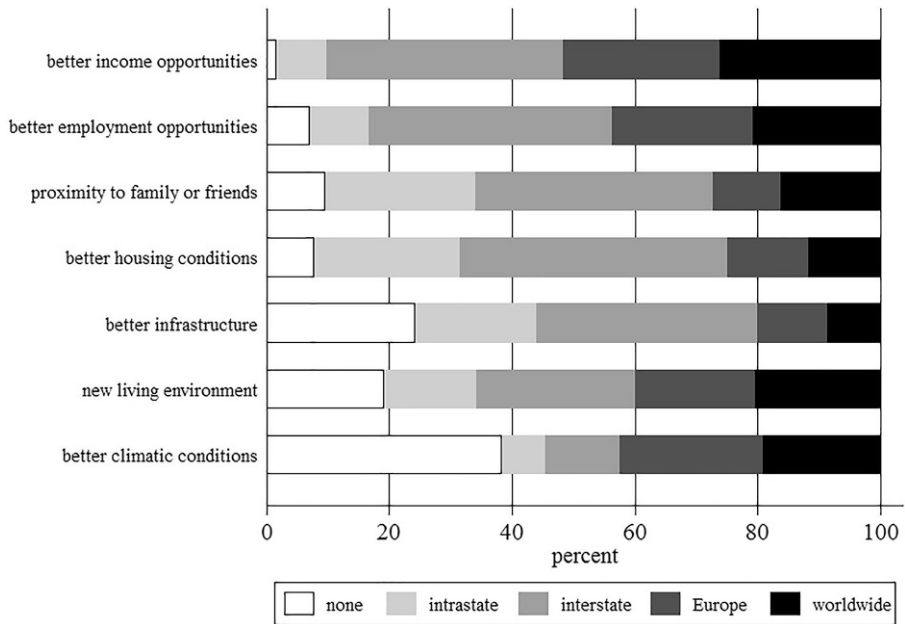
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<sup>7</sup> Students from the following universities participated: Bielefeld University, Clausthal University of Technology, TU Dortmund University, Martin-Luther-University Halle-Wittenberg, Leibniz Universität Hannover, University of Muenster and Otto von Guericke University Magdeburg. All universities are located in three German states (Lower Saxony, North Rhine-Westphalia, Saxony-Anhalt).

<sup>8</sup> Representativeness was evaluated based on gender, age, study programme and former educational attainment.

<sup>9</sup> Included programmes are business administration, economics, economics and business administration, engineering economics and business informatics.

<sup>10</sup> A practical argument related to the relative ease of obtaining economics departments' permission to conduct the survey on-site.



**Fig. 1** Maximum willingness to move, by motive (in %). Note: Sample size for all seven motives varies between 2202 and 2216 respondents

Referring to the amenity domain, the INKAR data also features information on district-level recreational area or transport connections, which is linked to individuals' postal code area of residence.

#### 4.1 Migration motives and willingness to move

The literature review presented a variety of influential factors affecting migration decisions. Some factors, e.g. finding employment or improving quality of life, may act as important motives to induce different types of migration. The realisation of more pressing motives, related to a substantial increase of subjective or economic wellbeing, might trigger a long distance move. Finding gainful employment in case of unemployment can be such a motive. Referring to the literature on compensating differentials, the aspiration to secure access to an amenity is another plausible one.

For seven different motives, participants in the MESARAS 2013 survey have been asked to state the maximum migratory move they would consider in order to realise the associated motive. In line with Arntz (2010), the results in Fig. 1 illustrate that especially economic motives might induce higher degrees of mobility. However, almost 17% explained their unwillingness to move to another state (or beyond) to improve employment opportunities in case of unemployment. 7.2% claim to be unwilling to move at all, even within the state. Cross-border moves are, to a larger extent, considered in case of labour market related motives: 44% mention a basic willingness to leave the country for better job opportunities (in case of

unemployment) and 51.5% state that better income opportunities would make them consider a cross-border move.

In contrast to this, prospective university graduates are less inclined to move to another country for the sake of being closer to family or friends. The same holds for gaining access to better housing conditions or infrastructure. Since most respondents in the sample have been born and raised in Germany, increasing proximity to reference persons typically does not require a cross-border move. Similarly, housing and infrastructure quality in Germany can be assumed to be relatively high, hence migrating to another country would not yield an improvement.

Climatic conditions, often identified as relevant migration motive (cf. Rappaport 2007), do not constitute an important migration motive for young adults in this sample: 38.4% display a complete unwillingness to move at all in order to get to a location offering better climatic conditions. The possibility to explore new living environments is for 60% not a sufficiently strong motive to induce cross-border mobility.

The observed variation in the shares of individuals willing to display a specific degree of mobility stresses the relevance of the underlying individual aspiration. At the same time, and across motives, a notable share of individuals—ranging from 10 to 45%—lacks any willingness to move beyond the intra-German state borders.<sup>11</sup> Staying at or remaining close to a place of residence is highly valued. In all likelihood, offsetting such a tendency to dwell requires a substantial mobility premium, even to induce interstate mobility.

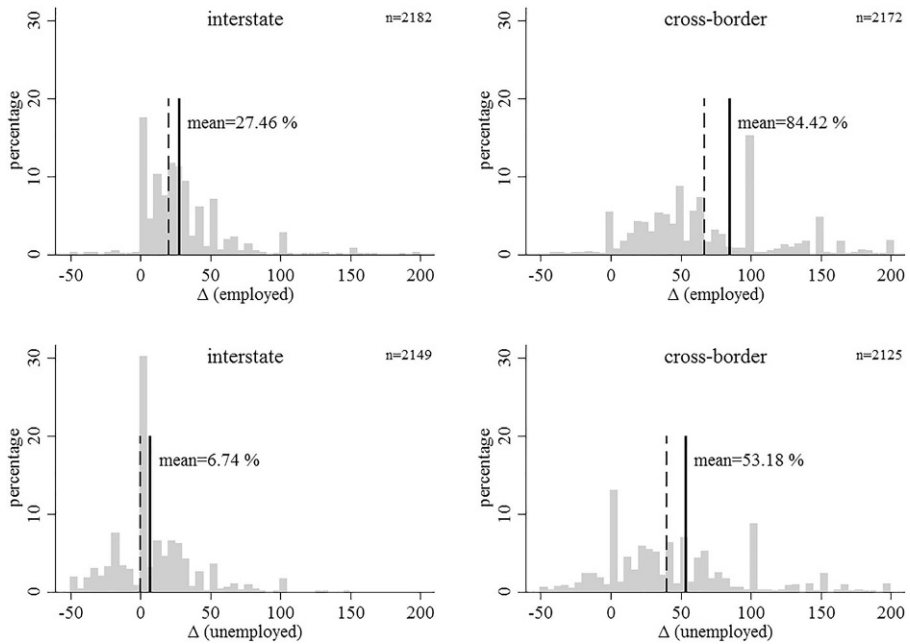
## 4.2 Mobility premiums across scenarios and personality dimensions

The starting point for the calculation of mobility premiums is the minimum monthly expected net income after graduation ( $w_0$ ). In the full sample, this corresponds to 3608.50 €. <sup>12</sup> Gross entry level salaries for graduates with an economics or business degree amount to ca. 50.000 € per year (4200 € per month; Statista 2018) in 2018, which is the year the typical student in the 2013 cohort would graduate. Considering that the entry level figures refer to gross wages, respondents' net wage expectations might have been overly optimistic. In the sub-sample of those with previous full-time working experience, however, the mean expectation amounts to 2891.59 €. This comes very close to the 2530 € a single person with a monthly gross income of 4200 € (marginal tax and social insurance contribution rate around 40%) would actually receive as net income. Eventually, in both samples the median net wage expectation is 2500 €. <sup>13</sup> This demonstrates that respondents have a basic understanding of their future income perspectives.

<sup>11</sup> Only 2.7%, however, display a reluctance to move beyond the state border for all seven motives.

<sup>12</sup> The full sample comprises individuals with non-missing information in at least one of the scenarios. The median is 2500 €.

<sup>13</sup> The first (1800 €) and the ninth (4000 €) deciles are also identical across the two samples.



