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Why do migrants stay unexpectedly? Misperceptions and implications for integration*

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Abstract

Empirical evidence suggests that the majority of immigrants who initially planned a temporary stay end up staying permanently in the host country. Since beliefs about the duration of stay are a strong determinant of integration, many long-term migrants may end up less than optimally integrated. We theoretically model migrants with potential misperceptions about their future utility and wage prospects in the host country relative to their country of origin. We describe conditions under which these misperceptions generate, and conditions on observables that identify, unexpected staying. These conditions involve pessimism about the endogenous long-term wage for which migrants are indifferent between staying and leaving: either they overestimate the probability of earning less than this indifference wage, or they underestimate their utility in the destination country when earning this wage. Using the German Socio-Economic Panel (SOEP), we find that higher levels of pessimism about utility and wages at arrival are associated with staying in the long-term in Germany despite having initially predicted a temporary stay.

Keywords: Migrant integration ; return intentions ; unexpected staying ; misperceptions ; pessimism ; SOEP

JEL codes: F22 ; D91 ; J61

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1 Introduction

Over the last decades, growing migration flows have been at the heart of vivid societal debates. Immigrants' socio-economic integration, which is seen as a key determinant of their impact on receiving countries, is a complex process that involves social interactions, human capital investments, labor market participation and savings, among other aspects. All these dimensions are intertwined with migrants' long-term location plans (Dustmann and Görlach, 2016), i.e. to stay permanently in the destination country or to plan another migration or a return migration. Importantly, migrants intending to stay temporarily in the host country tend to integrate less than migrants intending to stay permanently (Dustmann, 1999; Geurts and Lubbers, 2017; Adda et al., 2022). However, while temporary intentions are common, these predictions are often incorrect: many migrants planning a temporary stay end up staying permanently. This paper aims to shed light on the mechanisms causing this phenomenon.

There is substantial evidence of the discrepancy between migrants' initial intentions and their eventual longer, or even permanent, stay in the host country (see Schoorl, 2011 for the Netherlands, Adda et al., 2006; van Baalen and Muller, 2008; van den Berg and Weynandt, 2013 for Germany, Sinatti, 2011 and Agyeman, 2011 for Italy and Spain, Bolognani, 2007 for the UK, Alberts and Hazen, 2005 for the US, and Achenbach, 2017 for Japan). Table 1 draws on survey data from the German Socio-Economic Panel (SOEP) to illustrate this phenomenon. Among the 4,584 immigrants who planned to stay temporarily in Germany, 3,537 (77%) were still in Germany by 2020. Thus even if we assume that temporary stay intentions imply a probability of staying of 49% due to unexpected shocks, this still leaves a gap of 28% between the actual and predicted probability of stay, implying incorrect expectations.[1] Additionally, migrants with temporary stay intentions make up one third (32%) of the 10,947 immigrants still present in Germany by 2020. On the other hand, as Table 1 shows, only 380 immigrants out of 7,790 who had planned to stay permanently had left Germany by 2020. This is consistent with correct expectations or with at most 5% of unexpected leaving.

In this paper, we investigate theoretically and empirically why immigrants may hold incorrect predictions about the duration of their stay. We highlight the crucial role of pessimistic misperceptions around their *indifference wage*, i.e., the endogenous wage at which the migrant is indifferent between staying permanently and leaving. Concretely, we allow migrants, who choose how much to save and integrate after arrival, to either misperceive their job prospects by having a potentially incorrect belief over the distribution of wages; or to misperceive their long-term utility in the host country

[1] Note that some immigrants with temporary intentions may not yet have reached their planned duration of stay. In the empirical section, we address this point by taking into account the intended duration of stay, which leads to similar proportions of unexpected staying.

Table 1: Migrants' initial return intentions and actual location in 2020

	Actual location in 2020		
Initial intentions	in Germany	left Germany	
Permanent stay	7,410	380	7,790
Temporary stay	3,537	1,047	4,584
	10,947	1,427	12,374

Note: SOEP data for all migrants (excluding refugees and ethnic Germans) surveyed between 1984 and 2020. Reported intentions to stay (temporarily or permanently) are collected from the immigrants' first reply to the relevant survey question.

relative to the origin. We then provide sufficient conditions on observables that identify unexpected staying — whether a migrant is more likely to stay ex post than anticipated ex ante: either they overestimate the probability of earning less than the indifference wage, or they underestimate their life satisfaction in the destination country conditional on earning this wage. Intuitively, a migrant who misperceives the wage distribution still anticipates correctly whether they will stay or not conditional on a given wage. But if they are pessimistic and believe that wages below their indifference wage are more common than they are, then they underestimate their likelihood of staying. Similarly, a migrant who is pessimistic and underestimates their utility when receiving their *perceived* indifference wage will ex post strictly want to stay in that case. These conditions do not make assumptions on the source of the misperception and can, in principle, be measured via surveys.

We formally introduce misperceptions about migrants' future utility and long-term wage prospects in a model with endogenous integration, savings, and long-term return decisions. Short-term and long-term decisions are intertwined: the more a migrant integrates or the less they save, the more likely they are to stay ex post. Conversely, the more a migrant plans to stay, the more they integrate and the less they save. Misperceptions at arrival about utility and wage prospects thus affect short-term decisions as well as the predicted probability of return. We then derive the aforementioned conditions on observables that rely on the indifference wage to identify unexpected staying, as well as two alternative sufficient conditions that are stringent but do not rely on the indifference wage. Under the first alternative, if migrants are uniformly pessimistic about their wage prospects in the sense that their perceived wage distribution is first order stochastically dominated by the actual wage distribution, then they will stay unexpectedly, since this means that they are pessimistic about any wage, including their indifference wage. Under the second, if migrants are uniformly pessimistic about their utility in the sense of underestimating the utility of staying for all wages, then they will stay unexpectedly, since they then also underestimate the utility of staying if they receive their indifference wage. Finally, for misperceptions of wage prospects in general and for

misperceptions of utility under additional restrictions, we show that whenever unexpected staying increases in integration, it decreases in savings, and vice versa. We end this section by discussing the ideal data to estimate unexpected staying.

We then use SOEP data to explore the predictions of our model. Since there is no data to estimate perceived or actual indifference wages, we limit ourselves to measuring how general types of pessimism are associated with unexpected staying, and we discuss the limitations of the data available. We extract from this longitudinal dataset a sample of migrants who arrived in Germany between 1980 and 2010. Beyond relevant socio-demographic characteristics, the data contains information about migrants at different moments in time, such as their initial return intentions, beliefs about life satisfaction and wage prospects, their actual life satisfaction and employment outcomes in subsequent years, and whether they are still in Germany in 2020. We compare migrants' predictions to their actual outcomes, hence measuring migrants' mispredictions at arrival about their future location, life satisfaction and wage prospects. First, we measure pessimism about utility at arrival by comparing migrants' predicted life satisfaction to their realized life satisfaction five years later. A migrant is thus pessimistic about the host country if their level of predicted life satisfaction is lower than their actual level ex post.[2] Second, misperceptions about the distribution of long-term wages must involve an overestimation of the probability of earning wages below the indifference wage. This condition is more likely to be satisfied if the probability of poor labour market outcomes, like unemployment or demotion, is overestimated. We proxy this form of pessimism by using information about migrants' anticipation of losing their job in their first appearance in the survey. A migrant is then considered low-wage pessimistic if they anticipated a job loss in the next two years, but were in fact still employed two years later. Controlling for migrant characteristics at arrival, cohort of arrival fixed effects, and changes in the family structure during the migration spell, we measure the association between unexpected staying and pessimism at arrival. We find that migrants who were more pessimistic about future life satisfaction and about wage prospects are significantly more likely to be unexpected stayers in 2020.

We start by providing a literature review in Section 2. In Section 3, we introduce the theoretical framework. In Section 4, we consider both misperceptions of long-term wage prospects and of long-run utility and identify the necessary and sufficient conditions for unexpected staying. In Section 5, we discuss the limitations of the existing SOEP data, and provide descriptive evidence for the predictions of our model. We conclude in Section 6.

[2] In line with Ivlevs (2015), we find that migrants are optimistic about their life satisfaction in the host country. This need not be inconsistent with the relative pessimism concept defined in our theory, which requires lower optimism about the destination country than about the origin country.

2 Related literature

Immigrants' unexpected staying has been documented in various developed countries. This phenomenon appears to have a systematic component, in the sense that it does not result from mere uncertainty or luck. For instance, Schoorl (2011) finds that, while most economic migrants intend to stay temporarily in the Netherlands, only 40 percent of Turkish and 30 percent of the Moroccan migrants returned to their country of origin. This gap is also present, though less pronounced, for Italian and Spanish migrants, who return to their home country in larger proportions. Furthermore, Steiner and Velling (1994) and van Baalen and Muller (2008) note that migrants' intended duration of stay keeps growing with the number of years spent in the destination country.

The literature has identified idiosyncratic shocks, such as life events, that can explain changes in return intentions (de Groot et al., 2011; Bettin et al., 2018). Waldorf (1995) finds that migrants who are satisfied with their job and residence are more likely to stay despite their initial intention to return. Lu (1999) documents that age and being a homeowner are positively associated with inconsistent intentions to move. Coulter (2013) shows that age, and changing levels of ties and commitments over the life course, explain the non-realization of past desires of residential mobility in the UK. Individuals' inability to realize their intentions to migrate might also be linked to a poor health condition (van Dalen and Henkens, 2013). van den Berg and Weynandt (2013) find that age and the feeling of being disadvantaged because of one's origins contribute to explain the gap between return intentions and actual stay. Hooijen et al. (2020) argue that recent university graduates are less likely to realize their intention to leave their region of study if they accumulated location-specific capital. In addition, the socio-economic and political conditions in the origin country also affect immigrants' intended duration of stay (Kirdar, 2013).

However, unexpected shocks per se cannot explain the systematic pattern described above. Indeed, the structural inconsistency between intended and actual stay cannot result from "correct" beliefs about these shocks. The systematic misprediction of migration duration has, to the best of our knowledge, not yet been analyzed in a general behavioral framework allowing to study the impact of incorrect beliefs and behavioral biases on individual decision-making (Odermatt and Stutzer, 2019; Pinger et al., 2017; Dohmen et al., 2009). Incorrect expectations have been shown to affect individuals' behavior in other life situations. The labor market, which tends to exhibit an excess of optimism, constitutes a relevant example. Spinnewijn (2015) shows that the unemployed tend to overestimate the speed at which they will find a new job, which results in insufficient search and savings. Krueger and Mueller (2016) show that unemployment duration has a very limited impact on workers' reservation wages in the US. Excess of optimism also applies to individuals holding a job, as Hoffman and Burks (2020) show that truck drivers over-estimate the number of miles they will run over the week, and they fail to update these estimations through the course of the week.

An excess of optimism about labour market prospects could explain initial emigration decisions (Borjas and Bratsberg, 1996) but evidence in the literature is mixed. Shrestha (2020) finds that migrants without prior migration experience overestimate what they will earn on average by 26%, whereas in the case of Bangladesh this overestimation is approximately 40% (Bossavie et al., 2024). In contrast, people who have not migrated (yet) often underestimate potential earnings from migrating (McKenzie et al., 2013; Seshan and Zubrickas, 2017). This can be due to strategic misrepresentation by previous migrants who understate their incomes to reduce pressure to share it with relatives (De Weerdt et al., 2019; Baseler, 2023).

Our approach focusing on observed mispredictions (about wage and life satisfaction prospects) thus complements research explaining the heterogeneity in migrants' staying behavior and identifying idiosyncratic shocks that correlate with the likelihood of staying longer than intended. From this perspective, this study is the first to identify pessimism about the destination country as a general and systematic cause for migrants' unexpected staying. In particular, our analysis stresses that initial conditions at migrants' arrival have important impacts on long-term outcomes. This is in line with Fasani et al. (2021), who show that temporary employment bans, which cover the first months at arrival, reduce refugees' employment probability in the middle- to long-term by 15%.

Beyond improving the understanding of migrants' unexpected staying, our paper is also linked to the important literature studying the link between immigrants' duration of stay and their integration in the destination country. It is well-documented that return intentions impact migrants' decision in many domains, such as integration and language acquisition (Dustmann, 1999; Van Tubergen and Kalmijn, 2009; Geurts and Lubbers, 2017; Adda et al., 2022), savings (Sinning, 2011), remittances (Dustmann and Mestres, 2010a; Delpierre and Verheyden, 2014), asset holdings in the origin and destination countries (Dustmann and Mestres, 2010b; Chabé-Ferret et al., 2018), and entrepreneurial investments in the home country (Ammassari, 2004; Akwasi Agyeman and Fernández Garcia, 2016).

Finally, this paper contributes to the recent literature which integrates robust insights from behavioral economics into applied economics (Mullainathan et al., 2012; Eliaz and Spiegler, 2015; Chetty, 2015; Handel and Schwartzstein, 2018) in contrast to more common studies of separate behavioral models designed for specific biases. In line with this literature, our approach introduces misperceptions as a form of sufficient statistic for unexpected staying. This allows us to study multiple biases that systematically lead to pessimistic misperceptions within a general framework.

3 A basic model of integration, savings and return migration

We develop a two-period model with uncertainty and misperceptions about period-2 outcomes. In period 1 (the "short term"), the migrant has recently arrived in the destination country, and decides how much to integrate and save. In period 1, migrants face uncertainty about their long-term labor

market prospects, and may, for various reasons, misperceive their expected utility in period 2 (the "long term"). At the start of period 2, wages are realized, true utility is revealed, and the migrant chooses their location $L \in \{d, o\}$, where d and o denote destination and origin country, respectively.

Modelling migrant integration

Integration captures the sense of belonging and the ability to enjoy living in a given location. At arrival in the host country, immigrants are endowed with a certain level of integration I_1, which is fixed in the short run.[3] In contrast, the long-term level of integration in the host country, $I^d = I_1 + i$, can be increased by migrants' integration efforts i exerted in period 1 (e.g. language classes, community engagement programs, interactions with natives,...). These efforts impose in period 1 a utility cost noted $k(i)$, with $k'(i) > 0$, $k''(i) \geq 0$.

Hence in period 2, migrants will either stay in the host country and enjoy I^d, or return to the origin country and enjoy I^o. We assume for simplicity that I^o is unaffected by i, which is destination-country specific, and that I^d cannot exceed I^o, i.e. that migrants cannot feel more integrated in the destination country than in their home country.[4]

Utility in a given period depends on contemporaneous consumption c and integration level I, and is noted $u(c, I)$. Utility is strictly increasing and strictly concave in each argument, and is separable ($\partial^2 u(c, I) / \partial I \partial c = 0$).[5] Deducting integration investment costs $k(i)$, period-1 utility is thus:

$$v_1(s, i) \equiv u(c_1(s), I_1) - k(i),$$

where consumption $c_1(s) = s_0 + w_1 - s$ relies on exogenous savings accumulated before migrating, s_0, on the migrant's wage at arrival, w_1, and on savings from period 1 for period 2, s.

In the second period, utility depends on the migrant's location decision. Consumption in location L depends on the period-2 wage in location L, noted w^L. Given period-1 savings s, consumption in period 2 is thus either

$$\begin{aligned} c^d(s; w^d) &= w^d + s \text{ in case of stay, or} \\ c^o(s) &= w^o + x \cdot s \text{ in case of return,} \end{aligned}$$

where w^d and w^o are the migrant's wages in case of stay and of return, respectively, and $x \geq 1$ is a real exchange rate which accounts for the higher purchasing power in the origin country compared

[3] I_1 relies on pre-migration factors, such as proficiency in the host country's language, knowledge of the local culture and institutions, and the presence of family or ethnic networks.

[4] The fact that I^o is unaffected by i is a simplification; what matters for our results is that i is relatively more beneficial to I^d than to I^o. A sufficient condition for $I^d \leq I^o$ is $k'(I^o - I_1) \to \infty$.

[5] While some of our results hold for any $u(c, I)$, others only hold if consumption and integration are weak complements, and others require full separability. Hence, for ease of exposition, we choose to assume separability throughout.

to the destination country ($\partial c^o/\partial s = x \geq 1 = \partial c^d/\partial s$).[6] Defining period-2 utility, note that savings influence utility levels in both locations, whereas integration efforts i and the realized wage w^d only influence utility in case of stay:

$$\begin{aligned} v^d(s,i;w^d) &\equiv u\left(c^d\left(s;w^d\right), I^d(i)\right), \\ v^o(s) &\equiv u\left(c^o(s), I^o\right). \end{aligned}$$

Location decision: the indifference wage in the destination country

In period 2, the migrant has to make one decision, which is to return or to stay, taking integration investments i and savings s as given. The migrant returns if $v^o(s) > v^d\left(s,i;w^d\right)$. Clearly, the higher w^d, the higher the utility of staying. Hence, all else equal, there exists a unique level of w^d, which we define as the indifference wage w_R, which makes the migrant indifferent between the two locations:

$$w_R = w_R\left(s,i;v^d(\cdot), v^o(\cdot)\right) \text{ is such that } v^d(s,i;w_R) = v^o(s). \tag{1}$$

Hence, if the realized period-2 wage w^d is greater than the threshold w_R, the migrant decides to stay. Let us now describe the optimal choice of savings and integration in period 1. Lemma 1 describes how savings and integration decisions impact the probability of return.