**Fig. 2** Mobility premiums, by migration and employment scenario. Note: The *solid vertical line* depicts the average mobility premium; the *dashed line* corresponds to the median. For the sake of readability, the depicted premiums are confined to the interval [-50,200]

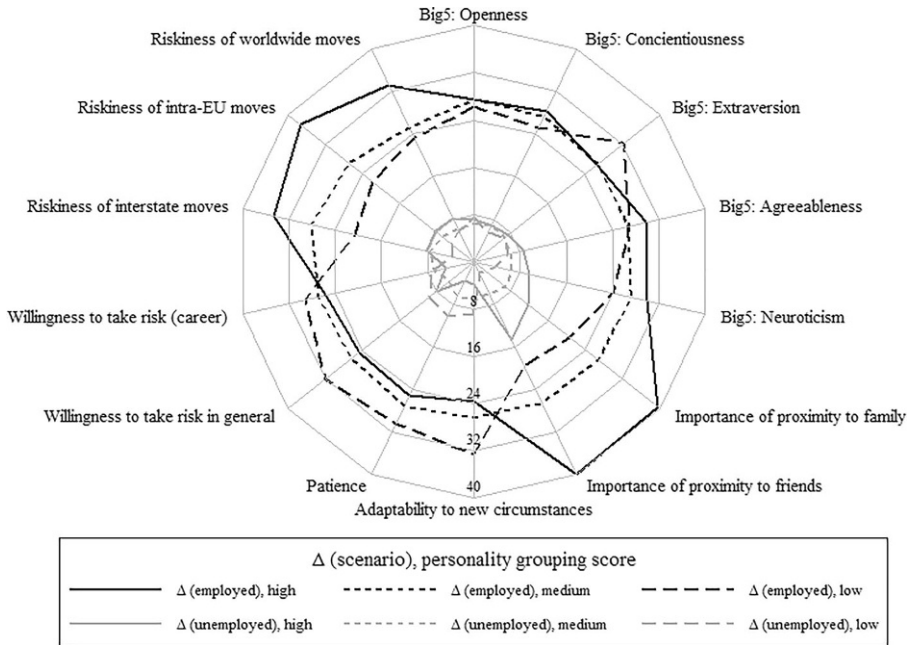
With respect to the four scenarios, expected income levels so a respondent would be willing to move to an alternative destination have been directly elicited.<sup>14</sup> Being confronted with precisely depicted scenarios, participants stated their expected wage levels for internal ( $w_{A1}$ ) and cross-border ( $w_{A2}$ ) try-your-luck migration, respectively internal ( $w_{U1}$ ) and cross-border ( $w_{U2}$ ) migration to avoid unemployment. Accordingly, one obtains a mobility premium, e. g. in case of cross-border mobility in the unemployment scenario:

$$\Delta_{U2} = \frac{w_{U2} - w_O}{w_O}$$

The subsequent analyses are based on a trimmed sample, where the lowest and the highest 0.5% of responses are excluded. Consistency checks and a validation of participants' response behaviour indicated that responses at these extreme ends are mostly related to a misunderstanding of reference values (monthly versus yearly).<sup>15</sup>

<sup>14</sup> Translated versions of those items used for the construction of the four mobility premiums are listed in the appendix (Fig. 4).

<sup>15</sup> I also apply quantile regression techniques in order to account for outliers (results reported in Table O.3 and Table O.4, online appendix).



**Fig. 3** Mobility premiums for internal migration scenarios, conditional on personality groupings (in %). Note: For each of the two depicted scenarios (employed vs. unemployed) the three depicted groups refer to a classification based on standardised scores of the underlying variables. The ‘medium’ group refers to those scoring within one standard deviation around the mean and the ‘high’ (‘low’) group comprises those more than one standard deviation above (below) the mean of the underlying variable. The sample size varies across dimensions between 2120 and 2181

Fig. 2 illustrates the mobility premiums’ unconditional distributions: the average expected mobility premium for an interstate move, whilst having an alternative employment option at the origin, amounts to 27.5%. In case of cross-border mobility, the corresponding average expected premium is 84.4%. For the unemployment scenario, we observe the expected downward shift of the mobility premium in both migration scenarios. The average internal mobility premium to avoid unemployment is still positive, i.e. it equals 6.7%.<sup>16</sup> Most notably, this ex ante mobility premium is virtually identical to displaced workers’ realised interstate wage premium in the US (Yankow 2003). In contrast to the scenario assuming continued employment at the origin (upper left panel), half of the respondents were willing to accept a lower income level for the sake of finding employment elsewhere. The average cross-border mobility premium in the unemployment scenario drops by more than one third to 53.2%. However, half of all respondents still featured an expected premium of more than 40%.

<sup>16</sup> This figure can be compared to unemployed graduates’ outside option, i.e. social security benefits. In the German context, unemployed graduates without continuous employment in the previous 12 months were only eligible to social assistance (390€ in 2013). The observed absolute mean premium in the interstate unemployment scenario (U1) amounts then to one third of the social assistance benefits.



The likely sources of the variation in the unconditional ex ante mobility premiums can be traced in Fig. 3, which depicts average interstate mobility premiums conditional on personality groupings:<sup>17</sup> those scoring distinctly below the mean (dashed line) on a given scale, those scoring within one standard deviation around the sample mean (short dashed line) and those notably above the mean (solid line). This approach offers a convenient comparison of more extreme types relative to the average respondent, irrespective of the underlying scale. The closer a line comes to the graph's centre the smaller the group-specific average mobility premium, and vice versa.

Participants who expressed a most pronounced preference of proximity to reference persons (solid lines) or who rated themselves as having a low adaptability to new circumstances (dashed lines) expect the highest mobility premium. If a person perceived an interstate move to be an especially risky endeavour, she would also exhibit a higher mobility premium. The tendency for more risk-averse persons to expect a higher mobility premium becomes more distinct for the scenarios assuming alternative employment at the origin (black lines). Individuals scoring highest in the Big-Five trait neuroticism expect on average a mobility premium of 30.2% in the employment scenario. Those on the opposite side of the scale exhibit an average mobility premium of 23.9%.

Turning to the cross-border scenarios (Fig. 5 in the appendix), group-specific mobility premiums are consistently larger in both labour market scenarios. In case of the trait neuroticism, for instance, the average expected cross-border mobility premium in an unemployment scenario (grey lines) of those scoring highest amounts to 56.1%. Least neurotic individuals still require on average a premium 47.9%, which is twice the size of the corresponding premium in the internal migration scenario.

The descriptive statistics in the four scenarios support the claim that heterogeneous personalities or preferences are most relevant candidates for understanding the distribution of mobility premiums.

## 5 Empirical analysis

To which extent do personality characteristics and preferences explain expected mobility premiums of prospective academics? After a brief discussion of the applied estimation specification in Sect. 5.1, Sect. 5.2 provides scenario-specific answers to this question. In Sect. 5.3, I discuss additional sensitivity checks, addressing the reliability of decisions in a hypothetical context and differing levels of labour market readiness.

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<sup>17</sup> All personality- or preference-related variables were elicited using Likert-type scales. The Big-Five personality traits are based on the short inventory by Rammstedt and John (2007), which has been validated in a student sample. The willingness to take risks items are borrowed from the German Socio-Economic Panel. A brief overview can be found in Table 4; more detailed information is accessible via the survey's documentation material (project report, questionnaire and codebook; Weisser 2016a)

## 5.1 Estimation specification

Scenario-specific mobility premiums ( $\Delta$ ) are investigated by applying ordinary least squares regressions. The estimation equation, which is the empirical equivalent of Eq. 4', takes the following form:

$$\begin{aligned} \Delta_i = & \beta_0 + \sum \beta_{\text{Soc}} X_{\text{Soc},i} + \beta_R I(\phi_{R,i}) + \beta_P I(\phi_{P,i}) + \sum \beta_\psi I(\psi_{\text{Big5},i}) \\ & + \sum \beta_S I(\phi_{S,i}) + \beta_A I(\phi_{A,i}) + \sum \beta_\chi \chi_i + \sum \beta_a L_0 + \beta_w \ln w_{O,i} + \varepsilon_i \end{aligned} \quad (5)$$

The set of socio-demographic variables ( $X_{\text{Soc}}$ ) encompasses in addition to gender, age, and partnership status also English language proficiency ( $\Lambda$ ). The preferred specification further contains the full set of individual traits and location-specific conditions, as introduced in the theoretical model in Sect. 3.<sup>18</sup> Personality-related variables, such as willingness to take risks (in the career domain,  $\phi_R$ ), patience ( $\phi_P$ ) and the Big-Five personality traits ( $\psi_{\text{Big5}}$ ) enter the model in categorical form, indicated by the notation  $I(\cdot)$ . The same holds for the adaptability measure ( $\phi_A$ ) and the social preference variables ( $\phi_S$ ). For each of these, a standardisation of the original scale variable yielded three distinct groups. The first is the reference group comprising the average-type individuals, whose standardised score is within the range of one standard deviation around the mean. The second group contains individuals scoring more than one standard deviation below the mean (labelled 'low') and the third includes those with scores more than one standard deviation above the mean (labelled 'high'). This approach allows detecting heterogeneous effects across groupings. Previous mobility experiences ( $\chi$ ) are controlled for as well. This includes earlier stays abroad and residential mobility during adolescence, as well as the most recent mobility experience, namely educational mobility.<sup>19</sup>

The location-specific conditions ( $L_0$ , comprises both the economic and hedonic dimension) refer to the district a participant explicitly stated to be his current place of residence. Aside from mostly economic variables, i.e. GDP per capita, building land prices as commodity price level proxy ( $p_O$ ) and the unemployment rate ( $\pi_{VO}$ ), they also comprise a measure of urbanisation (population density). Aspects of urban interconnectedness are also integrated, based on variables representing the time it takes to reach the three closest agglomeration centres by either car or train. Further (more hedonic) amenities ( $a_o$ ) are directly represented by a measure of access to recreational space and the provision of public goods, gauged by the relative number of communal employees.