Lemma 1. *Integration reduces the indifference wage, whereas savings increase it.*

$$\begin{aligned} \frac{\partial w_R(s,i)}{\partial i} &< 0, \\ \frac{\partial w_R(s,i)}{\partial s} &> 0. \end{aligned}$$

Proof. See Appendix. □

By integrating more, migrants make the host country more appealing in period 2, hence they are ready to stay for lower wages. Conversely, since savings are more appealing in case of return due to higher purchasing power in the origin country, migrants with higher savings require higher wages to stay in the host country. Having described the migrant's reaction to (any) period-1 decisions in period 2, let us now describe the migrant's optimal integration and savings.

Savings and integration decisions

In period 1, the migrant faces uncertainty about their wage in the host country in the long term, they only know its distribution $F\left(w^d\right)$, with a corresponding continuous density function $f(\cdot)$. The

[6] As we explicit below, migrants may differ in their exogenous characteristics (s_0, I_1, I^o, w^o). We refer to this set of characteristics as a migrant "type".

migrant anticipates that they will return if $w^d \leq w_R$, which occurs with probability $F(w_R)$. The migrant's expected utility in period 2, as perceived in period 1, is therefore:

$$Ev_2(s,i) = \int_0^{w_R} v^o(s) f(w^d) dw^d + \int_{w_R}^{\infty} v^d(s,i) f(w^d) dw^d,$$

where, as described in Lemma 1, w_R is a function of s and i. In period 1, the migrant's program is to maximize

$$EV(s,i) = v_1(s,i) + \delta \left(\int_0^{w_R} v^o(s) f(w^d) dw^d + \int_{w_R}^{\infty} v^d(s,i) f(w^d) dw^d \right), \tag{2}$$

where δ is a discount parameter. The optimal period-1 actions are $(s^*, i^*) = \arg\max_{s,i} EV(s,i)$.

For (s^*, i^*), the period-2 indifference wage is $w_R\left(s^*, i^*; v^d, v^o\right)$, which results in the return probability:

$$p^* = F\left(w_R(s^*, i^*)\right). \tag{3}$$

4 Introducing misperceptions

Migrants may arrive in the host country with misconceptions about their long-term prospects. For instance, since they just arrived in the host country, they may over- or underestimate how much they will appreciate living there in the long term, i.e. think that the shape of their utility function will be $\widetilde{v}^d(s,i)$ instead of $v^d(s,i)$. Also, as their ties with the origin country weaken, they may misperceive how they will enjoy a possible return in period 2, i.e. misperceive the shape of $\widetilde{v}^o(s)$. Alternatively, they may hold incorrect beliefs about their long-term wage prospects in the host country, $\widetilde{F}\left(w^d\right)$, with corresponding continuous density function $\widetilde{f}(\cdot)$. Hence, instead of EV (2), they perceive their expected utility to be $\widetilde{EV}$:

$$\widetilde{EV}(s,i) = v_1(s,i) + \delta \left(\int_0^{\widetilde{w}_R} \widetilde{v}^o(s) \widetilde{f}(w^d) dw^d + \int_{\widetilde{w}_R}^{\infty} \widetilde{v}^d(s,i) \widetilde{f}(w^d) dw^d \right), \tag{4}$$

where $\widetilde{w}_R(s,i)$ is determined by $\widetilde{v}^d(s,i;\widetilde{w}_R) = \widetilde{v}^o(s)$. These misperceptions thus directly distort migrants' savings and integration decisions in period 1, and indirectly by altering their beliefs about their future return decision (via $\widetilde{w}_R(s,i)$). Under misperceptions, decisions made in period 1 maximize $\widetilde{EV}$, i.e., $(\widetilde{s}, \widetilde{i}) = \arg\max_{s,i} \widetilde{EV}$.

The predicted probability of return and the perceived indifference wage

For these actions $(\widetilde{s}, \widetilde{i})$, the mispredicted probability of return is:

$$\widetilde{p} = \widetilde{F}\left(\widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right)\right). \tag{5}$$

The predicted probability of return migration may be mispredicted if any of v^d, v^o, or $F(\cdot)$ are misperceived in period 1. This probability depends on the indifference wage, which depends on misperceptions $\left(\widetilde{v}^d, \widetilde{v}^o, \widetilde{F}\right)$ and on fixed and correctly perceived characteristics of the migrant, $Z = (s_0, I_1, I^o, w^o)$. Considering the perceived optimal choice $\left(\widetilde{s}, \widetilde{i}\right)$, Proposition 1 describes the total effects of migrant characteristics on the indifference wage $\widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right)$ perceived in period 1.

Proposition 1. *For any* $\left(\widetilde{v}^d, \widetilde{v}^o, \widetilde{F}\right)$, $\widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right)$ *is*

- *increasing in initial savings* s_0*, wages at arrival* w_1*, wages in case of return* w^o*, and integration in case of return* I^o*;*
- *decreasing in integration at arrival* I_1*.*

Proof. See Appendix □

First note that these comparative statics results qualitatively apply to any $\left(\widetilde{v}^d, \widetilde{v}^o, \widetilde{F}\right)$, which include correct perceptions $\left(v^d, v^o, F\right)$ as well as partial misperceptions such as $\left(v^d, v^o, \widetilde{F}\right)$ or $\left(\widetilde{v}^d, \widetilde{v}^o, F\right)$.

Second, to provide some intuition for Proposition 1, consider increasing the integration at arrival of a migrant, I_1. This has two effects on the perceived indifference wage: first a direct effect through the level of initial integration; and second an indirect effect through the change in integration and savings decisions. The direct effect of higher integration increases the long-term utility of the migrant in the destination country, which increases both the indifference wage and the (perceived) probability of stay. This increase in the probability of stay in turn has two indirect effects. First, it encourages migrants to integrate in period 1, since integration is more valuable in case of stay. Second, it discourages them to save, since savings are relatively more valuable in case of return. These two indirect effects further lower the indifference wage. Analogous effects happen for w^o, I^o, s_0, and w_1, all of which however *increase* the appeal of returning, and thus raise the indifference wage, which leads to reinforcing integration and savings decisions.[7]

The actual probability of return and unexpected staying

Having described the period-1 *prediction* of the return probability, let us now define the *actual* probability of return. At the beginning of period 2, migrants realize that their actual preferences are $\left(v^d, v^o\right)$ and that, based on their past actions, their indifference wage is $w^R\left(\widetilde{s}, \widetilde{i}\right)$. The actual return probability is obtained by applying this w^R to the correct wage distribution $F(\cdot)$:

$$p_2 = F\left(w_R\left(\widetilde{s}, \widetilde{i}\right)\right). \tag{6}$$

[7] While w^o and I^o have a direct impact on the appeal of returning, higher income and wealth — s_0 and w_1 — lead to higher savings, which are more valuable in case of return.

The gap between the mispredicted probability and the actual probability of return is

$$\Delta \equiv \widetilde{F}\left(\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right)\right) - F\left(w^R\left(\widetilde{s},\widetilde{i}\right)\right).$$

We can now define *unexpected staying* and distinguish two aspects: whether unexpected staying is occurring (qualitative) and how likely it is to occur (quantitative).[8] To this end, we define the binary variable $D \equiv \mathbb{1}(\Delta > 0)$, which is 1 if and only if $\Delta > 0$ and 0 otherwise.

Definition 1. *Unexpected staying occurs (in expectation) if and only if $D = 1$. The likelihood of unexpected staying is given by $D \cdot \Delta$, or conditional on $D = 1$, by Δ.*

We highlight a crucial difference between unexpected staying caused by misperceptions and situations where migrants decide ex post to stay due to an unlikely shock. While the former leads to systematic bias in the prediction, with well-calibrated beliefs, random shocks do not lead to systematic bias and thus cannot generate unexpected staying in the sense defined above. In the remainder of this section, we say "unexpected staying occurs" to mean that it occurs *in expectation*.

Our central question is which forms of misperceptions lead to unexpected staying. We study separately two types of misperceptions, those of long-term wage prospects and of long-term utility. First, we determine which forms of misperceptions lead to unexpected staying. Second, building on Proposition 1, we analyze the impact of each migrant characteristic (i) on whether unexpected staying occurs ($D = 1$), and (ii) on the likelihood of unexpected staying when it occurs ($d\Delta/dz$).

4.1 Misperceptions about the distribution of long-term wages

In period 1, if the migrant misperceives the distribution of their long-term wage, they choose $\left(\widetilde{s},\widetilde{i}\right)$ which maximizes

$$\widetilde{EV}(s,i) = v_1(s,i) + \delta\left(\int_0^{w_R} v^o(s)\widetilde{f}(w^d)dw^d + \int_{w_R}^{\infty} v^d(s,i)\widetilde{f}(w^d)dw^d\right),$$

where only $\widetilde{F}(\cdot)$ differs from $F(\cdot)$. Although $\left(\widetilde{s},\widetilde{i}\right)$ is distorted by this misperception, preferences and therefore $w_R\left(\widetilde{s},\widetilde{i}\right)$ are correctly perceived.

Observation 1. *When the long-term wage distribution is misperceived, unexpected staying occurs ($D = 1$) if and only if*

$$\Delta \equiv \widetilde{F}\left(w_R\left(\widetilde{s},\widetilde{i}\right)\right) - F\left(w_R\left(\widetilde{s},\widetilde{i}\right)\right) > 0.$$

[8] We could have allowed Δ to be negative in our definition, in which case the absolute value of Δ would measure the likelihood of unexpected leaving. Given the focus of our paper and in order to avoid confusion, we limit ourselves to the case when $\Delta > 0$.

Observation 1 follows directly from Definition 1 and from the fact that preferences are correctly perceived. Intuitively, the condition implies that the migrant overestimates the probability of earning a wage below their indifference wage, i.e., they overestimate the likelihood of receiving a wage so low that they would return. In other words, they are pessimistic about the distribution of wages below their (correctly perceived) indifference level. Note that what matters is the migrant's relative pessimism about the destination country — how much more pessimistic they are about the wages in the destination compared to the origin country. For the sake of simplicity, we only model misperceptions about the destination country's wage distribution. Next, let us identify conditions on $\widetilde{F}$ that lead to unexpected staying.

First, unexpected staying occurs for any migrant whose misperception is such that F first-order stochastically dominates $\widetilde{F}$. Indeed, since for all w^d, $\widetilde{F}\left(w^d\right) \geq F\left(w^d\right)$, then $\Delta > 0$ and $D = 1$ for all w_R, and thus for any migrant characteristic. In this case, migrants overestimate the likelihood of earning less than any given wage, and are therefore globally pessimistic about their wage prospects.

Since first-order stochastic dominance is demanding, we next consider migrants who are pessimistic for wages below a certain threshold $\hat{w}$, but never above that threshold.

Definition 2. *A migrant's misperception $\widetilde{F}\left(w^d\right)$ satisfies low-wage pessimism below $\hat{w}$ if*

- $\widetilde{F}(w) > F(w)$*, for* $w \in (0, \widehat{w})$*,*
- $\widetilde{F}(w) \leq F(w)$ *for* $w \geq \widehat{w}$*.*

With such low-wage pessimism, we get the following observation, given that $D = 1$ when $\widetilde{F}(w_R) > F(w_R)$:

Observation 2. *A migrant with low-wage pessimistic misperceptions $\widetilde{F}(w)$ below $\widehat{w}$ tends to stay unexpectedly if and only if $w_R\left(\widetilde{s}, \widetilde{i}\right) < \widehat{w}$.*

Impact of migrant characteristics on the occurrence of unexpected staying

Combining this observation with Proposition 1, we can show the following monotonicity property for unexpected staying when migrants display low-wage pessimism:

Corollary 1. *Consider a migrant with low-wage pessimism and a given set of characteristics $(s_0, w_1, I_1, w^o, I^o)$. Then unexpected staying D is decreasing in s_0, w_1, w^o, and I^o; and increasing in I_1.*

Proof. By Observation 2, we know that $D = 1$ for all $w_R < w$ and $D = 0$ otherwise, so that D is (weakly) decreasing in w_R. By Proposition 1, we know that $\widetilde{w}_R$ is increasing in s_0, w_1, w^o, I^o, and

decreasing in I_1. Therefore D is (weakly) decreasing in s_0, w_1, w^o, and I^o, and (weakly) increasing in I_1. □

Impact of migrant characteristics on the likelihood of unexpected staying

We now discuss the impact of migrant characteristics on the likelihood of unexpected staying, assuming throughout that unexpected staying occurs, i.e., $D = 1$.[9] The impact of z on the likelihood of unexpected staying is given by:

$$\frac{d\Delta}{dz} = (\widetilde{f}(w_R) - f(w_R)) \cdot \frac{dw_R}{dz}. \tag{7}$$

This depends on dw_R/dz, which we determined in Proposition 1, and on the direction of the misperception of the density function evaluated at the indifference wage, $\widetilde{f}(w_R) - f(w_R)$. Since for any F and $\widetilde{F}$ with $\widetilde{F} \neq F$, there must be wages w^d and $w^{d\prime}$ such that $\widetilde{f}(w^d) > f(w^d)$ and $\widetilde{f}(w^{d\prime}) < f(w^{d\prime})$, the impact of z on the likelihood of unexpected staying cannot be monotonic even if the impact on the indifference wage is monotonic.[10] In order to sign the comparative statics, we therefore consider a particular type of low-wage pessimism, which also satisfies that $\widetilde{F}(w^d) - F(w^d)$ has a unique local maximum on $(0, \overline{w})$ at $\overline{w}$.[11]

Corollary 2. *Consider low-wage pessimism below $\hat{w}$, with $\widetilde{F}(w^d) - F(w^d)$ having a unique local maximum in $(0, \hat{w})$ at $\overline{w}$. Then*

- *when $w_R \in (0, \overline{w})$, the likelihood of unexpected staying decreases in s_0, w_1, w^o, I^o and increases in I_1,*
- *when $w_R \in (\overline{w}, \hat{w})$, the likelihood of unexpected staying increases in s_0, w_1, w^o, I^o and decreases in I_1.*

Proof. See Appendix. □

In this case, unexpected staying is largest when the indifference wage is equal to $\overline{w}$. Therefore if we start at an indifference wage below this threshold and increase savings s_0 or decrease integration I_1, then both the indifference wage and the likelihood of unexpected staying increase.

4.2 Misperceptions of long-term utility

In this section, we consider errors that are exclusively due to the migrant misperceiving the shape of their utility functions in the long term, $\widetilde{v}^d(\cdot,\cdot;\cdot) \equiv \widetilde{u}^d\left(c^d, I^d\right)$ and $\widetilde{v}^o(\cdot) \equiv \widetilde{u}^o(c^o, I^o)$. Unlike misperceived wage prospects, preference misperceptions directly impact the indifference wage

[9] The change in unexpected staying is well-defined otherwise, but to avoid confusion we do not want to say that unexpected staying increases for migrants who are in fact unexpectedly leaving, but do so less often.

[10] The same holds for low-wage pessimistic misperceptions: the quantity $\widetilde{f}(w^d) - f(w^d)$ changes signs below $\hat{w}$.

[11] Note that by low-wage pessimism, $\overline{w} < \hat{w}$ always exists.

$\widetilde{w}_R(s,i) \equiv w_R\left(s,i;\widetilde{v}^d,\widetilde{v}^o\right)$, which is such that $\widetilde{v}^d(s,i;w_R) = \widetilde{v}^o(s)$. The distorted decision in period 1 is $(\widetilde{s},\widetilde{i}) = \arg\max_{s,i} E\widetilde{V}$, with:

$$E\widetilde{V} = v_1(s,i) + \delta\left(\int_0^{\widetilde{w}_R(s,i)} \widetilde{v}^o(s) f(w^d) dw^d + \int_{\widetilde{w}_R(s,i)}^{\infty} \widetilde{v}^d(s,i;w^d) f(w^d) dw^d\right).$$

Based on this choice, the migrant's predicted probability of return is $F\left(\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right)\right)$. In contrast, at the start of period 2, they realize that with their actual preferences (v^d, v^o), their indifference wage is in fact $w_R\left(\widetilde{s},\widetilde{i}\right) \equiv w_R\left(\widetilde{s},\widetilde{i};v^d,v^o\right)$, so that their actual probability of return is $F\left(w_R\left(\widetilde{s},\widetilde{i}\right)\right)$.

Observation 3. *When long-term utilities are misperceived, the migrant tends to stay unexpectedly if and only if*

$$\Delta \equiv F\left(\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right)\right) - F\left(w_R\left(\widetilde{s},\widetilde{i}\right)\right) > 0.$$

This leads us to the necessary and sufficient condition for unexpected staying under utility misperceptions.

Proposition 2. *Under misperceived long-term utility, the following are equivalent:*

1. *Unexpected staying occurs ($D = 1$)*
2. $\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right) > w_R\left(\widetilde{s},\widetilde{i}\right)$
3. *misperceived preferences $(\widetilde{v}^d,\widetilde{v}^o)$ satisfy*

$$\widetilde{v}^d\left(\widetilde{s},\widetilde{i};\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right)\right) - \widetilde{v}^o\left(\widetilde{s}\right) < v^d\left(\widetilde{s},\widetilde{i};\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right)\right) - v^o\left(\widetilde{s}\right). \tag{8}$$

Proof. See Appendix. □

Conditions 2 and 3 display a form of utility pessimism about the host country relative to the origin country and specifically about pessimism conditional on earning the misperceived indifference wage $\widetilde{w}_R(\widetilde{s},\widetilde{i})$. Condition 2 states that the migrant tends to stay unexpectedly if they overestimate the indifference wage they will require to stay compared to the one at which they actually end up being willing to stay. Condition 3 makes this clearer, highlighting that this is equivalent to underestimating the utility when they receive their (perceived) indifference wage, so that they will in fact be willing to strictly stay instead of being indifferent between staying and leaving. It follows that, if migrants underestimate the utility of staying for every level of savings, integration, and indifference wage, then they will always stay unexpectedly.

Thus, one condition that allows us to infer unexpected staying is that migrants' misperceived preferences underestimate the utility gap $v^d - v^o$ not only for the indifference wage $\widetilde{w}_R$, but for all wages, i.e., if $\widetilde{v}^d(s,i;w^d) - \widetilde{v}^o(s) < v^d(s,i;w^d) - v^o(s)$ for all w^d.

One particularly tractable form of such a uniform pessimism is given by an additively pessimistic misperception:

Definition 3. *Utility misperceptions display additive pessimism if and only if* $\tilde{v}^d(i,s) = v^d(i,s) - \pi^d$ *and* $\tilde{v}^o(s) = v^o(s) - \pi^0$*, with* $\pi^d - \pi^o > 0$*, so that the utility gap is misperceived by the constant term* $\pi^R \equiv \pi^d - \pi^o > 0$ *:*

$$\tilde{v}^d\left(i,s;w^d\right) - \tilde{v}^o\left(s\right) = v^d\left(i,s;w^d\right) - v^o\left(s\right) - \pi^R. \tag{9}$$

Impact of Characteristics on Unexpected Staying with Utility Misperceptions

Let us first consider any utility misperceptions that satisfy the conditions stated in Proposition 2, so that $\Delta > 0$. We start by computing the comparative statics of unexpected staying with respect to some arbitrary parameter z :

$$\frac{d\Delta}{dz} = f(\widetilde{w}_R(\widetilde{s},\widetilde{i}))\frac{d\widetilde{w}_R(\widetilde{s},\widetilde{i})}{dz} - f(w_R(\widetilde{s},\widetilde{i}))\frac{dw_R(\widetilde{s},\widetilde{i})}{dz}.$$

In the comparative statics under distribution misperceptions $\widetilde{F}$, a particular focus was placed on the comparison between $\widetilde{f}(w_R(\widetilde{s},\widetilde{i}))$ and $f(w_R(\widetilde{s},\widetilde{i}))$. Here, the key mechanism explaining the impact of z on Δ is based on the comparison between $\frac{dw_R(\widetilde{s},\widetilde{i})}{dz}$ to $\frac{d\widetilde{w}_R(\widetilde{s},\widetilde{i})}{dz}$, rather than on differences between $f(\widetilde{w}_R(\widetilde{s},\widetilde{i}))$. We thus assume that the wage distribution $F(\cdot)$ is uniform over an interval of wages that include $\widetilde{w}_R(\widetilde{s},\widetilde{i})$ and $w_R(\widetilde{s},\widetilde{i})$, which removes the wage distribution channel and simplifies the equation to:

$$\frac{d\Delta}{dz} = \bar{f} \cdot \left(\frac{d\widetilde{w}_R(\widetilde{s},\widetilde{i})}{dz} - \frac{dw_R(\widetilde{s},\widetilde{i})}{dz}\right). \tag{10}$$

Equation 10 shows that z impacts the likelihood of unexpected staying through the gap between the misperceived indifference wage $\widetilde{w}_R(\widetilde{s},\widetilde{i})$ and the ex post correct indifference wage $w_R(\widetilde{s},\widetilde{i})$. For instance, $\frac{d\Delta}{dz}$ is positive if z increases $\widetilde{w}_R(\widetilde{s},\widetilde{i})$ more than it increases $w_R(\widetilde{s},\widetilde{i})$, or if it decreases $\widetilde{w}_R(\widetilde{s},\widetilde{i})$ less than it decreases $w_R(\widetilde{s},\widetilde{i})$.

In order to sign this effect, we further assume that utility misperceptions entail additive pessimism $\pi^R > 0$.[12] Under these assumptions, we get the following comparative statics on $\widetilde{w}_R - w_R$ and hence on the likelihood of unexpected staying.

Proposition 3. *Under uniformly distributed wages and additive pessimism, the likelihood of unexpected staying strictly increases with* s_0*,* w_1*,* w^o*, and* I^o*; and strictly decreases with* I_1*.*

[12]Without this assumption, the comparison between $\frac{d\widetilde{w}_R(\widetilde{s},\widetilde{i})}{dz}$ and $\frac{dw_R(\widetilde{s},\widetilde{i})}{dz}$ would be extremely challenging, as $\frac{d\widetilde{w}_R(\widetilde{s},\widetilde{i})}{dz}$ relies on misperceived marginal utilities evaluated at $\widetilde{w}_R(\widetilde{s},\widetilde{i})$, whereas $\frac{dw_R(\widetilde{s},\widetilde{i})}{dz}$ relies on actual marginal utilities evaluated at $w_R(\widetilde{s},\widetilde{i})$. Under this assumption, since misperceived utility differs from the actual utility only by a constant term, marginal utilities are perceived correctly, while the indifference wage $\widetilde{w}_R$ is greater than w_R.

Proof. See Appendix. □

To illustrate, consider the effect of a higher wage w^o in the origin country. A higher w^o directly increases the migrant's probability of return and thus their indifference wage. For a pessimistic migrant who already overestimates their probability of return, a higher w^o is perceived as even more valuable, since they overestimate how likely it is that they will return and thus benefit from an increase in w^o. Pessimism and higher w^o are thus complementary, as their combination amplifies the increase in the indifference wage. This direct increase in the return probability increases the incentives to save more and to integrate less, as savings are more and integration less valuable in the country of origin. This indirect impact on savings and integration amplifies the direct impact, further increasing the return probability.

4.3 Ideal Data to Identify Unexpected Staying

Based on our model, we now explore which data would be needed to empirically identify unexpected staying and its underlying mechanisms. To this end, we describe the ideal data to collect via tailored surveys to properly measure unexpected staying (D) and the likelihood of unexpected staying ($D\Delta$). To estimate these quantities requires eliciting the subjective beliefs about the probability of return, which in our model depend on perceptions of indifference wages and of long-term wage distribution. We summarize here the role played by both classes of misperceptions — about wages and about utility — and outline the data required to establish the role each plays in unexpected staying. In the next section, we compare this data to the data we use to explore the predictions of our model.

Mispredicted indifference wages

When migrants mispredict the distribution of future wages, their probability of return is determined by their (correctly perceived) indifference wage $w_R(\widetilde{s}, \widetilde{i})$. Unexpected staying occurs in expectation if the perceived probability of wages below this indifference wage $\widetilde{F}(w_R)$ is higher than the actual probability, $F(w_R)$. Eliciting the latter presents the standard challenges of identifying outcomes: it requires observing a large enough sample of migrants with the same labor market characteristics, as well as their decisions to stay or return. A challenge that is specific to our setting stems from measuring the mispredicted probability of wages below $w_R(\widetilde{s}, \widetilde{i})$, which provides an estimate for the perceived likelihood of unexpected staying. Together, the difference of these two quantities provides a direct quantitative estimate of wage pessimism.

Alternatively, when we do not observe the actual indifference wage, we might still observe F and $\widetilde{F}$ over the entire range of plausible wages. Then, if $\widetilde{F}$ is first-order stochastically dominated by F, we can infer that $D = 1$, and that these migrants tend to stay unexpectedly. We can draw the same conclusion for migrants who display low-wage pessimism below some $\hat{w}$ and for whom we know that

their indifference wage is less than $\hat{w}$.

While the first approach provides a clear and quantitative estimate of unexpected staying, it may be easier in practice to find out whether migrants' indifference wage is below some threshold $\hat{w}$ than to identify it precisely. Establishing the former requires a question of the following type: "Suppose you had a permanent job that pays X Euro per year. Would you stay permanently?" Migrants who would stay permanently are revealing that their indifference wage lies below X Euro per year. The following type of question could in principle be used to estimate the indifference wage: "Suppose that you had a permanent job in Germany. What is the lowest yearly wage such that you would be willing to stay permanently?" But this type of question is substantially more complicated and prone to misunderstandings, and a sequence of simpler questions may be better suited to identify the wage level. This may lead to respondents' fatigue or to more random answers, so practical considerations may favor different approaches depending on the context.

Mispredicted long-term utility

When migrants display utility pessimism, our model predicts that they will overestimate their indifference wage. According to Observation 3, we can then estimate the likelihood of unexpected staying if we observe the ex ante misperceived and ex post actual indifference wages and the actual likelihood of wages below these thresholds, $F(\widetilde{w}_R)$ and $F(w_R)$. This requires combining data on the misperceived indifference wage elicited via a survey, on the actual indifference estimated from observations on migrants' actual ex post decisions of staying conditional on wages, and on the likelihood of wages estimated from wage realizations.

If instead we are satisfied with figuring out whether migrants tend to stay unexpectedly ($D = 1$), rather than estimating the likelihood of this event, we have a few alternatives based on Proposition 2. Namely, unexpected staying occurs if the perceived indifference wage is higher than the actual indifference wage; or equivalently if the ex ante perceived utility is lower than the ex post actual utility at the perceived indifference wage. The benefit of eliciting the (perceived and actual) wages is that it is conceptually clear how to elicit them, while eliciting utilities directly is more challenging.

On the other hand, eliciting utilities at the perceived indifference wage has the advantage that all this data can be collected from migrants directly over time, since it all consists of *perceived* quantities, with no need to estimate the actual indifference wage w_R. Estimating this wage in practice requires data from other, similar migrants. For example, if we are willing to use a Likert scale on life satisfaction as a proxy for utility, then upon arrival (in period 1) we could elicit the predicted life satisfaction conditional on the perceived indifference wage, and at a later stage (period 2) repeat this elicitation for the same indifference wage now that current preferences are correctly perceived.

5 Stylized facts from the German SOEP

In this section, we aim to document whether, consistent with our theory, initial pessimistic misperceptions (about utility or wage prospects) are associated with an increased likelihood of staying unexpectedly. Based on our theory, we require a dataset that elicits initial return intentions, eventual return decisions, as well as proxies for wage and utility pessimism.

This is why we focus on the case of Germany and use data from the German Socio-Economic Panel (SOEP). The SOEP is a survey which provides household- and individual-level data for a representative sample of the population in Germany on a yearly basis over several decades (Goebel et al., 2019).[13] This population includes 29,793 immigrants observed since the first wave in 1984 to the last at our disposal in 2020. In addition to standard demographic and socio-economic characteristics, the panel includes information about immigrants' country of birth, year of arrival and last known location (i.e. whether the migrant left Germany). To the best of our knowledge, it is the only long panel containing the information required for our analysis on the following key variables: immigrants' initial intentions (to stay permanently or temporarily), proxies for initial levels of pessimism and for short-term levels of integration, savings, and actual location in the long term.

In Section 5.1, we detail how we construct the three central variables to our model. We discuss the demanding assumptions required to bring the theory as close as possible to the data in Section 5.2, and we detail our sample in Section 5.3. We then discuss the validity of prediction data in Section 5.4. In Section 5.5, we provide descriptive statistics and correlations between unexpected staying and two forms of pessimism: wage-pessimism and pessimism about life satisfaction.

5.1 Key variables

In this Section, we detail how we proxy in the data each of the three central variables in our theoretical framework, i.e. unexpected staying, pessimism about utility, and low-wage pessimism, and the assumptions needed to link each data proxy with its underlying theoretical concept.

Unexpected Staying A migrant is considered an unexpected stayer if they (i) initially have temporary intentions and (ii) are still in Germany in the long term. The information on intended duration of stay builds on two different survey questions: "How long do you want to stay in Germany?" (for survey years 1984-1995) and "Do you want to stay in Germany forever?" (for survey years 1996-2010). Regarding the realized location in the long run, the SOEP includes information on several drop-out studies which were designed to understand reasons for non-response: attrition, mobility (including emigration), death etc.[14] Our main measure of unexpected staying, "UnexpS"

[13] Version 37, SOEP, 2022, doi: 10.5684/soep.core.v37eu.

[14] In addition, if the respondent(s) cannot be found at their known address, the pollster may ask neighbours about

is a variable which takes a value of '1' if the migrant is still in Germany in 2020 although they had expected a temporary stay. The variable takes a value of '0' if they either (i) left Germany as predicted or (ii) are still in Germany as predicted. We refer to these individuals as "other migrants". The variable takes a value of '-1' if the migrant left Germany despite having initial intentions to stay permanently, i.e. they are unexpected leavers. We show in Appendix B.3 that results are robust for two alternative definitions of unexpected staying. In the first alternative definition, we combine the '0' and '-1' outcomes in order to contrast unexpected stayers to all migrants who did not stay unexpectedly (i.e. unexpected leavers and other migrants). In the second alternative, we adjust our baseline definition using information on the difference of intended and realized years of stay for the subset of temporary migrants who provide this information. In this alternative definition, a migrant is thus classified as an unexpected stayer if they are still in Germany and their actual duration of stay exceeds their initially intended duration.[15]

In the theoretical section, we define unexpected staying as the overestimation of the probability of return. Ideally, we would therefore rely on probabilistic predictions, i.e. statements by migrants about their perceived *probabilities* over a set of possible outcomes in the future (location, life satisfaction, wages). For example, a probabilistic prediction could have been obtained by asking "What is the probability that you will stay in Germany until the end of your life ? -... "

The SOEP data has two limitations in this respect. First, the wording of the questions about immigrants' stay in Germany could be interpreted as asking about the wish (rather than intention) to stay permanently. Second, the modalities of answer to this question are only binary ("yes, I will stay permanently" versus "no, I will stay temporarily") and therefore do not allow for probabilistic predictions. Regarding the first issue, we assume that the answers reveal predictions. The binary nature of the variable constrains us to categorize migrants as "unexpected stayers", "unexpected leavers", and "others" as described above. However, under the assumption that the fraction of true unexpected stayers is increasing when going from "unexpected leavers", to "others", to "unexpected stayers", our categorization should still yield accurate directional results.

Pessimism about Utility We proxy pessimism about utility by comparing information about migrants' predictions of future life satisfaction to their actual life satisfaction ex post.[16] The migrants

their possible whereabouts. For additional details on the identification of emigrants, see Kroh and Kröger (2020).

[15]Our baseline definition might overestimate the number of unexpected stayers if the latter includes immigrants who have temporary intentions but may not yet have reached their planned duration. To mitigate this concern, we show in Appendix Table A2 that more than 82% of the immigrants with temporary intentions who provided an expected duration in years have exceeded their initial expectation. Given that only a subsample of immigrants with temporary intentions also provide an expected duration in years, conditioning our definition the availability of expected years would significantly reduce our sample size.

[16]Measures of subjective well-being are known to correlate with migration decisions. For instance, Grimes and Wesselbaum (2021) show that differences between host and origin countries correlate with migration flows. Our

in our sample are observed at several points in time, so that we have information about (i) their prediction at arrival in Germany about the life satisfaction they think they will have five years later, and (ii) the actual life satisfaction that they state five years later. The two relevant variables are obtained through the survey questions: "How satisfied are you currently with your life in general?" (for realized life satisfaction) and "How do you think you will feel in five years?" (for predicted life satisfaction). Both variables are measured on a scale from 0 to 10. We then construct our variable of $LS-pessimism$ based on the difference between their actual life satisfaction ex post and the life satisfaction that they had predicted at arrival. The $LS-pessimism$ score thus theoretically ranges between -10 and 10. For instance, a value of 10 corresponds to extreme pessimism, with a predicted life satisfaction of 0 at arrival, but an actual life satisfaction of 10 five years later. In Appendix Table A7, we show that results are robust to using a binary version of the pessimism measure.