<sup>18</sup> Table 1 contains the expected effects of location-specific variables ( $L_O$ ), Table 2 documents the hypotheses for personality and individual-specific model parameters. An overview of corresponding descriptive statistics can be found in Table 4 in the appendix.

<sup>19</sup> Educational mobility refers in this context to geographic mobility for educational purposes, i.e. attending a university. It is measured as excess distance, i.e. the difference of the distance from an individual's pre-study origin to the chosen study location and the distance between this origin and the closest university offering an economics programme.

**Table 3** Scenario-specific mobility premiums

Labour market scenario	Interstate		Cross-border		Unemployment ( $\Delta U_2$ )	
	Job alternative ( $\Delta A_1$ )	Unemployment ( $\Delta U_1$ )	Job alternative ( $\Delta A_2$ )	Unemployment ( $\Delta U_2$ )		
	Coeff	s.e.	Coeff	s.e.	Coeff	s.e.
Gender (female = 1)	-0.7197	(1.3516)	2.8991*	(1.4818)	-1.1969	(3.4233)
Age	-0.0424	(0.2950)	0.8025**	(0.3497)	0.2120	(0.7946)
Partnership (yes = 1)	1.7965	(1.1705)	1.7942	(1.3101)	7.9239***	(3.0381)
Language skills (English)	0.2028	(1.9403)	0.3641	(2.2884)	-14.2812**	(5.4485)
Risk attitude (career domain, $\phi_R$ )	-0.9351	(1.7837)	-1.0436	(2.0699)	-7.8434	(5.1402)
Patience ( $\phi_P$ )	1.0668	(1.4569)	-0.8305	(1.5940)	8.0559***	(3.6874)
Extraversion ( $\psi_E$ )	1.5480	(1.7940)	-0.3313	(2.0657)	6.4476	(4.6659)
Neuroticism ( $\psi_N$ )	3.5968**	(1.6727)	2.8933	(1.8766)	8.1635	(4.7347)
Openness ( $\psi_O$ )	-0.8534	(1.5963)	-2.8192	(1.8302)	-3.4149	(4.0071)
Conscientiousness ( $\psi_C$ )	2.5990	(1.8788)	-2.6948	(2.2157)	4.6261	(5.1057)
Agreeableness ( $\psi_A$ )	-0.1800	(1.4925)	1.1296	(1.7892)	1.7766	(4.1112)
Adaptability ( $\phi_A$ )	-1.4558	(1.8312)	-1.0017	(2.0034)	2.5899	(6.3460)
Importance of proximity (family, $\phi_S$ )	0.8838	(1.6923)	1.4164	(1.8689)	-4.2229	(4.2936)
Importance of proximity (friends, $\phi_S$ )	-3.3878**	(1.4769)	-1.3327	(1.7242)	-4.6182	(4.3390)
	-2.5564*	(1.5025)	0.4247	(1.7016)	-0.7239	(4.5052)
	-0.2856	(1.8096)	0.5959	(2.2331)	-2.1957	(5.6295)
	-0.2953	(1.5997)	-1.5744	(1.8060)	-3.0004	(4.3060)
	-0.1304	(1.5247)	0.4803	(1.7744)	0.0486	(4.3776)
	3.1860*	(1.6513)	2.9933*	(1.6798)	1.4983	(4.4005)
	3.2690**	(1.5967)	3.2048*	(1.8258)	8.8515***	(4.4889)
	1.1230	(1.7819)	0.7855	(1.8689)	-3.0120	(5.6145)
	-2.0220	(1.5136)	-0.6128	(1.7450)	-5.5772	(4.6928)
	6.8777***	(2.1252)	-0.0198	(2.3834)	19.4975***	(5.5309)
	-4.1752***	(1.6051)	-2.6304	(1.8219)	-11.6357***	(4.7672)
	6.0000***	(2.1067)	6.0702**	(2.4882)	14.7322***	(6.0359)

Table 3 (Continued)

Migration scenario	Interstate		Unemployment ( $\Delta U_1$ )		Cross-border		Unemployment ( $\Delta U_2$ )	
	Job alternative ( $\Delta A_1$ ) Coeff	s. e.	Coeff	s. e.	Job alternative ( $\Delta A_2$ ) Coeff	s. e.	Coeff	s. e.
Previous mobility experiences ( $X$ )								
Residential move (yes = 1)	0.6710	(1.3230)	-0.0689	(1.5600)	1.0977	(3.9437)	1.4013	(3.5242)
Exchange participation (yes = 1)	-2.6014**	(1.2690)	-1.4469	(1.4204)	-7.7866**	(3.4505)	-3.7100	(3.1709)
Stay abroad (yes = 1)	-4.7414***	(1.5033)	-4.1557***	(1.6069)	-16.9764***	(3.8522)	-17.1766***	(3.2677)
Educational mobility (km)	-0.0239***	(0.0058)	-0.0254***	(0.0060)	-0.0535***	(0.0169)	-0.0454***	(0.0140)
Local conditions at origin ( $LO$ )								
GDP (per capita)	-0.4408**	(0.1916)	-0.4078**	(0.2025)	-1.4459**	(0.5720)	-1.2819**	(0.5165)
Building land prices	0.0868***	(0.0278)	0.0237	(0.0314)	0.1760**	(0.0833)	0.0795	(0.0784)
Accessibility (train)	-0.0881*	(0.0508)	-0.0824	(0.0570)	-0.2835**	(0.1406)	-0.3259**	(0.1314)
Accessibility (car)	-0.0444	(0.0903)	0.0524	(0.1056)	0.1183	(0.2784)	0.0923	(0.2594)
Pop. density	-0.0032*	(0.0018)	-0.0022	(0.0021)	-0.0020	(0.0063)	0.0001	(0.0058)
Recreational area (per capita)	0.0216	(0.0220)	-0.0181	(0.0275)	0.1261*	(0.0711)	0.1105	(0.0717)
Public services	-0.0199	(0.0410)	0.0630	(0.0473)	-0.0331	(0.1287)	0.0637	(0.1141)
Unemployment rate ( $\pi U_0$ )	-0.4863	(0.5302)	-0.4212	(0.6319)	-2.9644*	(1.7863)	-3.0359*	(1.7150)
Relative income control (ln $w_0$ )	-6.1957***	(1.3197)	-10.0112***	(1.7196)	-13.6083***	(3.5053)	-19.0974***	(3.2757)
Observations	1851		1851		1851		1851	
df (model)	38		38		38		38	
F-statistic	7.75		3.64		7.17		6.41	
Prob > F	0.0000		0.0000		0.0000		0.0000	
R-squared	0.1280		0.0834		0.1093		0.1080	
Adjusted R-squared	0.1097		0.0642		0.0906		0.0893	

Note: Robust standard errors implemented

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

In addition, all specifications incorporate the logarithm of the expected post-graduation income levels ( $w_O$ ). This accounts for cases where individuals might just ask for a reimbursement of fixed monetary moving costs, which are not depending on distance. Comparable amounts, however, might correspond to largely varying mobility premiums, depending on the position in the distribution of expected incomes.

## 5.2 Scenario-specific results

The main results (Table 3) refer to the sample to those 1851 individuals with four non-missing scenario-specific premiums.<sup>20</sup> Some model parameters display explanatory power across different scenarios, others are rather scenario-specific.

Social preferences ( $\phi_S$ ), e.g. importance of proximity to social reference persons, have to be heavily compensated for, especially in the scenario with an existing job alternative: if an individual has a distinctive affinity to familiar reference persons, the observed internal mobility premium is 13 percentage points higher.<sup>21</sup> Notably, proximity to family loses all explanatory power and it is only proximity to peers which retains its predictive power in the internal unemployment scenario. The network of friends has a higher value, e.g. a peer network can provide information on job openings. Overall, this lends strong support in favour of the psychic costs hypothesis—if existing social ties are especially relevant, people expect to be compensated more copiously for the discomfort of moving and being apart from familiar reference persons. The coefficients' relative size is in line with findings of Dahl and Sorenson (2010), who documented technical workers' high valuation of proximity to their parents or former classmates.<sup>22</sup> This further suggests that factors of high relevance in a real-world context can also be uncovered in an analysis of expected ex ante premiums.

Previous mobility experiences ( $\chi$ ), supposed to strengthen adjustment capabilities ( $\gamma$ ) in the model, are indeed associated with lower expected mobility premiums. Participants who spent time abroad expected a 4.2 to 4.7 percentage point smaller internal mobility premium. Those who displayed higher levels of educational mobility, e.g. by choosing a study location 100 kilometres beyond the closest alternative, feature a 2.4 to 2.5 percentage points diminished ex ante mobility premium. Across specifications, residential mobility during adolescence does not exhibit any explanatory power—the impact of mobility experiences in the distant past seem to fade out over time. In the domain of adjustment capabilities one can observe some differences too, especially between the scenario assuming existing job alternative and the scenario assuming unemployment. Only in the first one, individuals with short-term cross-border mobility experience (exchange participation) reduce the expected

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<sup>20</sup> Table O.1 and Table O.2 (online appendix) report results from alternative specifications, based on a restricted parameter space.