Low-wage Pessimism To measure low-wage pessimism, we use the perceived likelihood of losing one's job as a proxy for the probability of earning low wages. Following the same logic as for utility pessimism, wage pessimism compares the perceived probability of job loss in the following two years to the actual employment situation two years later.[17] Respondents who are employed when surveyed are asked: "How likely do you think it is that you might lose your job in the next two years?". The response modalities on beliefs about a potential job loss changed in 1999, from a qualitative measure to a probabilistic measure. To reconcile this different measurement, we create a binary indicator which takes a value of 1 if the respondent expected a job loss to occur either with the qualitative modalities "probably " or "definitely ", or with a probability above 50%. Otherwise, the indicator takes a value of 0. We focus on answers to this question which were provided within the first four years after arrival, and compare it to their actual employment situation two years after their prediction. A migrant is thus pessimistic ($W-pessimism=1$) if they had expected a job loss but were still employed ex post. Instead, a migrant turns out to be optimistic ($W-pessimism=-1$) if they did not expect to lose their job but ended up being unemployed ex post.

We are aware that the probability of losing a job does not determine the expected wage conditional on having a job. A person could be pessimistic about job loss, while optimistic about wages conditional on employment, in which case it is an imperfect proxy. Such a categorization will inevitably mislabel some migrants ex post: we categorize migrants as pessimistic who overestimate the likelihood of losing their job, while the relevant notion according to the model is that the migrant overestimates the likelihood of wages below w_R.

contribution here pertains to the impact of (mis)predictions about life satisfaction on return migration.

[17]The questions available in the survey impose that predictions about a future job loss pertain to a shorter time horizon (2 years) than predictions about future life satisfaction (5 years).

5.2 Additional data limitations

On top of the measurement issues noted above, we note four additional assumptions to establish a link between unexpected staying and mispredicted long-term utility and wage prospects.

First, note that the construction of our pessimism measures requires that migrants in our sample have stayed in Germany (and in the SOEP) at least two and five years, respectively, in order to observe the realized employment evolution and life satisfaction. This potentially increases the probability that migrants become unexpected stayers in our sample. To rule out concerns of selection towards unexpected stayers in our baseline sample, we compare it to an alternative "unconstrained" sample in which we do not measure pessimism and only impose the observation of intentions at arrival and actual location in 2020. Table A3 in the Appendix allows to compare the proportions of unexpected stayers between these two samples. Unexpected staying is even more prevalent in the unconstrained sample (39.4%) than in our baseline sample (35.1%, see Table 4). It is thus unlikely that our baseline sample suffers from this type of selection.

Second, the literature has established that migrants' return decisions may be affected by unforeseen life events.[18] We account for changes in marital status and in the number of children in our analysis, but have to assume that additional unobservable idiosyncratic shocks are balanced and independently distributed across migrants. More specifically, idiosyncratic shocks occurring to migrants during their stay should be uncorrelated with migrants' pessimism. Since the pessimism measure is created from comparing predictions at arrival with data several years in the future, it may capture part of the shocks and thus be correlated with outcomes.

Third, we must assume that unobserved macro factors also affect pessimistic and non-pessimistic migrants similarly. For instance, business cycles, changes in exchange rates, or political instability in the origin country, which occur during the migrants' stay in Germany, should not be correlated with predetermined pessimism about the destination country.

Finally, perhaps the biggest limitation of the SOEP data pertains to the fact that it does not allow us to fully capture the notion of *relative* pessimism about life satisfaction stated in the model.[19] Indeed, the prediction that we capture at arrival pertains to a time horizon of 5 years and is hence focused on life satisfaction in Germany.[20] Instead, the pessimism that we would like to measure should be *relative* between Germany and the migrant's origin country. A migrant exhibiting relative

[18] From a theoretical standpoint, we have argued in previous sections that such shocks cannot provide a systematic explanation to unexpected staying.

[19] Note that we do not face this issue with pessimism about wage prospects.

[20] For the subsample of migrants for which we observe the intended duration of stay (which is more demanding than the binary prediction temporary versus permanent), less than 20 percent of migrants state an intention to stay of less than five years. So there is a small minority of migrants who may consider this question through the lens of a return to the origin country.

pessimism is indeed less optimistic about their likelihood to enjoy life in Germany *than in the origin country.*[21] Migrants may thus be optimistic about Germany but still exhibit relative pessimism if they are even more optimistic about the origin country than about Germany. While we have no way to measure relative pessimism because we have no predictions on the origin country, we show in Table 4 that migrants who are unexpected stayers are less optimistic about life in Germany than "other migrants".[22]

5.3 Sample construction

Our sample of migrants does not impose restrictions on the type of intentions they had at arrival, nor on their latest location. Hence, our sample consists of migrants who had either temporary or permanent initial intentions, and who have either left Germany or stayed. Migrants can thus be unexpected stayers, unexpected leavers, or have made correct predictions about the temporariness or the permanent nature of their stay. However, since the focus of our paper is to explain why immigrants' *early* return intentions are frequently wrong, and how this impacts their behavior in the short term, we need to ensure that this information is collected sufficiently close to the time of arrival. Also, long-term return behaviors should be measured sufficiently long after arrival in order to limit censoring issues. Hence, we need to impose a number of selection criteria to our sample.

First, the variables required to build our pessimism measures are not available for all respondents. Our first criterion is thus the availability of respondents' predictions as well as actual ex post life satisfaction and employment outcomes. Second, we restrict the sample to migrants who arrived in Germany no later than 2010, in order to allow enough time for a possible return, with our last observed sample year being 2020. Third, we drop immigrants who were late repatriates (i.e. "Spätaussiedler" : immigrants of German descent that lived in the Eastern block) or who have a refugee status. The immigration and return decisions of these migrant groups are likely affected by different institutional settings, migration motives, and constraints. The conditions they face are generally less applicable to our model, which requires access to the labor market and the ability to freely return to the country of origin.[23] Fourth, and most importantly, we need to ensure that predictions about immigrants' duration of stay are measured *at arrival*. Hence we restrict our sample to migrants who were first interviewed at most four years after their arrival in Germany.[24]

[21] Indeed, we show under mispredicted long-term utility that unexpected staying results from an underestimation of the utility in the destination country relative to the origin country.

[22] To claim that unexpected stayers exhibit higher *relative* pessimism than "other migrants", we would need to assume that the lower optimism about Germany by unexpected stayers (compared to other migrants) is not compensated by an even lower optimism about the origin country (compared to other migrants).

[23] Table A1 shows that merely 5% of the sample of refugees and ethnic Germans intend to stay temporary. This proportion is of 48% in our main sample, which is composed of all other types of migrants (see Table 1).

[24] As the first survey wave was implemented in 1984, this condition implies that migrants arrived in Germany in 1980 at the earliest.

This condition imposes the strongest restriction on sample sizes. Indeed, immigrants in the SOEP spend on average almost 9 years in Germany before they appear for the first time in the survey. Excluding refugees and ethnic Germans increases this period to almost 12 years. Finally, to ensure that migrants' integration is a choice rather than a constraint, we focus on individuals aged at least 18 when they arrived in Germany. Table 2 describes the incremental impacts of these selection criteria on sample sizes. Column (1) refers to the construction of the LS-pessimism sample whereas column (2) refers to the W-pessimism sample.

Table 2: Sample selection criteria and sample sizes

	LS-pessimism (1)	W-pessimism (2)
Immigrant	29,793	29,793
+ Pessimism & Return int.	5,332	4,425
+ interviewed pre-2010	3,330	3,276
+ no refugee nor ethnic Germ.	2,327	2,574
+ years since arrival $\leq$4	276	164
+ age at arrival $\geq$18	253	143

Note: This table details the impact of sequentially applied selection criteria on sample sizes. Column (1) refers to the sizes of samples containing information on LS-pessimism, and column (2) refers to the W-pessimism samples.

5.4 Accuracy of Predictions

A possible concern regarding expectations data is that it might just be noise. While a large literature following Manski (2004) finds that subjective expectations are informative, we perform some tests to verify this. First, we check how expectations predict realizations controlling for individual characteristics. We find that a unit increase of expected life satisfaction increases realized life satisfaction by 0.39 units (standard error of 0.07) and a one unit increase in expected job loss increases realized job loss by 0.08 (standard error of 0.08, not significant).

In Table 3, we then decompose the two pessimism measures into their two components (expectations and ex-post realizations). We regress these components jointly on (i) unexpected staying (columns 1 and 2), ii) temporary intentions (columns (3) and (4)) and iii) final location in Germany (columns (5) and (6)) to check whether predictions are informative. We show that migrants who predicted a higher life satisfaction were less likely to express an intention to leave Germany and more likely to eventually stay. Migrants who expected a job loss had higher intentions to leave, albeit the coefficient is not statistically significant, while we find no notable difference in realized stay.

We confirm that expecting more favourable outcomes (both in terms of higher life satisfaction and

lower job loss concerns) is associated with lower intentions to stay temporarily. Since these expectations have no impact on the actual long-term location decision, this suggests that expectations (predicted life satisfaction and job loss) are connected to unexpected staying only via the return prediction, which strongly suggests that expectations are not pure noise. In comparison to predictions, none of the correlations between realizations (of life satisfaction and job loss) and any component of unexpected staying are significant. This seems fairly intuitive since these realizations take place only a few years after arrival and have thus limited connection with long-term location, whereas predictions about life satisfaction, job loss and future location are made at the same moment.

Table 3: Decomposed unexpected staying and pessimism measures

	(1)		(2)		(3)		(4)		(5)		(6)	
	Unexp. Stay		Unexp. Stay		Temp. intentions		Temp. intentions		Still in Germany		Still in Germany	
	b	se	b	se	b	se	b	se	b	se	b	se
Satis obs.t+5	0.037	(0.02)			0.033	(0.02)			0.003	(0.01)		
Satis expected	-0.052*	(0.03)			-0.055**	(0.02)			0.003	(0.01)		
Job lost in t+2			-0.209	(0.17)			-0.057	(0.14)			-0.152	(0.11)
Job loss expected			0.169	(0.14)			0.163	(0.12)			0.007	(0.09)
Age	0.001	(0.00)	-0.003	(0.01)	0.001	(0.00)	-0.002	(0.01)	0.000	(0.00)	-0.001	(0.01)
Female	-0.084	(0.08)	-0.061	(0.15)	-0.067	(0.07)	-0.085	(0.13)	-0.017	(0.04)	0.024	(0.10)
Married	0.041	(0.14)	0.136	(0.16)	-0.050	(0.13)	0.077	(0.14)	0.091	(0.07)	0.059	(0.11)
Children	-0.003	(0.04)	0.068	(0.06)	0.001	(0.04)	0.049	(0.06)	-0.004	(0.02)	0.020	(0.04)
Education	0.013	(0.02)	-0.001	(0.04)	-0.013	(0.02)	0.034	(0.03)	0.026**	(0.01)	-0.035	(0.03)
Missing education[2].	0.189	(0.27)	0.080	(0.40)	-0.027	(0.24)	0.502	(0.35)	0.216	(0.14)	-0.422	(0.27)
82-90 cohort	0.208	(0.15)	-0.486**	(0.22)	0.260*	(0.13)	-0.216	(0.19)	-0.052	(0.08)	-0.270*	(0.15)
91-00 cohort	-0.095	(0.13)	-0.322	(0.23)	0.048	(0.11)	-0.152	(0.20)	-0.143**	(0.07)	-0.170	(0.16)
Chg. married	0.107	(0.12)	0.235	(0.16)	0.067	(0.11)	0.150	(0.14)	0.040	(0.07)	0.085	(0.11)
Chg. children	-0.011	(0.04)	-0.003	(0.06)	-0.016	(0.04)	-0.056	(0.05)	0.005	(0.02)	0.054	(0.04)
Constant	0.329	(0.44)	0.665	(0.54)	0.755*	(0.39)	0.403	(0.47)	0.573**	(0.23)	1.262***	(0.37)
Observations	236		126		236		126		236		126	

Notes: Table 3 decomposes the two pessimism measures into their two components (expectations and ex-post realizations). We regress these components jointly on (i) unexpected staying (columns 1 and 2), ii) temporary intentions (columns (3) and (4)) and iii) final location in Germany (columns (5) and (6)) to check whether predictions are informative. ***,**,* denote significance at the 1, 5 and 10% level, respectively.

5.5 Descriptive evidence

Table 4 contains means and standard errors of the key variables, namely the two forms of pessimism, proxies of short-term integration and savings, as well as important socio-demographic characteristics measured at the time the predicted duration is stated (age, years of education, gender, being married, number of children, and cohort of arrival).[25] Cohorts of arrival in Germany are defined

[25]The number of years of education is missing for 13% of our sample. To avoid losing these observations, we generate an indicator variable which is equal to 1 when the education information is missing, and 0 otherwise. For these observations, we then replace the missing value for their education years by a value of 0, as the effect will be captured by the dummy. Note that using a different value for this imputation only changes the coefficient for the

at the decade level: 1982-90; 1991-2000 and 2001-2010. We first present descriptive statistics of the whole sample in (1) and then split it between (2) unexpected stayers, (3) "other migrants", who correctly predicted their duration of stay, and (4) unexpected leavers. Column (5) provides t-tests on the mean differences between unexpected stayers and other migrants (subsamples (2) and (3)) and Column (6) provides t-tests on the mean differences between unexpected leavers and other migrants (subsamples (4) and (3)).

Table 4: Descriptive Statistics

	(1)		(2)		(3)		(4)		(5)		(6)	
	All		UnexpS=1		UnexpS=0		UnexpS=-1		(2)-(3)		(4)-(3)	
	mean	sd	mean	sd	mean	sd	mean	sd	b	t	b	t
Temp. intentions	0.48	(0.50)	1.00	(0.00)	0.22	(0.41)	0.00	(0.00)	0.78***	(24.58)	-0.22***	(-6.75)
Still in Germany	0.82	(0.39)	1.00	(0.00)	0.78	(0.41)	0.00	(0.00)	0.22***	(6.75)	-0.78***	(-24.58)
Years overstayed[1]	5.34	(9.10)	18.34	(7.70)	0.43	(1.74)	0.00	(0.00)	17.91***	(17.68)	-0.43**	(-2.94)
LS-pessimism	-0.88	(1.86)	-0.51	(1.73)	-1.15	(1.94)	-0.46	(1.51)	0.64*	(2.55)	0.69	(1.53)
LS-pessimism (bin)	0.21	(0.40)	0.26	(0.44)	0.17	(0.38)	0.23	(0.44)	0.09	(1.49)	0.06	(0.48)
W-pessimism	0.08	(0.54)	0.17	(0.56)	0.04	(0.48)	0.00	(0.89)	0.13	(1.13)	-0.04	(-0.10)
W-pessimism (bin)	0.19	(0.39)	0.25	(0.44)	0.13	(0.34)	0.33	(0.52)	0.12	(1.36)	0.20	(0.93)
Job loss expected	0.20	(0.40)	0.25	(0.44)	0.15	(0.36)	0.33	(0.52)	0.10	(1.12)	0.18	(0.84)
Job lost in t+2	0.15	(0.36)	0.13	(0.34)	0.16	(0.37)	0.22	(0.44)	-0.03	(-0.56)	0.06	(0.38)
Age	29.12	(9.44)	27.87	(9.33)	29.73	(9.37)	30.50	(10.62)	-1.86	(-1.57)	0.77	(0.28)
Female	0.52	(0.50)	0.47	(0.50)	0.55	(0.50)	0.56	(0.51)	-0.08	(-1.20)	0.01	(0.09)
Married	0.83	(0.38)	0.82	(0.39)	0.86	(0.35)	0.50	(0.52)	-0.04	(-0.93)	-0.36*	(-2.75)
Education	8.68	(3.89)	8.33	(3.83)	8.99	(3.95)	7.66	(3.46)	-0.66	(-1.34)	-1.33	(-1.45)
Missing education[2].	0.13	(0.34)	0.14	(0.35)	0.13	(0.34)	0.13	(0.34)	0.01	(0.22)	-0.01	(-0.08)
Children	0.82	(1.08)	0.82	(0.98)	0.85	(1.15)	0.50	(0.97)	-0.03	(-0.24)	-0.35	(-1.36)
Chg. married	0.01	(0.40)	0.07	(0.36)	-0.03	(0.40)	0.13	(0.50)	0.10*	(2.12)	0.15	(1.20)
Chg. children	1.01	(1.12)	1.16	(1.11)	0.90	(1.08)	1.25	(1.44)	0.26	(1.89)	0.35	(0.95)
82-90 cohort	0.32	(0.47)	0.40	(0.49)	0.28	(0.45)	0.19	(0.40)	0.13*	(2.13)	-0.09	(-0.83)
91-00 cohort	0.56	(0.50)	0.47	(0.50)	0.59	(0.49)	0.81	(0.40)	-0.11	(-1.77)	0.23*	(2.09)
German spoken	1.91	(0.65)	1.81	(0.67)	1.97	(0.64)	1.88	(0.50)	-0.16	(-1.94)	-0.10	(-0.71)
Saves money	0.45	(0.50)	0.49	(0.50)	0.45	(0.50)	0.31	(0.48)	0.04	(0.52)	-0.14	(-1.02)
Observations	282		99		167		16		266		183	

Notes: [1]By design, the number of years of unexpected staying is only available for immigrants whose initial intention was to stay temporarily. The value of 18.3 for unexpected stayers is a lower bound since the unexpected staying duration is right censored: as long as these migrants remain in Germany, this number continues to increase. [2]This variable equals 1 for individuals for whom information on the number of education years is missing (13% of the sample) and 0 otherwise. For the latter, we assume their education years are equal to 0. Arrival cohorts 1982-90 and 91-2000 provide the share of respondents who arrived within a specific decade. The remaining 12% of respondents arrived between 2001 and 2010. ***,**,* denote significance at the 1, 5 and 10% level, respectively.