<sup>21</sup> For an individual scoring highest in importance of family and friends, the overall magnitude is the sum of 6.88 and 6 percentage points.

<sup>22</sup> Doubling the distance to the former is related to an annual income compensation between \$ 5263 and \$ 12.753.

mobility premium. This effect can be observed for both the internal and the cross-border scenario.

Across all four scenarios, adaptability to new circumstances, a measure hypothesised to impact on adjustment capability and related to the concept of hedonic adaptation (Frederick and Loewenstein 1999; Graham and Oswald 2010) proves to be a predictor of inflated mobility premiums. In both internal migration scenarios, individuals rating themselves as least adaptable to new circumstances expect on average mobility premiums that are 3.2 percentage points above those of the reference group, consisting of respondents of medium adaptability. This number varies between 8.9 and 10.3 percentage points in the cross-border scenarios.

With respect to personality traits in a narrower sense, the evidence is mixed. The Big-Five personality trait agreeableness, for instance, displays a similar level of explanatory power for internal mobility premiums: Most agreeable individuals ask for an additional premium of ca. 3 percentage points.<sup>23</sup> If these individuals expect episodes of labour mobility to be prompted by a future employer, they might expect a compensation for showing such distinct form of commitment to the requirements of the job. And indeed, there is evidence that agreeableness and job performance are positively correlated (Mount et al. 1998), respectively agreeable individuals evince also higher levels of job involvement (Liao and Lee 2009). Openness to experience is the second Big-Five trait which displays significant effects in the internal migration scenario, assuming an existing job alternative. Both groups, those scoring highest and those scoring lowest in this trait feature lower mobility premiums, however, only the first is in line with the hypotheses presented in Sect. 3.3. Risk attitude does not explain any variation in case of internal mobility premiums. Least patient individuals, however, ask for a 3.6 percentage point mobility premium in the try-your-luck scenario—their focus on the present may lead to an overemphasis of contemporary monetary compensation relative to the creation of long-term perspectives.<sup>24</sup>

Cross-border mobility premiums are not only larger in absolute terms, but feature a higher elasticity with respect to personality and preference parameters (Table 3): significant coefficients in the cross-border specifications are typically two or three times the size of the corresponding coefficient in the internal migration scenarios.

Important factors are once again previous mobility experiences and adaptability, both fostering adjustment capabilities. Beyond that, English language proficiency ( $\Delta$ ) is also significantly related to cross-border mobility premiums in the alternative job scenario: highest levels of language proficiency (native-speakers and those speaking fluently in all situations), are paralleled by reduced mobility premiums by more than 14 percentage points. Contrasting these results with the OLS model comparison in Table O.2 (online appendix) provides an explanation why English skills display no significance in the cross-border unemployment scenario: in the specification without previous mobility experiences, English proficiency is highly

<sup>23</sup> Referring to the ambiguous predictions of agreeableness, affecting  $\Delta$  through the model parameters ‘job finding probability’ (Table 2), the observed positive effect implies that more agreeable individuals seem to place a higher weight on job finding probabilities at the origin ( $\pi_{EO}$ ).

<sup>24</sup> Once again, and in reference to the ambiguous prediction of the impact of patience, the negative effect for the low scoring group indicates a relatively higher valuation of employment perspectives at the origin.

significant too. This suggests that language proficiency and previous mobility are interrelated and act jointly as facilitators to future cross-border mobility.<sup>25</sup>

Social preferences prove to be robust predictors of cross-border mobility premiums, accordingly to the modelling approach of psychic costs. People who value their existing social ties strive to maintain them: Individuals with highest preference for being close to family and friends expect a 27 (given unemployment) to 34 (given job alternative) percentage point cross-border mobility premium. Those who are in a relationship feature in contrast to the internal scenarios now a markedly positive premium (6.6 to 7.9 percentage points). Whilst internal work migration over, by all likelihood, a shorter distance would in principle allow a weekend relationship, this would probably change when a cross-border move is considered. Perceived psychic costs in such a cross-border scenario would be substantial. Hence, to tip the scale in favour of inducing geographically mobile behaviour requires a larger weight, corresponding to a higher mobility premium in both scenarios.

Moving to another country might be considered as a relatively radical change, especially in the case of try-your-luck migration with a job alternative back home. This can be seen in the alternative employment scenario: in order to consider a labour market in another country, least risk prone individuals expect on average a cross-border mobility premium of 8.1 percentage points.

Turning to location-specific conditions at the origin, the significant proxies for amenity levels display the expected signs across scenarios. The lower the degree of accessibility of agglomeration centres, measured as longer travel time by train, the lower the expected mobility premium. For one, this points towards a fundamental value of being geographically well connected and having access to metropolitan markets or amenities.<sup>26</sup> But then, in conjuncture with an insignificant coefficient for accessibility by car, this result suggests that cars are not the crucial means of transportation for the surveyed cohort. The provision of public services, accounted for as public employees in relation to population does not exhibit a significant association across scenarios. The most hedonic amenity measure (recreational area per capita) is only significant in the cross-border scenario assuming an existing job alternative.

With respect to local economic conditions, the hypothesised dampening effect of higher unemployment rates at origin emerges only in the cross-border scenarios: a one percent increase in the unemployment rate implies individuals lower the expected cross-border mobility premium by around 3 percentage points. GDP per capita and the price level proxy (building land prices) at the district level yield a conspicuous result at first glance. One would have expected that, controlling for unemployment risk, individuals from relatively richer regions would request higher compensations. Albeit, there is a possible explanation for this result: if individuals from high income districts have a more wealthy background, their overall financial position could be more favourable so they might put less weight on potential income

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<sup>25</sup> Separate regressions (not reported) show that this is mostly related to 'stay abroad' and 'exchange participation'.

<sup>26</sup> In conjunction with the negative coefficient for population density one may conclude that individuals have a distinct preference of living in the periphery of metropolitan areas.

gains from migration. Building land prices, on the other hand, show the opposite sign compared to the hypothesis on commodity price levels. This, however, can be reconciled acknowledging that this proxy seems to be primarily a measure for housing prices (thus in the end rents as well): the results are now consistent with the literature on compensating differentials where local amenity levels can be capitalised into housing prices (Graves 1983). People from municipalities where building prices are one standard deviation higher expect on average an additional mobility premium of almost 7 percentage points.<sup>27</sup>

### 5.3 Sensitivity checks

This research's pivotal point are *ex ante* mobility premiums, which shine a light on individuals who might expect especially high compensation levels in order to relocate to a spatially distinct labour market. A first sensitivity check is applied to cope with the hypothetical nature of the underlying scenarios, in which these mobility premiums have been elicited. Undoubtedly, a hypothetical willingness to migrate does not always coincide with a subsequent actual migratory decision (Lu 1999).

The theory of planned behaviour (cf. Ajzen 1991) provides further guidance regarding the circumstances such that a hypothetical statement can be interpreted as reliable precursor of actual behaviour: assuming a person has *actual behavioural control* over an outcome, stronger *intentions* together with more pronounced levels of *perceived behavioural control* would result in a higher likelihood that someone actually performs a certain behaviour. Conveying this concept to the migration scenarios at hand, actual behavioural control merely implies that someone was physically able to migrate and had the (financial) resources to do so. Following this idea, sensitivity check (A) integrates factors which are requirements such that planned (or hypothetical) behaviour would converge towards actual behaviour. An implication of the theory of planned behaviour would then be that the measures for perceived behavioural control and migration-related intentions should display explanatory power with respect to expected mobility premiums. If the main findings from the scenario-specific results prove to be robust regarding the inclusion of these important behavioural determinants, the inference drawn in the previous section would gain in validity.

Based on this theoretical ground, two new components are introduced: the first is a measure of perceived behavioural control ( $\theta_R$ ), i. e. the perceived probability of succeeding at a given migratory path. This perceived success probability is proxied by individuals' assessment regarding the riskiness of a specific move to another state or another country. The second component ( $\theta_M$ ) captures migration intentions, which are integrated as expected likelihood of moving to another state (or country in Europe) in the first five years after graduation. Past mobility behaviour or habits, additional important precursors of behavioural outcomes (Connor and Armitage 1998), have already been included in the previously discussed specifications.

<sup>27</sup> Calculated as  $\beta \times std.dev = 0.0868 \times 80.80 = 7.0134$ .



Table 5 reports the results of this first robustness check. The main findings of the empirical analysis (Table 3), i.e. the importance of psychic costs and adjustment capability, prove to be robust. Yet, the sensitivity check yields directly interpretable significant coefficients too: individuals who assess a certain move to be hardly risky at all expect a lower premium, albeit not in the internal unemployment scenario. Moreover, the underlying item, directly addressing subjectively perceived riskiness of a specific mobility form, absorbs more variation than the baseline risk variable, referring to individuals' willingness to take risks in the career domain. Secondly, the less (more) inclined someone is to move within the first five years after graduation to a certain destination the higher (lower) the respective mobility premium: prospective labour market entrants, freshly graduated from university, who had no prior intention to move to another regional labour market, ask for an especially high premium. Given the rich set of controls, this inflated premium is mostly attributable to an extremely pronounced place attachment amongst the future highly-skilled labour force, and hence, it is required to overcome a sort of internal resistance against any form of migration behaviour. Another result is worth mentioning, as coefficients of high levels of English proficiency are now smaller and insignificant. This is not contrary to the claim that English as *lingua franca* fosters successful socio-cultural or labour-market integration abroad, for the following reason: better English skills reduce the likelihood of post-migration hardships and transaction costs abroad, thus increase the likelihood of a successful migratory event. When controlling directly for expected riskiness of a move to another country, the related variation is no longer absorbed by the facilitator 'language skills', but by the corresponding control variable.