Column (1) shows that 48% of all migrants in our sample had temporary intentions at arrival,

indicator variable in our regressions but leaves the other coefficients unaffected.

whereas 82% are still in Germany in 2020. Out of the 282 migrants, 99 are unexpected stayers (i.e. they are in Germany in 2020 although they intended to leave the country at the beginning of their stay). Among the 167 other migrants (who are not unexpected stayers nor unexpected leavers), 22% had planned to be temporary and have indeed left and 78% planned a permanent stay and are still in Germany. 16 migrants (i.e., 5.7% of our sample) are unexpected leavers, who had planned to stay permanently but have left by 2020. In terms of observable characteristics at arrival, unexpected stayers appear to be ex ante similar to the two other groups of migrants. Unexpected stayers remain in Germany on average 18.3 years more than they initially predicted, whereas other migrants stay, on average, only 0.4 years more than predicted.

Migrants are optimistic about life in Germany as the average LS-pessimism value is negative for all migrant groups. Optimism by migrants about the host country at arrival is sensible given the recent decision to emigrate there, and it is in line with previous research (Taylor et al., 2006). It can also be explained by unanticipated declines in actual life satisfaction that occur in the years that follow the arrival.[26] As previously mentioned, this does not imply that migrants are not *relatively* pessimistic compared to the origin country. What is important here is that unexpected stayers are less optimistic about their life satisfaction than other migrants, with a t-statistic of the mean difference between both groups equal to 2.55. The binary LS-pessimism measure confirms that the proportion of pessimists is higher among unexpected stayers than among the two other migrant groups. Unexpected stayers also appear to be more pessimistic than migrants in the two other groups regarding their employment prospects, although the mean differences between the groups are not statistically different.

Finally, Table 4 provides information related to integration investments i and savings s. Integration is proxied by the level of German spoken at the first interview on a scale from 1 ("Not at all") to 3 ("Good or Very Good"). Information on savings is provided by the question: "Do you usually have money left over at the end of the month that you can put aside for larger purchases, emergencies, or to build savings? ", which we transform into a binary variable. Unexpected stayers have a slightly lower level of German and a slightly higher likelihood to save, although differences across groups are not statistically significant.[27]

[26] Such declines might be explained by unmet aspirations and related concerns, for instance because migrants realize after some time that they earn lower wages than natives (Nikolova, 2015; Paparusso, 2021).

[27] Note that, as discussed in the theoretical part, the effects of savings and integration on unexpected staying are indirect, and the direct effect stems from the indifference wage, whose probability is overestimated under wage pessimism and whose level is overestimated under utility pessimism. Hence, utility and wage misperceptions can cause unexpected staying even if they do not impact integration and savings.

Unexpected staying and pessimism

We estimate by OLS the following equation:

$$UnexpS_{i,2020} = \alpha + \beta \cdot Pessimism_{i,t_i^0} + \gamma \cdot X_{i,t_i^0} + \delta \cdot Cohort\left(t_i^0\right) + \gamma_c + \eta \cdot FamilyDynamics_i + \epsilon_i,$$

where $\text{UnexpS}_{i,2020}$ equals '1' if migrant i (i) is still in Germany in 2020, and (ii) had predicted a temporary stay at their arrival, '0' if the migrant had made correct predictions and '-1' if the migrant (i) predicted a permanent stay (ii) but had left Germany by 2020. The year, $t_0^i \in [1980; 2010]$, varies across migrants and corresponds to the first year in which we observe migrant i's prediction about their stay. Since this prediction should be made as early as possible in the migration spell, we restrict our sample to migrants who made it at the latest four years after their arrival in Germany.[28] $Pessimism_{i,t_i^0}$ is the measure of (life satisfaction or low-wages) pessimism in t_i^0. X_{i,t_i^0} is a set of migrant characteristics measured at arrival, $Cohort\left(t_i^0\right)$ is a dummy variable capturing the decade migrants arrived in Germany, and $FamilyDynamics_i$ is a set of variables that measure changes in marital status and number of children which occurred between t_i^0 and 2020.[29] All regressions also include country of origin fixed effects, γ_c.[30] Note that we study the effect of each of the two pessimism measures in two separate estimations.[31] The main parameter of interest β is expected to be positive as the model predicts that pessimism at arrival and the probability of unexpected staying are positively correlated.

Tables 5 and 6 provide estimates of the determinants of unexpected staying. Column (1) controls for individual demographic characteristics (age and gender) and Column (2) adds the respondent's family situation (marital status and number of children). These variables are all measured at the time the respondents provide their intended duration of stay. Column (3) adds education (in years) and includes an indicator variable which takes value 1 when this information is missing (and 0 otherwise). Column (4) includes in addition cohort-of-arrival fixed effects (defined at the decade level: 1982-1990; 1991-2000 and 2001-2010 as reference). Since they may affect eventual return, in column (5) we control for changes in the family situation (the marital status and number of children) between the initial and the final survey.[32] Coefficient estimates are very stable throughout

[28] We chose a four-year interval after arrival so as to balance sample sizes and be able to observe intentions early enough in the migrant's migration spell. Appendix Table A8 shows that the positive correlation between the pessimism measures and unexpected staying is maintained under alternative restrictions on years since arrival.

[29] Life events have been shown to affect individuals' duration of stay (de Groot et al., 2011; Bettin et al., 2018).

[30] In Appendix Table A9, we show that results are qualitatively robust when we exclude country of origin fixed effects or when we replace country of origin with origin-survey year fixed effects. The latter considerably reduce sample sizes.

[31] Since life satisfaction and wage pessimism have many missing values, we only observe both forms of pessimism for 47 migrants. We thus use two different subsamples for each regression so as to maximize the number of available observations for each pessimism measure.

[32] For instance, a migrant who was married at arrival but who is single, divorced or widowed in the last survey

Table 5: Unexpected staying and pessimism about life satisfaction

	(1)		(2)		(3)		(4)		(5)	
	Unexpected staying									
	b	se	b	se	b	se	b	se	b	se
LS-pessimism	0.040*	(0.02)	0.039*	(0.02)	0.040*	(0.02)	0.044**	(0.02)	0.043**	(0.02)
Age	0.001	(0.00)	0.001	(0.00)	0.001	(0.00)	0.002	(0.00)	0.002	(0.00)
Female	-0.073	(0.08)	-0.080	(0.08)	-0.078	(0.08)	-0.079	(0.08)	-0.084	(0.08)
Married			-0.008	(0.12)	-0.006	(0.12)	-0.018	(0.12)	0.042	(0.14)
Children			0.030	(0.04)	0.031	(0.04)	0.002	(0.04)	-0.003	(0.04)
Education					0.003	(0.02)	0.011	(0.02)	0.013	(0.02)
Missing educ.[2]					0.063	(0.27)	0.183	(0.27)	0.191	(0.27)
82-90 cohort							0.204	(0.15)	0.204	(0.15)
91-00 cohort							-0.098	(0.13)	-0.097	(0.13)
Chg. married									0.106	(0.12)
Chg. children									-0.012	(0.04)
Constant	0.372***	(0.14)	0.345**	(0.17)	0.300	(0.34)	0.245	(0.35)	0.211	(0.37)
Observations	236		236		236		236		236	

Notes: Unexpected staying (UnexpS)=1 for immigrants who report an initial intention to leave but who are still in Germany in 2020. All regressions include country of origin fixed effects. ***,**,* denote significance at the 1, 5 and 10% level, respectively.

the different specifications. In both Table 5 and Table 6, the coefficient of pessimism is positive and statistically significant (in most specifications), which highlights a positive association between pessimism about both life satisfaction and wages and unexpected staying. More specifically, the full specification in Table 5 (column 5) suggests that a migrant who had one unit of life-satisfaction pessimism (i.e. who had predicted at arrival a future life satisfaction one point below their actual life satisfaction 5 years later) is on average 4.3 percentage points more likely to stay unexpectedly in 2020. One standard deviation of pessimism about life satisfaction (1.86 units of $LS - Pessimism$) is thus associated with a 8 percentage points higher probability of unexpected staying. Column 5 of Table 6 shows that a migrant who was pessimistic about their job prospects tends to be 18.5 percentage points more likely to stay unexpectedly.

Appendix B.3 disaggregates the unexpected staying outcome by distinguishing two components: (1) a binary variable equal to 1 if the migrant had temporary intentions at arrival and (2) a binary variable equal to 1 if the migrant is still in Germany in 2020. Our main outcome variable

year (i.e. not married) would have a change in marital status equal to -1. The change in number of children in the migrant's household is calculated as the difference between the maximum number of children ever observed in the household and the initial number of children at arrival. For example, a respondent who is living with two children in the last survey period, but who lived with three children five years earlier and who entered SOEP without children, has a recorded change in the number of children of 3.

Table 6: Unexpected staying and wage pessimism

	(1)		(2)		(3)		(4)		(5)	
	Unexpected staying									
	b	se	b	se	b	se	b	se	b	se
W-pessimism	0.189*	(0.11)	0.191*	(0.11)	0.176	(0.11)	0.178	(0.11)	0.185*	(0.11)
Age	-0.000	(0.01)	-0.001	(0.01)	-0.001	(0.01)	-0.004	(0.01)	-0.004	(0.01)
Female	-0.098	(0.14)	-0.106	(0.14)	-0.108	(0.14)	-0.055	(0.15)	-0.060	(0.15)
Married			0.001	(0.13)	0.013	(0.13)	0.013	(0.14)	0.140	(0.16)
Children			0.040	(0.06)	0.038	(0.06)	0.063	(0.06)	0.069	(0.06)
Education					0.022	(0.04)	0.008	(0.04)	-0.000	(0.04)
Missing education[2].					0.270	(0.38)	0.125	(0.39)	0.092	(0.40)
82-90 cohort							-0.442**	(0.22)	-0.489**	(0.22)
91-00 cohort							-0.279	(0.22)	-0.331	(0.23)
Chg. married									0.236	(0.16)
Chg. children									-0.002	(0.06)
Constant	0.380	(0.24)	0.361	(0.24)	0.132	(0.43)	0.658	(0.52)	0.658	(0.54)
Observations	126		126		126		126		126	

Notes: Unexpected staying (UnexpS)=1 for immigrants who report an initial intention to leave but who are still in Germany in 2020. All regressions include country of origin fixed effects. ***,**,* denote significance at the 1, 5 and 10% level, respectively.

is the difference between these two binary variables. Migrants who were more pessimistic about their life satisfaction tend to formulate temporary intentions ex ante, but do not appear to have different actual return behaviors than non-pessimistic migrants. Since their intentions are more often temporary, these migrants are more likely to be unexpected stayers (see Table 5).

In Appendix B.4, we provide regressions of short-term decisions - integration and savings - on our two measures of pessimism, controlling for migrant characteristics. The estimated coefficients are small and not statistically significant.

Summing up, our empirical investigation is consistent with our theoretical results, as pessimism about utility and wages is positively and significantly associated with unexpected staying. We acknowledge however that this analysis would benefit from richer data. In particular, direct tests of life satisfaction pessimism would require country-specific life satisfaction predictions. Indeed, the theoretical measure of pessimism is one of greater pessimism about the destination than the origin country – thus to measure relative pessimism, one should observe migrants' predictions about utility in both countries separately.

6 Conclusion

Empirical evidence shows that migrants tend to systematically underestimate their propensity to stay in the long term. With a simple theoretical framework, we show that this unexpected staying results from pessimistic misperceptions about the host country relative to the origin country at arrival. Our approach allows for two broad types of misperceptions: misperceptions of the wage distribution, and misperceptions of future utility. We use this theoretical framework to determine the type of data needed to identify unexpected staying. Relying on survey data from the German SOEP, we find a positive correlation between our two pessimism measures and unexpected staying.

Our results show the crucial role played by migrants' perceived and actual indifference wage, and their wage- and utility-pessimism around this wage. Putting aside important issues of measurement and implementation, in the case of wage misperceptions, it suffices to measure the difference in perceived and actual probability of earning a wage below the indifference wage. The larger this difference, the larger the degree of unexpected staying. The indifference wage w_R and the perceived probability $\widetilde{F}(w_R)$ can be directly elicited from migrants via surveys upon arrival, while estimating the actual wage distribution is a hard, but standard estimation problem that requires observing the wage outcomes of many similar migrants. For utility misperceptions, the degree of unexpected staying instead depends on the difference between the perceived and actual indifference wage. While there are many challenges in how to reliably elicit these indifference wages and beliefs, we hope that our framework will help in designing future surveys that more accurately measure the degree and source of unexpected staying.

Our theoretical framework can be enriched to describe potential sources of these misperceptions such as projection bias or misinference (see the working paper version of this paper (Kaufmann et al., 2021)). Though studying the specific mechanisms leading to misperceptions and their implications may prove helpful in designing better policies, we do not study how to potentially address and measure these mechanisms.

A shortcoming of our model is that we only consider two periods, when in reality migrants may decide repeatedly whether to return. Extending the framework to include multiple periods would provide richer dynamics and highlight alternative channels for unexpected staying. Similarly, while we study misperceptions about utility and the wage distribution, we focus only on one dimension of uncertainty, namely that long-term wages are unknown upon arrival. However, uncertainty could also apply, for instance, to family dynamics (getting married, having children...) or the adaptation to the new environment, which cannot be foreseen with certainty and which may also influence return plans.

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Appendix

A Appendix: Proofs

A.1 Proofs of Lemmas 1 and 2

Notation: In the appendix, we write ∂_x for $\partial/\partial x$, and ∂_{xy} for $\partial^2/\partial x \partial y$, and we use the notation d_x similarly for d/dx and d_{xy} for $d^2/dxdy$.

Proof of Lemma 1

Proof. First note that $w_R(s,i)$ is defined by the indifference condition $u^d\left(c^d, I^d\right) = u^o\left(c^o, I^o\right)$, where $c^d = w_R + s$, $I^d = I_1 + i$, $c^o = w^o + xs$, and I^o is exogenous. This equation is identical to $v^d(s,i;w_R) - v^o(s) = 0$. Applying the implicit function theorem to this condition, we obtain:

$$\begin{aligned}
\partial_i w_R(s,i) &= -\frac{\partial_{I^d} u\left(c^d, I^d; w_R\right)}{\partial_{c^d} u\left(c^d, I^d; w_R\right)} = -\frac{\partial_i v^d(s,i;w_R)}{\partial_s v^d(s,i;w_R)} < 0, \\
\partial_s w_R(s,i) &= -\frac{\partial_{c^d} u\left(c^d, I^d; w_R\right) - x\partial_{c^o} u\left(c^o, I^o; w_R\right)}{\partial_{c^d} u\left(c^d, I^d; w_R\right)} = \frac{\partial_s v^o(s)}{\partial_s v^d(s,i;w_R)} - 1.
\end{aligned}$$

To show that $\partial_s w_R(s,i) > 0$, we need to prove that $\partial_s v^o(s) > \partial_s v^d(s,i;w_R)$, or equivalently that $x\partial_{c^o} u\left(c^o, I^o; w_R\right) > \partial_{c^d} u\left(c^d, I^d; w_R\right)$. First note that $x > 1$ by assumption. Second, by definition of w_R, these derivatives are evaluated at values of $\left(c^d, I^d\right)$ which make the migrant indifferent between the two locations, that is, $u\left(c^d, I^d\right) = u\left(c^o, I^o\right)$. To ensure indifference, and since $I^o \geq I^d$, it must be that $c^d \geq c^o$. Hence $\partial_{c^o} u^o\left(c^o, I^o\right)$ must be greater than $\partial_{c^d} u^d\left(c^d, I^d; w_R\right)$, since $u(c, I)$ is separable in its arguments. □

Proof of Lemma 2

Lemma 2 formalizes the conditions ensuring that $\left(\widetilde{s}, \widetilde{i}\right)$ maximizes (perceived) utility.