A second sensitivity check (B) addresses aspects of labour market readiness. Low levels of labour market readiness could be associated with a lack of information on how employers value labour and qualifications. This can translate into unrealistic wage expectations, and thus, ex ante mobility premiums which would be either disproportionately scaled up or down.<sup>28</sup> Two groups displaying low degrees of labour market readiness come to mind: respondents who have not yet gained any labour market experience and individuals who recently entered university, hence, have no urgent need to think actively about job search and form salary expectations. The opposite can be expected of those already being enrolled in a masters' programme, since they are likely to enter the labour market within the next two years. To evaluate whether labour market experience might affect wage-related considerations, and thus the mobility premium, a vocational training variable is added. It is supplemented by a variable containing information on general labour market experience (full-time, part-time or mini-job and none). Those who already gathered full-time working experience, and thereby received a payroll, might have a more realistic knowledge about how the labour market values their skills.

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<sup>28</sup> Unreported auxiliary wage regressions (available upon request), show that individuals scoring highest regarding preferences for proximity to friends or agreeableness, women and those being older or with full-time work experience have scaled down wage expectations. The opposite holds for most neurotic individuals and (to a limited extent) those displaying higher educational mobility. All scaling effects (in percentage) are in the single digit range.

While neither the essential baseline results nor those from sensitivity check (A) change for the internal migration scenarios, labour market readiness is informative with respect to the process of forming wage expectations (Table O.5, online appendix). In the internal scenarios, those who already advanced to their masters' studies expect across labour market scenarios 8.5 to 10 percentage points lower mobility premiums. Previous work experience, however, does not influence individuals' expectations considering internal migration scenarios. This finding is reversed for the cross-border scenarios, where those with some work experience (part-time or mini-job) expect a significant positive premium in the try-your-luck scenario. A more in-depth investigation of differential effects of labour market readiness in a split-sample analysis (full-time vs. no full-time work experience sample, Table O.6) reveals a varying degree of importance of previous mobility experiences and social preferences. Stays abroad (or exchange participation) are significant predictors of mobility premiums only for those without full-time work experience. Educational mobility, i. e. the selection of a more distant university is significant for the group with more pronounced labour market readiness. With respect to social preferences, inflated premiums are exclusively observed for those without full-time work experience.

Further sensitivity analyses investigated the degree of co-linearity of independent variables, potentially inflating standard errors. All individual-specific variables were found to have a variance inflation factor (VIF) far below five. Only two variables featured a VIF above the critical threshold of 10 (GDP per capita and building land prices). Table O.1 and Table O.2 (online appendix) document that the inclusion of these two variables does not alter the overall patterns regarding size or significance of the individual-specific variables.

Furthermore, I re-estimated the scenario-specific mobility premiums using quantile regression techniques. The obtained estimates for the three analysed quartiles ( $q = 0.25$ ,  $q = 0.50$  and  $q = 0.75$ ) inform about the estimates' sensitivity with respect to the distribution of the dependent variables and the impact of outliers (Table O.3 and Table O.4, online appendix).<sup>29</sup> The overall patterns are comparable to the results from the ordinary least squares regressions, although coefficient sizes vary foreseeably across quantiles.

Ultimately, all applied sensitivity analyses document the robustness of the essential findings: expected mobility premiums vary substantially across individuals.<sup>30</sup> This variation is largely due to those personality-related aspects which either foster adjustment capability or heighten psychic costs.

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<sup>29</sup> Based on initial consistency checks, only the lowest and highest 0.5% (11 cases in each tail) of the mobility premiums were excluded. Thus, outliers may still have a certain impact on estimates in ordinary least squares regressions.

<sup>30</sup> A further sensitivity analysis, applying a sample-split by gender, highlights gender-scenario-specific differentials (Table O.7 and Table O.8, online appendix).

## 6 Conclusion

This research addresses the question to which extent individual characteristics drive mobility premiums of prospective university graduates. In this regard, mobility premiums can be interpreted as mark-up firms had to pay in order to attract a reluctant worker from a spatially distinct labour market. Inflated expected mobility premiums and insufficient mark-ups may, eventually, lead to matching inefficiencies.

The novelty of this research is the integration of agents with heterogeneous personalities and preferences into a compensating differential framework. This approach explicitly takes into account a broad concept of personality, social preferences and individual adjustment capability. Using a student sample, comprising prospectively high-skilled employees, I examine which factors are involved in the formation of salary expectations in alternative migration (interstate or cross-border) and labour market scenarios (employed or unemployed). Moreover, these analyses highlight which prospective high-skilled workers might be especially costly to hire and which are most likely to refrain from applying for a distant job right away.

I find that social ties are amongst the most prominent components, which increase psychic costs of leaving the familiar milieu: if someone exhibits the highest valuation of proximity to social reference persons, the *ex ante* mobility premium for an internal move increases between 6 (facing unemployment) and 13 percentage points (being employed). For corresponding cross-border moves to another European country, these individuals expect an additional premium of 27 to 34 percentage points.

Another relevant dimension is adjustment capability, likely to affect the costs of integrating into a new environment. A first important aspect in this dimension is adaptability to new circumstances: individuals scoring lowest in this trait expect an additional internal mobility premium of around 3 percentage points, which increases to around 10 percentage points in a cross-border migration scenario. Another important factor, contributing to an improved adjustment capability and lowering expected mobility premiums, are previous mobility experiences: higher degrees of educational mobility in a geographic sense are associated across all types of scenarios with a dampening effect on *ex ante* mobility premiums. Those with international experience, who are more familiar with living abroad and who have devised adjustment strategies, expect cross-border mobility premiums which are diminished by 10 to 17 percentage points. Yet, the mobility fostering effect can also be observed in case of interstate mobility premiums, which are reduced by around 4 percentage points. Considering job-to-job mobility, individuals who participated during their adolescence in an exchange programme feature relatively lower mobility premiums. Referring to cross-border mobility premiums, there is also evidence in favour of a mobility facilitating effect of English language proficiency.

Within the process of forming salary expectations, risk perception and place attachment matter as well: those perceiving a specific migratory path to be especially risky and those having a relative low inclination to leave the familiar environment expect a further risk premium.

One of the main conclusions is that individually assessed (psychic) costs of mobility, though hard to measure, are highly relevant for understanding geographic mobility of high-skilled individuals: they have the potential to inflate expected mo-

bility premiums, and thus, for a given wage offer distribution in an economy they may lower overall mobility. Some factors, scaling these costs up, cannot or should not be externally influenced, e. g. relevance of social ties. The impact of other factors, however, could be alleviated by fostering adjustment capability. In the context of prospective university graduates, promoting language proficiency would not only be an investment into human capital, but into adjustment capabilities as well. One way to achieve this goal is to emphasise languages in the university curriculum. In a similar manner, promoting academic exchange programmes, such as the ERASMUS programme, or encouraging temporary sojourns abroad would allow future labour market entrants to familiarise with other labour markets and cultural peculiarities. This would not only increase their socio-cultural capital, but the transferability of skills across borders as well. Ultimately, not only intra-European and intra-national labour mobility could be fostered, but matching efficiency in regional labour markets of tertiary educated workers as well.

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## Appendix

**5.1** What would be the minimum monthly net income\* you expect to receive after you eventually will have graduated from university?

(\*corresponds to the income after taxes and social insurance contributions have been deducted)

\_\_\_\_\_ Euro

**5.3** Imagine, that after graduation, you will receive an interesting job offer in the vicinity of your current residence, realising the monthly net income you expect (see Question 5.1).

What would be the minimum monthly net income for an otherwise comparable job offer, which made you willing to move for this alternative job to an unfamiliar environment:

to another state \_\_\_\_\_ Euro per month (net)

to another country \_\_\_\_\_ Euro per month (net)

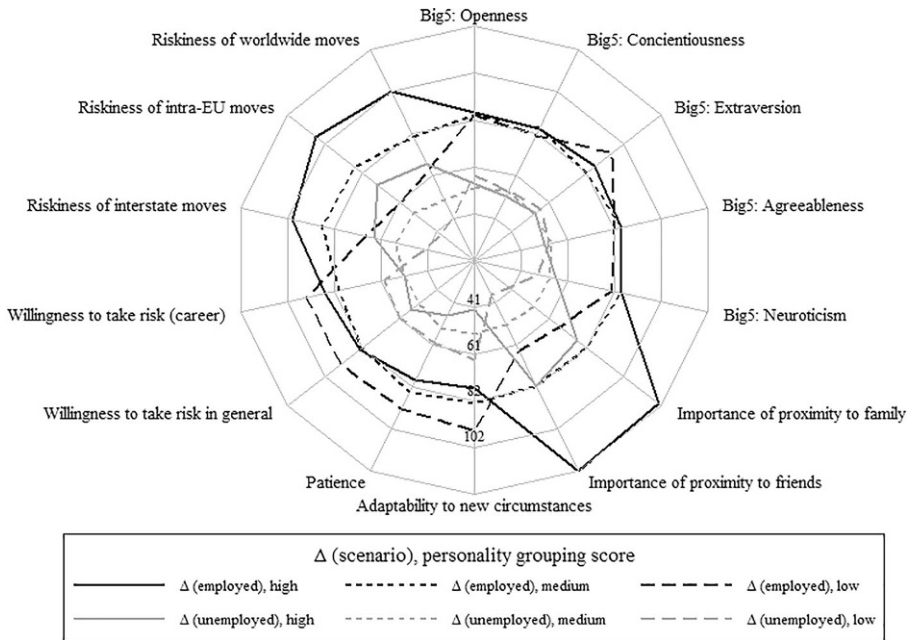
**5.6** Imagine, that despite intensive job search after graduation, you will **NOT** receive an interesting job offer in the vicinity of your current residence, realising the monthly net income you expect (see Question 5.1).

What would be the minimum monthly net income for a job offer you were interested in, which made you willing to move for this alternative job to an unfamiliar environment:

to another state \_\_\_\_\_ Euro per month (net)

to another country \_\_\_\_\_ Euro per month (net)

**Fig. 4** Items for expected income levels in various scenarios. Note: Depicted items are translated versions. Their visual presentation corresponds to the original item layout in the MESARAS 2013 survey. Item 5.1 gives the reference income ( $w_O$ ). In the scenarios with existing job alternative the first answer of question 5.3 corresponds to  $w_{A1}$ , the second one to  $w_{A2}$ . Similarly, the first answer to question 5.6 yields  $w_{U1}$ , the second  $w_{U2}$  in the unemployment scenarios



**Fig. 5** Mobility premiums for cross-border migration scenarios, conditional on personality groupings (in %). Note: For each of the two depicted scenarios (employed vs. unemployed) the three depicted groups refer to a classification based on standardised scores of the underlying variables. The ‘medium’ group refers to those scoring within one standard deviation around the mean and the ‘high’ (‘low’) group comprises those more than one standard deviation above (below) the mean of the underlying variable. The sample size varies across dimensions between 2096 and 2172

**Table 4** Overall descriptive statistics for model variables included in the empirical analyses

Category	Variable label	Short description	Original scale	N	Min	Max	Mean	Std.dev
Mobility premiums	$\Delta_{A1}$	<i>Interstate, given job alternative</i>	Dependent variable	1851	-71.43	185.71	27.016	25.80
	$\Delta_{U1}$	<i>Interstate, given unemployment</i>	Dependent variable	1851	-71.43	150	6.65	28.04
	$\Delta_{A2}$	<i>Cross-border, given job alternative</i>	Dependent variable	1851	-42.86	900	82.60	75.62
	$\Delta_{U2}$	<i>Cross-border, given unemployment</i>	Dependent variable	1851	-66.67	525	52.64	66.68
Socio-demographic	X	<i>Gender</i>	1: female, 0: male	1851	0	1	0.42	-
	X	<i>Age</i>	Age in years	1851	17	49	20.28	2.35
	X	<i>Partnership</i>	1: currently in a relationship, 0: no relationship	1851	0	1	0.44	-
	$\Lambda$	<i>English language proficiency</i>	(1: mother tongue or business fluent, 2: fluent in daily routine, 3: basic)	1851	1	3	-	-
Big-Five/personality	$\phi_R$	<i>Risk attitude (career domain)</i>	Willingness to take risk, 1 1-point scale (1: low, 11: high)	1851	1	11	5.54	2.49
	$\phi_P$	<i>Patience</i>	Willingness to bear costs in the present for future benefits, 7-point scale (1: low, 7: high)	1851	1	7	5.46	1.16
	$\psi_E$	<i>Extraversion</i>	5-point scale (1: low, 5: high)	1851	1	5	3.42	0.96
	$\psi_N$	<i>Neuroticism</i>	5-point scale (1: low, 5: high)	1851	1	5	2.82	0.92
	$\psi_O$	<i>Openness</i>	5-point scale (1: low, 5: high)	1851	1	5	3.24	1.03
	$\psi_C$	<i>Conscientiousness</i>	5-point scale (1: low, 5: high)	1851	1	5	3.37	0.90
	$\psi_A$	<i>Agreeableness</i>	5-point scale (1: low, 5: high)	1851	1	5	2.95	0.81
	$\phi_A$	<i>Adaptability</i>	Ability to adapt to new circumstances, 7-point scale (1: low, 7: high)	1851	1	7	3.97	1.52
Social preference	$\phi_S$	<i>Importance of proximity (family)</i>	7-point scale (1: low, 7: high)	1851	1	7	4.75	1.64
	$\phi_S$	<i>Importance of proximity (friends)</i>	7-point scale (1: low, 7: high)	1851	1	7	5.00	1.44

**Table 4** (Continued)

Category	Variable label	Short description	Original scale	N	Min	Max	Mean	Std.dev
Perceived behavioural control	$\theta_{R1}$	<i>Riskiness of moving to another state</i>	7-point scale (1: not at all risky, 7: risky)	1851	1	7	2.83	1.62
	$\theta_{R2}$	<i>Riskiness of moving to another European country</i>	7-point scale (1: not at all risky, 7: risky)	1850	1	7	4.41	1.66
Migration intentions	$\theta_{M1}$	<i>Moving to another state</i>	7-point scale (1: highly unlikely, 7: highly likely)	1848	1	7	4.96	1.69
	$\theta_{M2}$	<i>Moving to another European country</i>	7-point scale (1: highly unlikely, 7: highly likely)	1850	1	7	3.16	1.65
Labour market readiness	–	<i>Work experience</i>	2: full-time, 1: part-time or mini-job, 0: none	1850	0	2	–	–
	–	<i>Vocational training</i>	1: vocational training completed, 0: otherwise	1848	0	1	0.17	–
Previous mobility experiences	–	<i>Master student</i>	1: master student, 0: bachelor student	1850	0	1	0.02	–
	$\chi$	<i>Residential move during school</i>	1: at least one residential move during school, 0: none	1851	0	1	0.23	–
	$\chi$	<i>Exchange participation</i>	1: exchange participation during school, 0: otherwise	1851	0	1	0.33	–
$\chi$	<i>Stay abroad</i>	1: at least one month abroad without family, 0: otherwise	1851	0	1	0.23	–	
$\chi$	<i>Educational mobility</i>	Excess distance of chosen university	km, cardinal	1851	0	531.2	89.36	107.79

**Table 4** (Continued)

Category	Variable label	Short description	Original scale	N	Min	Max	Mean	Std.dev	
Local conditions at origin	<i>pO</i>	Proxied by local building plot prices; INKAR 2012 data	Cardinal, € per m <sup>2</sup>	1851	16	368.4	130.77	80.80	
	<i>aO</i>	GDP (per capita)	Cardinal, 1000€	1851	16.5	106.2	33.38	10.71	
	<i>aO</i>	Accessibility of 3 closest agglomeration centres by train	Aggregated travel time to the three nearest agglomeration centres; INKAR 2012 data	1851	36	181	83.39	25.44	
	<i>aO</i>	Accessibility of 3 closest agglomeration centres by car	Aggregated travel time to the three nearest agglomeration centres; INKAR 2012 data	1851	44	151	90.57	14.20	
Other	<i>aO</i>	Population density	Cardinal	1851	58.6	3005.9	970.32	669.32	
	<i>aO</i>	Recreational area (per capita)	Cardinal, m <sup>2</sup>	1851	17	333.8	75.09	62.07	
	<i>aO</i>	Public service provision	Cardinal	1851	56.3	269.1	168.11	40.38	
	$\pi UO$	Unemployment rate	%	1851	3.1	14.3	9.37	2.91	
	<i>wO</i>	Expected monthly net income	Expected post-graduation income net income tax and social insurance contributions	Log	1851	5.86	10.71	7.92	0.44

Note: Overall descriptive statistics are conditional on the existence of all four scenario specific mobility premiums and refer to the main sample. 'Original scale' refers to the scale the information has been elicited from survey participants. All variables based on a point scale have been standardised and categorised into three distinct groups: those scoring low (score below the mean minus one standard deviation), the reference group of medium-type individuals (score within the range of one standard deviation around the mean) and those scoring high (score more than one standard deviation above the mean). Standard deviations are only reported for cardinal variables. INKAR data originates from the INKAR online database (BBSR 2014).