Lemma 2. *A (perceived) local maximum $\left(\widetilde{s}, \widetilde{i}\right)$ must satisfy the following first-order conditions:*

$$\begin{aligned}
\partial_i \widetilde{EV} &= \partial_i v_1\left(\widetilde{s}, \widetilde{i}\right) + \delta \int_{w_R}^{\infty} \partial_i v^d\left(\widetilde{s}, \widetilde{i}\right) f\left(w^d\right) dw^d = 0, \\
\partial_s \widetilde{EV} &= \partial_s v_1\left(\widetilde{s}, \widetilde{i}\right) + \delta \int_{0}^{w_R} \partial_s v^o\left(\widetilde{s}\right) f\left(w^d\right) dw^d + \delta \int_{w_R}^{\infty} \partial_s v^d\left(\widetilde{s}, \widetilde{i}\right) f\left(w^d\right) dw^d = 0,
\end{aligned}$$

as well as $\partial_{ii}\widetilde{EV} < 0$, $\partial_{ss}\widetilde{EV} < 0$, and $\partial_{ii}\widetilde{EV}\partial_{ss}\widetilde{EV} - \left(\partial_{si}\widetilde{EV}\right)^2 > 0$. In addition, we have that $\partial_{si}\widetilde{EV} < 0$ at every such maximum.

The proof consists in computing the first- and second-order derivatives, as it is simply a statement of the necessary conditions for a local optimum to be a local maximum.

First, we compute $\partial_i \widetilde{EV}$ and $\partial_s \widetilde{EV}$ needed for the first-order conditions. Note: in what follows, we will write w_R as short-hand for $w_R(\widetilde{s},\widetilde{i})$ and only mention the arguments explicitly if needed.

$$\partial_i \widetilde{EV} = \partial_i v_1\left(\widetilde{s},\widetilde{i}\right) + \delta \int_{w_R}^{\infty} \partial_i v^d\left(\widetilde{s},\widetilde{i}\right) f\left(w^d\right) dw^d + \delta \partial_i w_R \overbrace{\left(v^o\left(\widetilde{s};w_R\right) - v^d\left(\widetilde{s},\widetilde{i};w_R\right)\right)}^{=0 \text{ by definition of } w_R} f\left(w_R\right), \tag{A.1}$$

$$\begin{aligned}\partial_s \widetilde{EV} = {} & \partial_s v_1\left(\widetilde{s},\widetilde{i}\right) + \delta \int_{0}^{w_R} \partial_s v^o\left(\widetilde{s}\right) f\left(w^d\right) dw^d + \delta \int_{w_R}^{\infty} \partial_s v^d\left(\widetilde{s},\widetilde{i}\right) f\left(w^d\right) dw^d \\ & + \delta \partial_s w_R \overbrace{\left(v^o\left(\widetilde{s};w_R\right) - v^d\left(\widetilde{s},\widetilde{i};w_R\right)\right)}^{=0 \text{ by definition of } w_R} f\left(w_R\right).\end{aligned} \tag{A.2}$$

This shows that the first-order conditions are as stated. Next, let us compute the second-order partial derivatives by taking partial derivatives of the above quantities and check that the second-order conditions for a maximum hold.

$$\partial_{ii} \widetilde{EV} = \partial_{ii} v_1(\widetilde{s},\widetilde{i}) + \delta \int_{w_R}^{\infty} \partial_{ii} v^d(\widetilde{s},\widetilde{i}) f\left(w^d\right) dw^d + \partial_i w_R \partial_i v^d(\widetilde{s},\widetilde{i}) f(w_R). \tag{A.3}$$

Integration costs in period 1 are convex, utility benefits from integration in period 2 in destination are concave, and since from Lemma 1 we have that $\partial_i w_R < 0$, we see that $\partial_{ii} \widetilde{EV} < 0$.

Next, we have

$$\begin{aligned}\partial_{ss} \widetilde{EV} = {} & \partial_{ss} v_1(\widetilde{s},\widetilde{i}) + \delta \left(\int_{0}^{w_R} \partial_{ss} v^o(\widetilde{s}) f(w^d) dw^d + \int_{w_R}^{\infty} \partial_{ss} v^d(\widetilde{s},\widetilde{i}) f(w^d) dw^d \right) \\ & + \delta \partial_s w_R \left(\partial_s v^o - \partial_s v^d(\widetilde{s},\widetilde{i})\right) f(w_R)\end{aligned} \tag{A.4}$$

We know that $\partial_{ss} v_1 < 0$, that $\partial_{ss} v^o < 0$, and that $\partial_{ss} v^d < 0$. Further, by Lemma 1, we have that $w_R = (\partial_s v^d)^{-1}\left(\partial_s v^o - \partial_s v^d\right)$, where $\partial_s v^d > 0$. Hence, like $\partial_s w_R$, the sign of $\partial_s v^o - \partial_s v^d$ is positive. So for a maximum, we need to impose that $\partial_{ss} \widetilde{EV} < 0$, which holds as soon as the direct effects through $\partial_{ss} v_1$, $\partial_{ss} v^o$ and $\partial_{ss} v^d$ dominate the indirect effect through $\partial_s w_R$.

Finally for the cross-partial derivative we get the following, using separable preferences $u(c, I)$,

$$\partial_{si} \widetilde{EV} = -\delta \partial_s w_R \partial_i v^d(\widetilde{s},\widetilde{i}) f(w_R) \tag{A.5}$$

Since $\partial_s w_R > 0$ and $\partial_i v^d > 0$, we have that $\partial_{si} \widetilde{EV} < 0$. ■

A.2 Proof of Proposition 1

Before starting the proof, note that the results in Proposition 1 apply to any $\left(\widetilde{v}^d, \widetilde{v}^o, \widetilde{F}\right)$, where this notation include correct perceptions $\left(v^d, v^o, F\right)$ as well as partial misperceptions such as $\left(v^d, v^o, \widetilde{F}\right)$ or $\left(\widetilde{v}^d, \widetilde{v}^o, F\right)$. Similarly, Lemma 1 holds also for the perceived $\widetilde{w}_R$This is obvious once we realize that, from the perspective of the person with misperceptions, $\widetilde{w}_R$ is the optimal indifference wage. Ex post, the actual indifference wage may turn out to be different, but that doesn't affect perceptions in period 1.

We need to determine the sign of the total derivative of $\widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right)$ with respect to each z. This total derivative is

$$d_z \widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right) = \partial_z \widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right) + \partial_i \widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right) \partial_z \widetilde{i} + \partial_s \widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right) \partial_z \widetilde{s}, \tag{A.6}$$

where by Lemma 1 we know that $\partial_i \widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right) < 0$ and $\partial_s \widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right) > 0$ for all $\left(\widetilde{s}, \widetilde{i}\right)$.

For any given z, we know that $\widetilde{i}$ and $\widetilde{s}$ satisfy the perceived first order conditions (FOCs), $\partial_i \widetilde{EV} = 0$ and $\partial_s \widetilde{EV} = 0$. We can then apply the implicit function theorem for two equations based on these two FOCs that jointly characterize $\widetilde{i}(z)$ and $\widetilde{s}(z)$:

$$\partial_z \widetilde{i} = \det{}^{-1} \cdot \left(\partial_{is} \widetilde{EV} \partial_{sz} \widetilde{EV} - \partial_{iz} \widetilde{EV} \partial_{ss} \widetilde{EV}\right) \tag{A.7}$$

$$\partial_z \widetilde{s} = \det{}^{-1} \cdot \left(\partial_{iz} \widetilde{EV} \partial_{is} \widetilde{EV} - \partial_{ii} \widetilde{EV} \partial_{sz} \widetilde{EV}\right) \tag{A.8}$$

where $\det \equiv \partial_{ii} \widetilde{EV} \partial_{ss} \widetilde{EV} - (\partial_{is} \widetilde{EV})^2$ is the determinant of the Hessian matrix of $\widetilde{EV}$, which is strictly positive at the (perceived) optimum by Lemma 2.

Let us now apply these formulas for each $z \in (s_0, w_1, I_1, I^o, w^o, x)$, starting with I_1.

Integration at arrival (I_1)

Since $I^d = I_1 + i$ and since $\widetilde{w}_R$ depends on i and I_1 only through I_d, we have that $\partial_{I_1} \widetilde{w}_R = \partial_{I^d} = \partial_i \widetilde{w}_R < 0$, where the last inequality holds by Lemma 1. Therefore,

$$d_{I_1} \widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right) = \overbrace{\partial_i \widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right)}^{<0} \left(1 + \partial_{I_1} \widetilde{i}\right) + \overbrace{\partial_s \widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right)}^{>0} \partial_{I_1} \widetilde{s}. \tag{A.9}$$

To determine the sign of equation (A.9), we have to compute $\partial_{I_1} \widetilde{i}$ and $\partial_{I_1} \widetilde{s}$ using equations (A.7) and (A.8), where we replace z by I_1. This requires computing $\partial_{iI_1} \widetilde{EV}$ and $\partial_{sI_1} \widetilde{EV}$.

Since $v_1(s, i) \equiv u\left(c_1(s), I_1\right) - k(i)$, we have that $\partial_{iI_1} v_1(s, i) = \partial_{iI_1}\left(u_1\left(c_1, I_1\right) - k(i)\right) = 0$. This is the only term of $\partial_i \widetilde{EV}$ that is affected differently by I_1 than by i ($\partial_i \widetilde{w}_R = \partial_{I_1} \widetilde{w}_R$, etc), hence it is easy to straightforward to compute the partial derivative ∂_{I_1} of $\partial_i \widetilde{EV}$ from Lemma 2:

$$\partial_{iI_1} \widetilde{EV}\left(\widetilde{s}, \widetilde{i}\right) = \partial_{ii} \widetilde{EV}\left(\widetilde{s}, \widetilde{i}\right) - \partial_{ii} v_1\left(\widetilde{s}, \widetilde{i}\right).$$

Similarly, we can take the partial derivative ∂_{I_1} of $\partial_s \widetilde{EV}$ using equation (A.2):

$$\partial_{sI_1} \widetilde{EV}\left(\widetilde{s}, \widetilde{i}\right) = \partial_{si} \widetilde{EV}\left(\widetilde{s}, \widetilde{i}\right) < 0.$$

Therefore, plugging these values into equation (A.7) with z equal to I_1, we get

$$\begin{aligned}
\partial_{I_1} \widetilde{i} &= \det{}^{-1}\left(\partial_{is}\widetilde{EV}\partial_{si}\widetilde{EV} - \left(\partial_{ii}\widetilde{EV} - \partial_{ii}v_1\right)\partial_{ss}\widetilde{EV}\right) \\
&= \det{}^{-1}\left(-\det{}^{-1} + \partial_{ii}v_1\partial_{ss}\widetilde{EV}\right) \\
&> -1,
\end{aligned}$$

where the last inequality holds since $\partial_{ii}v_1 < 0$, $\partial_{ss}\widetilde{EV} < 0$, and $\det > 0$, since we evaluate this at a (perceived) optimum.

Similarly, plugging the values into equation (A.8) with z equal to I_1, we obtain

$$\partial_{I_1} \widetilde{s} = \det{}^{-1}\left(\partial_{is}\widetilde{EV}\left(\partial_{ii}\widetilde{EV} - \partial_{ii}v_1\right) - \partial_{ii}\widetilde{EV}\partial_{si}\widetilde{EV}\right) = -\det{}^{-1}\partial_{is}\widetilde{EV}\partial_{ii}v_1 < 0,$$

where the last inequality holds since $\partial_{ii}v_1 < 0$ and $\partial_{is}\widetilde{EV} < 0$.

We have thus shown that $1 + \partial_{I_1}\widetilde{i} > 0$ and that $\partial_{I_1}\widetilde{s} < 0$, so that both terms on the right-hand side of equation (A.9) are negative, hence $d_{I_1} w_R < 0$.

Savings and wage at arrival ($s_0 + w_1$)

First note that upon arrival, savings s_0 and wages w_1 are perfect substitutes and only affect $c_1 = s_0 + w_1 - s$ as period-1 income. We will thus compute only the comparative statics with respect to s_0. We start as before by computing $d_{s_0}\widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right)$. Note that, fixing $\widetilde{s}$ and $\widetilde{i}$, s_0 does not affect utility in period 2, thus it cannot (directly) affect the indifference wage in period 2. Hence $\partial_{s_0}\widetilde{w}_R(\widetilde{s}, \widetilde{i}) = 0$. Therefore, the first term in the total derivative of $\widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right)$ from equation (A.6) with respect to s_0 is zero, and it becomes

$$d_{s_0} w_R\left(\widetilde{s}, \widetilde{i}\right) = \partial_i \widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right)\partial_{s_0}\widetilde{i} + \partial_s \widetilde{w}_R\left(\widetilde{s}, \widetilde{i}\right)\partial_{s_0}\widetilde{s}. \tag{A.10}$$

We will again use equation (A.7) to compute $\partial_{s_0}\widetilde{i}$ and equation (A.8) to compute $\partial_{s_0}\widetilde{s}$, substituting z by s_0.

First, we compute $\partial_{is_0}\widetilde{EV}$ by taking the derivative of $\partial_i \widetilde{EV}$ from Lemma 2 with respect to s_0. Since v_1 is separable in i and s the first term is zero, and since $\partial_{s_0}\widetilde{w}_R = 0$ the second term is too. Hence $\partial_{is_0}\widetilde{EV} = 0$.

Next, we take the derivative of $\partial_s \widetilde{EV}$ from Lemma 2 with respect to s_0 and obtain:

$$\partial_{ss_0}\widetilde{EV} = -\partial_{ss} v_1(s, i) > 0,$$

since the impact of s_0 on v_1 is the same as that of $-s$ on v_1.

Finally, we substitute these into equations (A.7) and (A.8):

$$\partial_{s_0}\widetilde{i} = \det{}^{-1}\left(\partial_{is}\widetilde{EV}\left(-\partial_{ss}v_1\right) - 0\cdot\partial_{ss}\widetilde{EV}\right) = -\det{}^{-1}\partial_{is}\widetilde{EV}\partial_{ss}v_1 < 0$$

and

$$\partial_{s_0}\widetilde{s} = \det{}^{-1}\left(\partial_{is}\widetilde{EV}\cdot 0 - \partial_{ii}\widetilde{EV}\left(-\partial_{ss}v_1\right)\right) = \det{}^{-1}\partial_{ii}\widetilde{EV}\partial_{ss}v_1 > 0.$$

Using these inequalities, we see that both terms in equation (A.10) are strictly positive, since $\partial_i\widetilde{w}_R < 0$ and $\partial_s\widetilde{w}_R > 0$. Hence $d_{s_0}\widetilde{w}_R(\widetilde{s},\widetilde{i}) > 0$.