**Table 5** Sensitivity check (A)—theory of planned behaviour

Dependent variable	$\Delta_{A1}$ (interstate, given alternative job)		$\Delta_{U1}$ (interstate, given unemployment)		$\Delta_{A2}$ (Europe, given alternative job)		$\Delta_{U2}$ (Europe, given unemployment)	
	Coeff	s.e.	Coeff	s.e.	Coeff	s.e.	Coeff	s.e.
Gender (female = 1)	0.3287	(1.3192)	3.7031**	(1.4785)	-3.5915	(3.6478)	1.3906	(3.3904)
Age	-0.0785	(0.2937)	0.7579**	(0.3542)	-1.4356*	(0.8088)	-0.2010	(0.7928)
Partnership (yes = 1)	1.1892	(1.1452)	1.5155	(1.3031)	4.1322	(3.2611)	6.0888**	(3.0092)
Language skills (English)	0.4485	(1.9188)	0.6705	(2.2713)	-9.6444	(6.0143)	-4.4365	(5.4476)
Risk attitude (career domain, $\phi_R$ )	-0.5597	(1.7682)	-0.6893	(2.0502)	-5.3815	(5.8175)	-3.1786	(5.1497)
	0.2254	(1.4214)	-1.4452	(1.5817)	5.4697	(3.9726)	2.3775	(3.6681)
Low	1.5500	(1.7467)	-0.4954	(2.0339)	7.8506	(5.9399)	0.9763	(4.5184)
High	3.0206*	(1.6468)	2.4493	(1.8687)	6.2271	(4.8314)	5.8944	(4.5942)
Low	0.3386	(1.5548)	-2.1207	(1.8379)	-1.2457	(4.3488)	-3.5588	(3.8927)
Low	1.4483	(1.8455)	-3.2579	(2.1900)	4.2164	(6.0549)	-7.0070	(5.0767)
High	0.0232	(1.4710)	1.2074	(1.7818)	4.0492	(4.2876)	6.1074	(3.7380)
Low	-1.4020	(1.7533)	-0.8003	(1.9891)	2.5059	(6.0797)	-1.1782	(4.7147)
High	0.9539	(1.6653)	1.4162	(1.8559)	-6.4830	(4.1554)	-2.3119	(4.0188)
Low	-3.6350**	(1.4636)	-1.9006	(1.7068)	-6.3428	(4.3231)	-1.3168	(4.1051)
High	-2.0719	(1.4618)	0.6612	(1.6883)	0.6194	(4.3854)	1.8001	(3.9655)
Low	-0.1243	(1.7634)	1.0300	(2.2169)	-2.7054	(5.4537)	0.5621	(5.1433)
High	-0.5895	(1.5481)	-1.8254	(1.7989)	-3.7551	(4.1810)	-4.9366	(3.7416)
Low	0.4704	(1.4878)	0.9381	(1.7497)	0.1299	(4.2642)	1.4642	(3.8778)
High	2.3802	(1.6349)	2.4727	(1.6736)	2.0843	(4.2936)	-0.9279	(3.8300)
Low	2.4716	(1.5899)	3.2022*	(1.8185)	7.1185	(4.4212)	9.1852**	(4.1474)
High	2.0307	(1.7959)	0.9386	(1.8961)	-0.6299	(5.7053)	-1.4982	(4.0459)
Low	-1.0271	(1.4950)	-0.4701	(1.7302)	-1.9117	(4.7013)	-1.1761	(3.7987)
High	6.0926***	(2.0843)	-0.5438	(2.3679)	15.4355***	(5.3842)	8.2114	(5.2943)

Table 5 (Continued)

Dependent variable	$\Delta_{A1}$ (interstate, given alternative job)	$\Delta_{U1}$ (interstate, given unemployment)	$\Delta_{A2}$ (Europe, given alternative job)	$\Delta_{U2}$ (Europe, given unemployment)
	Coeff	s.e.	Coeff	s.e.
Importance of proximity (friends, $\phi_S$ )				
Low	-4.0571***	(1.5677)	-9.2514**	(4.6314)
High	4.4351**	(2.0764)	9.5718	(5.8711)
Riskiness of move ( $\theta_R$ )				
Low	-3.6693***	(1.3859)	-14.4132***	(4.3262)
High	1.0155	(1.7403)	5.0986	(6.2010)
Likelihood of move ( $\theta_M$ )				
Low	13.5827***	(1.7715)	32.2415***	(5.7392)
High	-2.5582*	(1.3849)	-19.3846***	(3.3651)
Residential move (yes = 1)	0.8984	(1.3139)	2.7119	(3.9068)
Exchange participation (yes = 1)	-1.7648	(1.2523)	-6.0357*	(3.4124)
Stay abroad (yes = 1)	-4.1823***	(1.4606)	-11.0323***	(3.7134)
Educational mobility (km)	-0.0136**	(0.0058)	-0.0418**	(0.0165)
GDP (per capita)	-0.3400*	(0.1828)	-1.3585**	(0.5513)
Building land prices	0.0552**	(0.0266)	0.1665**	(0.0812)
Accessibility (train)	-0.0708	(0.0495)	-0.2646*	(0.1386)
Accessibility (car)	-0.0601	(0.0894)	0.0699	(0.2728)
Pop. density	-0.0018	(0.0018)	-0.0008	(0.0061)
Recreational area (per capita)	0.0274	(0.0218)	0.1415**	(0.0691)
Public services	0.0049	(0.0395)	-0.0171	(0.1244)
Unemployment rate ( $\pi_{LO}$ )	-0.6445	(0.5139)	-3.1343*	(1.7299)
Observations	1842	1842	1842	1842
df (model)	42	42	42	42
F-statistic	8.69	3.65	8.75	7.06
Adjusted R-squared	0.1548	0.0802	0.1359	0.1246

Note: Robust standard errors are implemented. Behavioural control ( $\theta_R$ ) and migration intention ( $\theta_M$ ) measures are accordingly conditioned (on interstate or cross-border move to another country in Europe). All specifications contain the relative income control.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table 6** OLS model comparison for sensitivity check (B)—labour market readiness

Dependent variable	$\Delta U_1$ (interstate, given alternative job)			$\Delta U_1$ (intra-state, given unemployment)			$\Delta A_2$ (Europe, given alternative job)			$\Delta U_2$ (Europe, given unemployment)		
	Coeff	s.e.	Coef	s.e.	Coef	s.e.	Coeff	s.e.	Coef	s.e.	Coef	s.e.
Female	0.5474 (1.3245)	-0.4297 (1.3637)	3.6097** (1.4897)	3.0167** (1.4920)	-3.4902 (3.6870)	-6.2143* (3.7529)	1.3174 (3.4340)	-0.8155 (3.4557)				
Age	0.3266 (0.3718)	0.2404 (0.3812)	0.9063** (0.4616)	0.8971** (0.4571)	-0.5850 (1.0043)	-0.4676 (1.0710)	-0.1009 (1.0519)	0.0448 (1.0938)				
Partnership	1.1457 (1.1469)	1.7962 (1.1754)	1.5990 (1.3068)	2.0202 (1.3147)	3.8026 (3.2903)	6.4245* (3.3635)	6.0763** (3.0298)	8.1716*** (3.0505)				
Language skills (English)	0.7215 (1.9335)	0.4861 (1.9627)	0.9571 (2.2832)	0.8357 (2.2883)	-9.6019 (6.0418)	-14.4559** (6.0786)	-4.1462 (5.4643)	-7.8540 (5.4850)				
Risk attitude (career)	-0.5871 (1.7689)	-0.9334 (1.7933)	-0.6518 (2.0515)	-0.7649 (2.0532)	-5.6319 (5.8209)	-8.4778 (5.8381)	-3.1228 (5.1508)	-5.5875 (5.1463)				
	0.1105 (1.4216)	0.8499 (1.4655)	-1.5581 (1.5808)	-1.0037 (1.5989)	5.4363 (3.9837)	7.6190* (4.0502)	2.3553 (3.6717)	4.1920 (3.7041)				
	1.4816 (1.7543)	1.4945 (1.7997)	-0.4883 (2.0312)	-0.3017 (2.0630)	8.1725 (5.9830)	6.7934 (6.0731)	1.0579 (4.5199)	0.2183 (4.6857)				
Patience	3.0844* (1.6493)	3.7162*** (1.6807)	2.3871 (1.8648)	2.8702 (1.8753)	6.4925 (4.8257)	8.6734* (4.8257)	5.9101 (4.5710)	7.7557 (4.7281)				
	0.3163 (1.5603)	-0.7918 (1.6049)	-2.1492 (1.8342)	-2.7335 (1.8291)	-1.0204 (4.3429)	-2.8971 (4.5968)	-3.5710 (3.8991)	-4.5107 (4.0067)				
Extraversion	1.4367 (1.8556)	2.6822 (1.8986)	-3.3099 (2.1876)	-2.5683 (2.2220)	4.3457 (6.1023)	5.2899 (6.2068)	-6.9805 (5.1088)	-6.3116 (5.1435)				
	-0.0474 (1.4768)	-0.1303 (1.5039)	1.3598 (1.7808)	1.4782 (1.7900)	3.6434 (4.3038)	1.7437 (4.4425)	6.1615 (3.7518)	4.7124 (3.8558)				
Neuroticism	-1.4447 (1.7533)	-1.4221 (1.8383)	-0.8634 (1.9905)	-0.7481 (2.0017)	2.4484 (6.0783)	2.7479 (6.3760)	-1.2381 (4.7235)	-0.8940 (4.9103)				
	1.1927 (1.6699)	0.9277 (1.7068)	1.6829 (1.8544)	1.4493 (1.8688)	-6.2936 (4.1521)	-5.1462 (4.2626)	-2.0645 (4.0214)	-1.0120 (4.0789)				
Openness	-3.3422** (1.4602)	-3.3125** (1.4838)	-1.7396 (1.7024)	-1.6912 (1.7123)	-5.4874 (4.3645)	-4.4288 (4.3895)	-1.0962 (4.1372)	-0.3231 (4.1669)				
	-2.1592 (1.4617)	-2.5747* (1.5064)	0.5987 (1.6889)	0.2961 (1.7079)	0.5690 (4.3831)	-0.6919 (4.5153)	1.7852 (3.9771)	0.8498 (4.0519)				
Conscientiousness	-0.2034 (1.7632)	-0.2921 (1.8105)	0.9653 (2.2109)	0.7021 (2.2267)	-3.2504 (5.4554)	-2.5874 (5.6300)	0.5172 (5.1396)	1.3782 (5.2081)				
	-0.4301 (1.5484)	-0.3386 (1.6135)	-1.7675 (1.8037)	-1.7980 (1.8156)	-3.6841 (4.2024)	-3.7332 (4.3125)	-4.8903 (3.7622)	-4.3953 (3.8518)				
Agreeableness	0.4278 (1.4857)	-0.1545 (1.5287)	0.8378 (1.7451)	0.5385 (1.7733)	-0.0822 (4.2569)	-0.0323 (4.3821)	1.3940 (3.8710)	1.5270 (3.9873)				
	2.2762 (1.6339)	3.1485* (1.6560)	2.3538 (1.6717)	2.9578* (1.6805)	1.8612 (4.2906)	1.5964 (4.4058)	-1.0429 (3.8207)	-0.8971 (3.8844)				
Adaptability	2.4963 (1.5943)	3.2797** (1.6072)	3.1817* (1.8331)	3.2712* (1.8435)	7.4595* (4.4453)	9.3735*** (4.5220)	9.2487** (4.1713)	10.8263** (4.2131)				
	1.9230 (1.8137)	0.9775 (1.8049)	0.9509 (1.9039)	0.7123 (1.8783)	-0.4943 (5.7680)	-2.9513 (5.6835)	-1.5754 (4.0882)	-2.4940 (4.0468)				
Importance of prox. (family)	-0.8441 (1.5043)	-1.8472 (1.5298)	-0.1501 (1.7356)	-0.6119 (1.7346)	-1.5890 (4.7466)	-5.0344 (4.7526)	-0.9137 (3.8640)	-3.4724 (3.8729)				
	5.8309*** (2.0777)	6.6505*** (2.1268)	-0.6580 (2.3695)	-0.2661 (2.3892)	14.6378*** (5.3718)	18.5556*** (5.5190)	8.0691 (5.2867)	11.6196** (5.3860)				