Integration in the origin country (I^o)

We need to determine the signs of $\partial_{I^o}\widetilde{w}_R$, $\partial_{I^o}\widetilde{i}$ and $\partial_{I^o}\widetilde{s}$. First, note that I^o only impacts future utility in the origin country $u^o\left(c^o, I^o\right)$. Applying the implicit function theorem to the indifference condition, the partial effect of I^o on w_R is positive:

$$\partial_{I^o}\widetilde{w}_R = \frac{\partial_{I^o}\widetilde{v}^o}{\partial_s\widetilde{v}^d} > 0.$$

Second, since

$$\begin{aligned}
\partial^2_{iI^o}\widetilde{EV} &= -\delta\partial_{I^o}\widetilde{w}_R\partial_i\widetilde{v}^d\left(\widetilde{s},\widetilde{i};w_R\right)\widetilde{f}\left(w_R\right) < 0,\\
\partial^2_{sI^o}\widetilde{EV} &= \delta\partial_{I^o}\widetilde{w}_R\left(\partial_s\widetilde{v}^o\left(\widetilde{s}\right) - \partial_s\widetilde{v}^d\left(\widetilde{s},\widetilde{i};w_R\right)\right)\widetilde{f}\left(w_R\right) > 0,
\end{aligned}$$

we have that $\partial_{I^o}\widetilde{i} < 0$ and $\partial_{I^o}\widetilde{s} > 0$:

$$\begin{aligned}
\partial_{I^o}\widetilde{i} &= \det{}^{-1}\left(\overbrace{\partial^2_{is}\widetilde{EV}}^{<0}\overbrace{\partial^2_{sI^o}\widetilde{EV}}^{>0} - \overbrace{\partial^2_{iI^o}\widetilde{EV}}^{<0}\overbrace{\partial^2_{ss}\widetilde{EV}}^{<0}\right) < 0,\\
\partial_{I^o}\widetilde{s} &= \det{}^{-1}\left(\overbrace{\partial^2_{is}\widetilde{EV}}^{<0}\overbrace{\partial^2_{iI^o}\widetilde{EV}}^{<0} - \overbrace{\partial^2_{sI^o}\widetilde{EV}}^{>0}\overbrace{\partial^2_{ii}\widetilde{EV}}^{<0}\right) > 0.
\end{aligned}$$

Therefore, the total effect of I^o on $\widetilde{w}_R$ is positive:

$$d_{I^o}\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right) = \overbrace{\partial_i\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right)}^{>0} + \overbrace{\partial_i\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right)}^{<0}\overbrace{\partial_{I^o}\widetilde{i}}^{<0} + \overbrace{\partial_s\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right)}^{>0}\overbrace{\partial_{I^o}\widetilde{s}}^{>0} > 0.$$

Wage in the origin country (w^o)

This case is very similar to that of I^o, since w^o only impacts future utility in the origin country $u^o\left(c^o, I^o\right)$. The partial effect of w^o on w_R is thus positive:

$$\partial_{w^o}\widetilde{w}_R = \frac{\partial_{w^o}\widetilde{v}^o}{\partial_s\widetilde{v}^d} > 0.$$

Second, since

$$\begin{aligned}\partial^2_{iw^o}\widetilde{EV} &= -\delta\partial_{w^o}\widetilde{w}_R\partial_i\widetilde{v}^d\left(\widetilde{s},\widetilde{i};w_R\right)\widetilde{f}\left(w_R\right)<0,\\ \partial^2_{sw^o}\widetilde{EV} &= \delta\partial_{w^o}\widetilde{w}_R\left(\partial_s\widetilde{v}^o\left(\widetilde{s}\right)-\partial_s\widetilde{v}^d\left(\widetilde{s},\widetilde{i};w_R\right)\right)\widetilde{f}\left(w_R\right)>0,\end{aligned}$$

we have that $\partial_{w^o}\widetilde{i}<0$ and $\partial_{w^o}\widetilde{s}>0$:

$$\begin{aligned}\partial_{w^o}\widetilde{i} &= \det{}^{-1}\left(\overbrace{\partial^2_{is}\widetilde{EV}}^{<0}\overbrace{\partial^2_{sw^o}\widetilde{EV}}^{>0}-\overbrace{\partial^2_{iw^o}\widetilde{EV}}^{<0}\overbrace{\partial^2_{ss}\widetilde{EV}}^{<0}\right)<0,\\ \partial_{w^o}\widetilde{s} &= \det{}^{-1}\left(\overbrace{\partial^2_{is}\widetilde{EV}}^{<0}\overbrace{\partial^2_{iw^o}\widetilde{EV}}^{<0}-\overbrace{\partial^2_{sw^o}\widetilde{EV}}^{>0}\overbrace{\partial^2_{ii}\widetilde{EV}}^{<0}\right)>0.\end{aligned}$$

Therefore, the total effect of I^o on w_R is positive:

$$d_{w^o}w_R\left(\widetilde{s},\widetilde{i}\right)=\overbrace{\partial_i\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right)}^{>0}+\overbrace{\partial_i\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right)}^{<0}\overbrace{\partial_{w^o}\widetilde{i}}^{<0}+\overbrace{\partial_s\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right)}^{>0}\overbrace{\partial_{w^o}\widetilde{s}}^{>0}>0.$$

A.3 Proof of Corollary 2

Throughout the proof, we restrict ourselves to the range $w\in[0,\hat{w}]$.

Since $\widetilde{F}(w)-F(w)$ has a unique local maximum at $\overline{w}$ in $(0,\hat{w})$, this implies that $\widetilde{f}(w)-f(w)=0$ only holds for $w=\overline{w}$. Since $\widetilde{F}(0)-F(0)=\widetilde{F}(\hat{w})-F(\hat{w})$, it follows that $\widetilde{F}(w)-F(w)$ is strictly increasing from 0 to $\overline{w}$ and strictly decreasing from $\overline{w}$ to $\hat{w}$ - in other words $\tilde{f}(w)-f(w)$ is strictly positive on $(0,\overline{w})$ and strictly negative on $(\overline{w},\hat{w})$.

By equation (7), this implies that the effect of z on Δ is of the same sign as the effect of z on w_R for $w_R\in(0,\overline{w}$ and of the opposite sign for $w_R\in(\overline{w},\hat{w})$. This proves the result given that the effect of different parameters on w_R from Proposition 1.

A.4 Proof of Proposition 2

It follows immediately from Observation 3 that 1 and 2 are equivalent. So we show that 2 and 3 are equivalent.

Under misperceived utility, the definition of unexpected staying boils down to $F(\widetilde{w}_R(\widetilde{s},\widetilde{i}))>F(w_R(\widetilde{s},\widetilde{i})$, which occurs if and only if $\widetilde{w}_R\left(\widetilde{s},\widetilde{\imath}\right)>w_R\left(\widetilde{s},\widetilde{\imath}\right)$. To prove that this condition is equivalent to equation 8, note that by definition of the indifference wages, we have that

$$\widetilde{v}^d(\widetilde{s},\widetilde{i},\widetilde{w}_R(\widetilde{i},\widetilde{s}))-\widetilde{v}^o(\widetilde{s})=v^d(\widetilde{s},\widetilde{i},w_R(\widetilde{s},\widetilde{i}))-v^o(\widetilde{s})=0. \tag{A.11}$$

So, since v^d is strictly increasing in w_R, we have that $\widetilde{w}_R(\widetilde{s},\widetilde{i})>w_R(\widetilde{s},\widetilde{i})$ if and only if $v^d(\widetilde{s},\widetilde{i},w_R(\widetilde{s},\widetilde{i}))-v^o(\widetilde{s})<v^d(\widetilde{s},\widetilde{i},\widetilde{w}_R(\widetilde{s},\widetilde{i}))-v^o(\widetilde{s})$. Combining this condition with equation equation A.11 we get equation 8. On the other hand, if equation 8 holds, then by equation (A.11), we know that $\widetilde{w}_R>w_R$.

A.5 Proof of comparative statics under long-term utility misperceptions

Under misperceptions of long-term utility, the amount of unexpected staying Y is given by $F(\tilde{w}_R(\widetilde{s},\widetilde{i}))-F(w_R(\widetilde{s},\widetilde{i}))$. Thus the comparative statics of unexpected staying with respect to some arbitrary parameter z is given by $d_zY = f(\widetilde{w}_R(\widetilde{s},\widetilde{i}))d_z\widetilde{w}_R(\widetilde{s},\widetilde{i}) - f(w_R(\widetilde{s},\widetilde{i}))d_zw_R(\widetilde{s},\widetilde{i})$.

To simplify the remaining derivations, we will first assume that the distribution $F(\cdot)$ over wages is uniform over some fixed range, so that $f(w) = f(w') = \bar{f}$ for all wages that can occur. This leads to the following impact of z on unexpected staying, where we dropped the explicit dependence on $\widetilde{s}$ and $\widetilde{i}$ to simplify notation:

$$d_zY = f(\widetilde{w}_R)d_z\widetilde{w}_R - f(w_R)d_zw_R = \bar{f}(d_z\widetilde{w}_R - d_zw_R). \tag{A.12}$$

Thus, directionally, the comparative static of z on Y is that of $d_z\widetilde{w}_R - d_zw_R$.

Next, we further assume that $\tilde{v}^d(i,s) = v^d(i,s) - \pi^d$ and $\tilde{v}^o(s) = v^o(s) - \pi^0$ so that for all w^d the perception in utility is shifted up:

$$\tilde{v}^d\left(i,s;w^d\right)\Big) - \tilde{v}^o = v^d\left(i,s;w^d\right) - v^o - \pi^R, \tag{A.13}$$

where $\pi^R = \pi^d - \pi^o$, where we assume that $\pi^R > 0$ so that the misperception is pessimistic.

Under this assumption, since we only add a constant term, all the partial derivatives are perceived correctly, but the indifference wage $\widetilde{w}_R$ may be misperceived.

Moreover, consider equation (A.13) for the wage $w^d = \widetilde{w}_R$, which leads to the following after rearranging:

$$\pi^R = \Big(v^d(i,s;\widetilde{w}_R) - v^o(s)\Big) - \Big(\tilde{v}^d(i,s;\widetilde{w}_R) - \tilde{v}^o(s)\Big) = v^d(i,s;\widetilde{w}_R) - v^o(s),$$

where the last equality holds because by definition of $\widetilde{w}_R$ as the perceived indifference wage, we must have $\tilde{v}^d(i,s;\widetilde{w}_R) - v^o(s) = 0$. But this means that $v^d(s,i;\widetilde{w}_R) - v^o(s) = \pi^R > 0 = v^d(i,s;w_R) - v^o(s)$, hence $\widetilde{w}_R > w_R$. Moreover, the reverse holds if $\pi^R < 0$. So $\widetilde{w}_R > w_R$ if and only if $\pi^R > 0$.

We are now ready to compute $d_z\widetilde{w}_R - d_zw_R$:

$$d_z\widetilde{w}_R - d_zw_R = \partial_z\widetilde{w}_R - \partial_zw_R + \left(\partial_i\widetilde{w}_R - \partial_iw_R\right)\partial_z\widetilde{i} + \left(\partial_s\widetilde{w}_R - \partial_sw_R\right)\partial_z\widetilde{s}$$

We can use the implicit function theorem to get the first difference:

$$\partial_z\widetilde{w}_R - \partial_zw_R = -\frac{\partial_z\left(v^d\left(i,s;\widetilde{w}_R\right) - v^o\left(s\right)\right)}{\partial_sv^d\left(i,s;\widetilde{w}_R\right)} + \frac{\partial_z\left(v^d\left(i,s;w_R\right) - v^o\left(s\right)\right)}{\partial_sv^d\left(i,s;w_R\right)}.$$

By separability, $\partial_iv^d\left(i,s;\widetilde{w}_R\right) = \partial_iv^d\left(i,s;w_R\right) = \partial_iv^d\left(i\right) = \partial_i\tilde{v}^d(i)$, so we get:

$$\partial_i\widetilde{w}_R - \partial_iw_R = -\partial_iv^d\left(\frac{1}{\partial_sv^d\left(i,s;\widetilde{w}_R\right)} - \frac{1}{\partial_sv^d\left(i,s;w_R\right)}\right) < 0,$$

where the last inequality holds because $\partial_s v^d(i,s;\widetilde{w}_R) < \partial_s v^d(i,s;w_R)$, since $\widetilde{w}_R > w_R$. Next we get

$$\partial_s \widetilde{w}_R - \partial_s w_R = \partial_s v^o \left(\frac{1}{\partial_s v^d(i,s;\widetilde{w}_R)} - \frac{1}{\partial_s v^d(i,s;w_R)} \right) > 0.$$

Summing up, additive pessimism yields the following simplifications:

$$d_z \widetilde{w}_R - d_z w_R = \partial_z \widetilde{w}_R - \partial_z w_R + \overbrace{(\partial_i \widetilde{w}_R - \partial_i w_R)}^{<0} \partial_z \widetilde{i} + \overbrace{(\partial_s \widetilde{w}_R - \partial_s w_R)}^{>0} \partial_z \widetilde{s} \tag{A.14}$$

We now apply these expressions to various characteristics z.

Integration at arrival I_1

We need to determine the sign of $\frac{d\widetilde{w}_R(\widetilde{s},\widetilde{i})}{dI_1} - \frac{dw_R(\widetilde{s},\widetilde{i})}{dI_1}$. First, note that I_1 only impacts v^d (and $\widetilde{v}^d$) via $I^d = I_1 + i$. Hence I_1 impacts v^d and w_R in the same way as i:

$$\partial_{I_1} \widetilde{w}_R - \partial_{I_1} w_R = \partial_i \widetilde{w}_R - \partial_i w_R < 0$$

as we established above.

Second, we know the signs of all the terms in equation (A.14), so we need only to determine the signs of $\partial_{I_1} \widetilde{i}$ and $\partial_{I_1} \widetilde{s}$. These are obtained in exactly the same fashion as in the section on misperceptions of wages - the fact that now the indifference wage might be misperceived is irrelevant, as our derivation there relied only on what the migrant *perceives* as optimal at period 1, as $\widetilde{s}$ and $\widetilde{i}$ are determined only by the perceptions in period 1. Hence, we know that $\partial_{I_1} \widetilde{i} > -1$ and that $\partial_{I_1} \widetilde{s} < 0$. So we get the following for equation (A.14) with z equal to I_1:

$$\begin{aligned} d_{I_1} \widetilde{w}_R - d_{I_1} w_R &= \partial_{I_1} \widetilde{w}_R - \partial_{I_1} w_R + (\partial_i \widetilde{w}_R - \partial_i w_R)\, \partial_{I_1} \widetilde{i} + (\partial_s \widetilde{w}_R - \partial_s w_R)\, \partial_{I_1} \widetilde{s} \\ &= \overbrace{(\partial_i \widetilde{w}_R - \partial_i w_R)}^{<0} \overbrace{(1 + \partial_{I_1} \widetilde{i})}^{>0} + \overbrace{(\partial_s \widetilde{w}_R - \partial_s w_R)}^{>0} \overbrace{\partial_{I_1} \widetilde{s}}^{<0} \\ &< 0, \end{aligned}$$

where the middle equality holds, since $\partial_{I_1}(\widetilde{w}_R - w_R) = \partial_i(\widetilde{w}_R - w_R)$.

Period-1 income ($s_0 + w_1$))

First, note that the partial derivatives $\partial_{s_0} \widetilde{w}_R(\widetilde{s},\widetilde{i}) = \partial_{s_0} w_R(\widetilde{s},\widetilde{i}) = 0$. Hence,

$$\begin{aligned} d_{s_0} \widetilde{w}_R(\widetilde{s},\widetilde{i}) - d_{s_0} w_R(\widetilde{s},\widetilde{i}) \;=\; & \overbrace{\left(\partial_i \widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right) - \partial_i w_R\left(\widetilde{s},\widetilde{i}\right)\right)}^{<0} \partial_{s_0} \widetilde{i} \\ & + \overbrace{\left(\partial_s \widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right) - \partial_s w_R\left(\widetilde{s},\widetilde{i}\right)\right)}^{>0} \partial_{s_0} \widetilde{s}. \end{aligned}$$

Again, starting from equations (A.1) and (A.2), we obtain (thanks to separability in utility and to $\partial_{s_0} w_R = 0$):

$$\begin{aligned}\partial^2_{is_0}\widetilde{EV} &= 0,\\ \partial^2_{ss_0}\widetilde{EV} &= -\partial^2_{ss} v_1(s,i) > 0.\end{aligned}$$

Therefore,

$$\begin{aligned}d_{s_0}\widetilde{i} &= \det{}^{-1}\left(\partial^2_{is}\widetilde{EV}\left(-\partial^2_{ss}v_1\right)\right) < 0,\\ d_{s_0}\widetilde{s} &= \det{}^{-1}\left(-\partial^2_{ii}\widetilde{EV}\right)\left(-\partial^2_{ss}v_1(s,i)\right) > 0.\end{aligned}$$

Hence,

$$\begin{aligned}d_{s_0}\widetilde{w}_R(\widetilde{s},\widetilde{\imath}) - d_{s_0} w_R(\widetilde{s},\widetilde{\imath}) &= \overbrace{\left(\partial_{\widetilde{\imath}}\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right) - \partial_i w_R\left(\widetilde{s},\widetilde{i}\right)\right)}^{<0}\overbrace{\partial_{s_0}\widetilde{i}}^{<0}\\ &\quad + \overbrace{\left(\partial_s\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right) - \partial_s w_R\left(\widetilde{s},\widetilde{i}\right)\right)}^{>0}\overbrace{\frac{\partial\widetilde{s}}{\partial s_0}}^{>0}\\ &> 0.\end{aligned}$$

Integration in the origin country (I^o)

We need to determine the sign of $d_{I^o}\widetilde{w}_R(\widetilde{s},\widetilde{\imath}) - d_{I^o} w_R(\widetilde{s},\widetilde{\imath})$. First, note that I^o only impacts v^o (and $\widetilde{v}^o$) and w_R:

$$\partial_{I^o}\widetilde{w}_R(\widetilde{s},\widetilde{\imath}) - \partial_{I^o} w_R(\widetilde{s},\widetilde{\imath}) = \partial_{I^o} v^o\left(\frac{1}{\frac{\partial v^d(i,s;\widetilde{w}_R)}{\partial s}} - \frac{1}{\frac{\partial v^d(i,s;w_R)}{\partial s}}\right) > 0.$$