Table 6 (Continued)

Dependent variable	$\Delta A_1$ (interstate, given alternative job)			$\Delta U_1$ (interstate, given unemployment)			$\Delta A_2$ (Europe, given alternative job)			$\Delta U_2$ (Europe, given unemployment)										
	Coeff	s.e.		Coeff	s.e.		Coeff	s.e.		Coeff	s.e.									
Importance of prox. (friends)	-4.3905***	(1.5807)		-3.0694*	(1.6252)		-4.4783***	(1.6252)		-3.0718*	(1.8555)		-12.0531**	(4.7829)		-7.4114*	(4.0018)		-9.0191**	(4.0359)
Riskiness of move	4.5366**	(2.0748)		5.9935***	(2.1080)		5.8205**	(2.4355)		9.7200*	(5.8713)		14.3599**	(6.0302)		10.3407*	(5.7908)		14.1385**	(5.9189)
Likelihood of move	-3.7522***	(1.3847)		-1.1092	(1.5158)		-1.7538	(1.9347)		-14.4254***	(4.3129)		-	-		-7.2598*	(3.9699)		-	-
	0.9590	(1.7481)		-1.4763***	(1.9426)		9.4763***	(1.9426)		5.0434	(6.1948)		-	-		8.4333	(6.3899)		-	-
	13.7071***	(1.7604)		-1.1585	(1.5719)		-19.4019***	(3.3769)		32.5247***	(5.7197)		-	-		27.4024***	(5.2767)		-	-
	-2.3489*	(1.3893)		-0.0237	(1.6414)		-0.0706	(1.6576)		6.9247*	(4.1476)		-	-		-12.5646***	(3.0153)		-	-
Work experience	1.5840	(1.4169)		-3.6981	(2.2784)		-3.6555	(2.3074)		7.1514*	(4.2909)		-	-		1.3333	(3.8251)		1.2150	(3.9245)
	-0.4023	(1.7919)		2.8745	(2.4055)		3.6946	(2.4573)		-2.2931	(5.7241)		-	-		-2.2182	(5.6495)		-2.2784	(5.7465)
Vocational training	-1.7094	(1.9620)		-8.4636**	(3.5092)		-8.9157**	(3.5211)		-8.1120	(7.5751)		-	-		2.8146	(6.0892)		5.2612	(6.3306)
Master student	-9.4267***	(2.7827)		-0.0344	(1.5500)		-0.2618	(1.5588)		2.3415	(3.8985)		-	-		-7.9741	(6.8655)		-10.3000	(7.2061)
Residential move	0.7426	(1.3165)		-0.8470	(1.4152)		-1.3566	(1.4250)		-6.3147*	(3.4325)		-	-		2.0574	(3.5237)		1.5347	(3.5452)
Exch. participation	-1.8492	(1.2524)		-3.5719**	(1.5255)		-3.6639**	(1.6369)		-10.6642***	(3.7432)		-	-		-2.1373	(3.1621)		-3.5053	(3.2020)
Stay abroad	-3.8809***	(1.4740)		-0.0227***	(0.0059)		-0.0234***	(0.0060)		-0.0410**	(0.0165)		-	-		-12.4858***	(3.2037)		-16.6608***	(3.3010)
Educ mobility (km)	-0.0128**	(0.0058)		-0.4501**	(0.1916)		-0.3670*	(0.1956)		-1.4338***	(0.5510)		-	-		-0.0357***	(0.0138)		-0.0443***	(0.0141)
GDP (pc)	-0.3539*	(0.1829)		0.0861***	(0.0277)		0.0030	(0.0309)		0.0207	(0.0311)		-	-		-1.2177**	(0.4903)		-1.2571**	(0.5119)
Building land prices	0.0575**	(0.0265)		-0.0728	(0.0580)		-0.0757	(0.0571)		0.1732**	(0.0807)		-	-		0.0711	(0.0753)		0.0636	(0.0769)
Accessibility (train)	-0.0721	(0.0491)		0.0431	(0.1060)		0.0438	(0.1049)		0.0715	(0.2715)		-	-		-0.2973**	(0.1296)		-0.3007**	(0.1294)
Accessibility (car)	-0.0598	(0.0889)		-0.0534	(0.0903)		-0.0534	(0.0903)		0.0646	(0.2754)		-	-		0.0419	(0.2536)		0.0364	(0.2550)

**Table 6** (Continued)

Dependent variable	$\Delta A_1$ (interstate, given alternative job)			$\Delta U_1$ (interstate, given unemployment)			$\Delta A_2$ (Europe, given alternative job)			$\Delta U_2$ (Europe, given unemployment)		
	Coeff	s.e.	Observations	Coeff	s.e.	Observations	Coeff	s.e.	Observations	Coeff	s.e.	Observations
Pop. density	-0.0019	(0.0018)	1842	-0.0011	(0.0021)	1842	-0.0015	(0.0061)	1842	0.0010	(0.0057)	1842
Recr. area (pc)	0.0267	(0.0212)	42	-0.0157	(0.0274)	42	0.1402**	(0.0676)	42	0.1180*	(0.0689)	42
Public services	0.0095	(0.0396)	7.61	0.0878*	(0.0465)	3.46	-0.0063	(0.1243)	6.66	0.0904	(0.1093)	5.96
Unemployment rate	-0.7235	(0.5140)	0.1104	-0.6280	(0.6328)	0.0665	-3.2907*	(1.7198)	0.0898	-3.1447*	(1.6705)	0.0868
Observations	1842		1842	1842		1842	1842		1842		1842	1842
df (model)	46		46	46		46	46		46		46	42
F-statistic	8.67		7.61	3.50		3.46	8.34		6.66		6.67	5.96
Adj. R-squared	0.1567		0.1104	0.0819		0.0665	0.1370		0.0898		0.1232	0.0868

Note: Statistical inference relies on robust standard errors. Measures of behavioural control and migration intention are accordingly conditioned, either with reference to an interstate or a cross-border move to another country in Europe. All specifications contain the relative income control.  
 \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

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