Second, we need to determine the signs of $\frac{\partial\widetilde{i}}{\partial I^o}$ and $\frac{\partial\widetilde{s}}{\partial I^o}$, which depend on the cross partials of the objective function. Since

$$\partial^2_{iI^o}\widetilde{EV}\left(\widetilde{s},\widetilde{i}\right) = -\delta\frac{\partial_i\widetilde{v}^d\left(\widetilde{s},\widetilde{i}\right)\partial_{I^o}\widetilde{v}^o}{\partial_s\widetilde{v}^d\left(\widetilde{s},\widetilde{i}\right)} f(w_R) < 0,$$

and

$$\partial^2_{sI^o}\widetilde{EV}\left(\widetilde{s},\widetilde{i}\right) = \delta\frac{\left(\partial_s\widetilde{v}^o(s) - \partial_s\widetilde{v}^d(s,i)\right)\partial_{I^o}\widetilde{v}^o(s)}{\partial_s\widetilde{v}^d\left(\widetilde{s},\widetilde{i}\right)} f(w_R) > 0,$$

we have that

$$d_{I^o}\widetilde{i} = \det{}^{-1}\left(\overbrace{\partial^2_{is}\widetilde{EV}\partial^2_{sI^o}\widetilde{EV}}^{<0} - \overbrace{\partial^2_{iI^o}\widetilde{EV}\partial^2_{ss}\widetilde{EV}}^{>0}\right) < 0,$$

$$d_{I^o}\widetilde{s} = \det{}^{-1}\left(\overbrace{\partial^2_{is}\widetilde{EV}\partial^2_{iI^o}\widetilde{EV}}^{>0} - \overbrace{\partial^2_{sI^o}\widetilde{EV}\partial^2_{ii}\widetilde{EV}}^{<0}\right) > 0.$$

Combining, we find that $d_{I^o}\widetilde{w}_R\left(\widetilde{s},\widetilde{\imath}\right) - d_{I^o}w_R\left(\widetilde{s},\widetilde{\imath}\right) > 0$ since

$$\begin{aligned} d_{I^o}\widetilde{w}_R\left(\widetilde{s},\widetilde{\imath}\right) - d_{I^o}w_R\left(\widetilde{s},\widetilde{\imath}\right) &= \overbrace{\frac{\partial\widetilde{w}_R}{\partial I^o} - \frac{\partial w_R}{\partial I^o}}^{>0} \\ &\quad + \overbrace{\left(\partial_i\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right) - \partial_i w_R\left(\widetilde{s},\widetilde{i}\right)\right)}^{<0}\overbrace{d_{I^o}\widetilde{i}}^{<0} \\ &\quad + \overbrace{\left(\partial_s\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right) - \partial_s w_R\left(\widetilde{s},\widetilde{i}\right)\right)}^{>0}\overbrace{d_{I^o}\widetilde{s}}^{>0}. \end{aligned}$$

Wage in the origin country (w^o)

We need to determine the sign of $d_{w^o}\widetilde{w}_R\left(\widetilde{s},\widetilde{\imath}\right) - d_{w^o}w_R\left(\widetilde{s},\widetilde{\imath}\right)$. First, note that w^o only impacts v^o (and $\widetilde{v}^o$) and w_R:

$$\partial_{w^o}\widetilde{w}_R\left(\widetilde{s},\widetilde{\imath}\right) - \partial_{w^o}w_R\left(\widetilde{s},\widetilde{\imath}\right) = \partial_{w^o}v^0\left(\widetilde{s},\widetilde{\imath}\right)\left(\frac{1}{\partial_s v^d\left(i,s;\widetilde{w}_R\right)} - \frac{1}{\partial_s v^d\left(i,s;w_R\right)}\right) > 0.$$

Second, we need to determine the signs of $\partial_{w^o}\widetilde{i}$ and $\partial_{w^o}\widetilde{s}$, which depend on the cross partials of the objective function. Since

$$\partial^2_{iw^o}\widetilde{EV}\left(\widetilde{s},\widetilde{i}\right) = -\delta\frac{\partial_i v^d\left(\widetilde{s},\widetilde{i}\right)\partial_{w^o}\left(u^o\left(c^o,w^o\right)\right)}{\partial_s v^d\left(\widetilde{s},\widetilde{i}\right)}\widetilde{f}\left(w_R\right) < 0,$$

and

$$\partial^2_{sw^o}\widetilde{EV}\left(\widetilde{s},\widetilde{i}\right) = 2\delta\frac{\partial_{w^o}v^o\left(\widetilde{s}\right)\left(\partial_s v^o\left(\widetilde{s}\right) - \partial_s v^d\left(\widetilde{s},\widetilde{i}\right)\right)}{\partial_s v^d\left(\widetilde{s},\widetilde{i}\right)}f\left(w_R\right) > 0.$$

Therefore,

$$d_{w^o}\widetilde{i} = \det{}^{-1}\left(\overbrace{\partial^2_{is}\widetilde{EV}\partial^2_{sw^o}\widetilde{EV}}^{<0} - \overbrace{\partial^2_{iw^o}\widetilde{EV}\partial^2_{ss}\widetilde{EV}}^{>0}\right) < 0,$$

$$d_{w^o}\widetilde{s} = \det{}^{-1}\left(\overbrace{\partial^2_{is}\widetilde{EV}\partial^2_{iw^o}\widetilde{EV}}^{>0} - \overbrace{\partial^2_{sw^o}\widetilde{EV}\partial^2_{ii}\widetilde{EV}}^{<0}\right) > 0.$$

Therefore,

$$
\begin{aligned}
d_{w^o}\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right) - d_{w^o}w_R\left(\widetilde{s},\widetilde{i}\right) \;=\; & \overbrace{\partial_{w^o}\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right) - \partial_{w^o}w_R\left(\widetilde{s},\widetilde{i}\right)}^{>0} \\
& + \overbrace{\left(\partial_{\widetilde{i}}\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right) - \partial_i w_R\left(\widetilde{s},\widetilde{i}\right)\right)}^{<0}\overbrace{d_{w^o}\widetilde{i}}^{<0} \\
& + \overbrace{\left(\partial_s\widetilde{w}_R\left(\widetilde{s},\widetilde{i}\right) - \partial_s w_R\left(\widetilde{s},\widetilde{i}\right)\right)}^{>0}\overbrace{d_{w^o}\widetilde{s}}^{>0}.
\end{aligned}
$$

B Appendix: Data

B.1 Sample selection criteria and effect on sample sizes

Table A1: Return intentions and actual location in 2020 of refugees and ethnic Germans

	Actual location in 2020		
Initial intentions	in Germany	left Germany	
Permanent stay	12,539	304	12,843
Temporary stay	644	33	677
	13,183	337	13,520

Note: SOEP data for immigrants who are either refugees or ethnic Germans, surveyed between 1984 and 2020. Reported intentions to stay (temporarily or permanently) are collected from the first reply to the related survey question.

Table 1 excluded ethnic Germans and refugees, since to be aligned with our theory, our population of interest should be able to freely return to their home country. The relevance of this condition is highlighted by Table A1, which focuses exclusively on refugees and ethnic Germans. It shows that 94.9% of these migrants intended to stay permanently. Among the few who intended to stay temporarily, 95.1% are unexpected stayers, which can be attributed, on top of the mechanisms studied in this paper, to refugees' mere impossibility to return.

In Table A2, we focus on the subsample of immigrants with temporary intentions who provide information on their intended duration of stay (in years). Column 2 (all migrants except for refugees and ethnic Germans) shows that 82% already stayed longer than their intended duration. This mitigates the concern that the phenomenon of unexpected staying is overestimated with our baseline definition, since only 18% of stayers may return in time with respect to their initial plan.

Table A2: Return intentions and location in 2020: subsample with available information on intended years of stay

	All Migrants	Excl. Refugees & Ethnic Germans
	(1)	(2)
Temporary intentions	3,833	3,624
Exceeded intended duration	3,121	2,972

This table shows the number of immigrants with temporary intentions who provide information on their number of intended years of stay, and among those, the number of migrants who already exceeded their intended duration. Column 1 refers to all migrants including refugees, column 2 excludes refugees and ethnic Germans.

B.2 Measures of pessimism do not alter sample composition

Table A3 provides descriptive statistics for the unconstrained sample, i.e. the sample of individuals that provide a return intention but not necessarily information to construct any of the two pessimism variables. The availability of a pessimism variable does not alter the sample composition, in particular in terms of unexpected staying: if anything, unexpected staying is more prevalent in the unconstrained (39.4%) than in the constrained sample (35.1%).

B.3 Impact of pessimism on temporary intentions, remaining in Germany and unexpected staying

Tables A4 and A5 provide results of linear regressions of the following equation:

$$Y_i = \alpha + \beta \cdot Pessimism_{i,t_i^0} + \gamma \cdot X_{i,t_i^0} + \delta \cdot Cohort\left(t_i^0\right) + \gamma_c + \eta \cdot FamilyDynamics_i + \epsilon_i,$$

where each column corresponds to a different outcome variable Y_i related to unexpected staying: (1) a binary variable which equals 1 if the migrant stated temporary intentions at arrival and 0 otherwise, (2) a binary variable which equals 1 if the migrant is still in Germany in 2020 and 0 otherwise, and (3) our main measure of unexpected staying (UnexpS), i.e. the difference of (1) and (2). The latter variable takes value '1' if the migrant is still in Germany although they had expected to be a temporary migrant, value '0' if they made correct predictions about their location and value '-1' if they predicted a permanent stay but ended up leaving Germany. In column (4), we use an alternative measure of unexpected staying: UnexpSB is a binary variable which is equal to 1 in case of unexpected staying, and 0 otherwise (i.e., if initial intentions are aligned with actual location ex post, or if the migrant has left unexpectedly). In column (5), we use information, when available, to compare the number of intended years of stay to the realized spell for temporary migrants. More concretely, UnexpSY redefines immigrants who mentioned a temporary migration intention but are still in Germany as "other migrants" (i.e. not unexpected stayers) if their intended duration of stay

Table A3: Descriptive statistics - Sample meeting demographic conditions

	(1)		(2)		(3)		(4)		(5)		(6)	
	All		UnexpS=1		UnexpS=0		UnexpS=-1		(2)-(3)		(4)-(3)	
	mean	sd	mean	sd	mean	sd	mean	sd	b	t	b	t
Temp. intentions	0.43	(0.50)	1.00	(0.00)	0.17	(0.38)	0.00	(0.00)	0.83***	(24.31)	-0.17***	(-5.14)
Still in Germany	0.76	(0.43)	1.00	(0.00)	0.67	(0.47)	0.00	(0.00)	0.33***	(12.60)	-0.67***	(-25.08)
Years overstayed[1]	3.58	(7.86)	18.71	(7.30)	0.26	(1.38)	0.00	(0.00)	18.45***	(19.32)	-0.26**	(-2.91)
LS-pessimism	-0.86	(1.93)	-0.52	(1.81)	-1.07	(1.99)	-0.58	(1.73)	0.56	(1.93)	0.49	(0.92)
LS-pessimism (bin)	0.22	(0.41)	0.25	(0.44)	0.20	(0.40)	0.25	(0.45)	0.05	(0.81)	0.05	(0.39)
W-pessimism	0.17	(0.60)	0.21	(0.63)	0.13	(0.56)	0.17	(0.75)	0.09	(0.55)	0.04	(0.12)
W-pessimism (bin)	0.28	(0.45)	0.32	(0.48)	0.23	(0.43)	0.33	(0.52)	0.10	(0.81)	0.11	(0.48)
Age	30.00	(10.82)	28.84	(10.48)	30.78	(11.14)	30.51	(9.52)	-1.94*	(-2.07)	-0.26	(-0.15)
Female	0.60	(0.49)	0.60	(0.49)	0.62	(0.49)	0.51	(0.51)	-0.01	(-0.30)	-0.10	(-1.12)
Married	0.78	(0.41)	0.79	(0.40)	0.79	(0.40)	0.60	(0.50)	-0.00	(-0.01)	-0.19*	(-2.24)
Education	8.67	(3.54)	8.49	(3.50)	8.78	(3.61)	8.96	(3.13)	-0.28	(-0.93)	0.18	(0.32)
Missing education[2].	0.11	(0.31)	0.12	(0.32)	0.11	(0.31)	0.06	(0.24)	0.01	(0.27)	-0.05	(-1.22)
Children	0.83	(1.09)	0.79	(0.98)	0.89	(1.18)	0.57	(0.92)	-0.10	(-1.07)	-0.32	(-1.89)
Chg. married	0.02	(0.36)	0.04	(0.35)	0.01	(0.36)	0.06	(0.42)	0.04	(1.23)	0.05	(0.70)
Chg. children	0.76	(1.05)	0.87	(1.07)	0.67	(1.00)	0.80	(1.26)	0.20*	(2.22)	0.13	(0.60)
82-90 cohort	0.41	(0.49)	0.51	(0.50)	0.35	(0.48)	0.40	(0.50)	0.16***	(3.67)	0.05	(0.57)
91-00 cohort	0.42	(0.49)	0.34	(0.48)	0.46	(0.50)	0.51	(0.51)	-0.12**	(-2.74)	0.05	(0.60)
German spoken	1.91	(0.64)	1.85	(0.63)	1.95	(0.65)	1.94	(0.66)	-0.10	(-1.82)	-0.01	(-0.09)
Saves money	0.42	(0.49)	0.45	(0.50)	0.41	(0.49)	0.38	(0.50)	0.03	(0.58)	-0.03	(-0.29)
Observations	581		229		317		35		546		352	

Notes: This table provides descriptive statistics for all migrants who (i) were at least 18 years old when they arrived in Germany, (ii) replied to SOEP within their first four years after arrival, (iii) replied for the first time at the latest in 2010 and (iv) replied to the return intention question. Compared to Table 4, this unconstrained sample also includes respondents who did not provide information required to construct our pessimism measures. [1]By design, the number of years of unexpected staying is only available for immigrants whose initial intention was to stay temporarily. [2]This variable equals 1 for individuals for whom information on the number of education years is missing (11% of the sample) and 0 otherwise. For the latter, we assume their education years are equal to 0. Arrival cohorts 1982-90 and 91-2000 provide the share of respondents who arrived within a specific decade. The remaining 17% of respondents arrived between 2001 and 2010. ***,**,* denote significance at the 1, 5 and 10% level, respectively.

has not been reached by the year 2020. These immigrants could still leave within their initially intended migration spell.

We did not opt for this measure as our benchmark definition for four reasons. First, the model does not explicit mispredictions about the duration of stay but rather mispredictions about the probability of permanent versus temporary migration. Second, the intended duration of stay (expressed in years in the data) is only available for a subset of migrants who state a temporary migration intention. Since migrants who stated a permanent intention were not asked about their intended duration of stay, an arbitrary imputation, for instance based on an average life expectancy, would be needed to create this variable for these respondents. Third, the intended duration of stay is missing among many migrants with temporary intentions, while our sample size is already limited. Finally, the number of intended years of stay has a larger within-individual volatility than the binary measure of temporary/permanent intention (i.e. the number of intended years of stay can vary while the respondent keeps stating a constant temporary intention). Hence, values of this alternative variable would depend on the survey year selected to construct it, and we prefer to avoid this arbitrary choice.

Table A4 provides results for pessimism about life satisfaction. Migrants who were pessimistic about their life satisfaction tend to formulate temporary intentions ex ante, but do not appear to have different actual return behaviors compared to more optimistic migrants. Since their intentions are more often temporary, these migrants are more likely to become unexpected stayers. Table A5 shows that the more migrants are pessimistic about wages, the more they tend to stay unexpectedly. Results are stable across alternative pessimism measures. Overall, Tables A4 and A5 confirm that both types of pessimism are positively associated with unexpected staying. Changing the definition of unexpected staying in columns (4) and (5) only has a slight impact on the magnitude of the coefficient and on the significance of the pessimism measures (mainly in the case of W-pessimism).

B.4 Impact of pessimism on short-term decisions (integration and savings)

In this section, we look at the endogenous decisions that are made in the short term (in the first four years after arrival in Germany). These decisions include integration and savings, which according to the model's predictions, should respectively decrease and increase with pessimism.

Integration is proxied by the level of German spoken at the first interview on a scale from 1 ("Not at all") to 3 ("Good or Very Good"). Information on savings is provided by the question: "Do you usually have money left over at the end of the month that you can put aside for larger purchases, emergencies, or to build savings? ", which we transform into a binary variable. However, information on savings is only available for a subsample of respondents.

Table A6 shows that the coefficients associated to LS-pessimism have the sign predicted by the

Table A4: Intentions, final location, unexpected staying and LS-Pessimism

	(1)		(2)		(3)		(4)		(5)	
	Temp. intentions		Still in Germany		UnexpS		UnexpSB		UnexpSY	
	b	se	b	se	b	se	b	se	b	se
LS-pessimism	0.043**	(0.02)	0.000	(0.01)	0.043**	(0.02)	0.045**	(0.02)	0.033	(0.02)
Age	0.002	(0.00)	-0.000	(0.00)	0.002	(0.00)	0.003	(0.00)	0.001	(0.00)
Female	-0.064	(0.07)	-0.017	(0.04)	-0.084	(0.08)	-0.076	(0.07)	-0.065	(0.08)
Married	-0.089	(0.11)	0.090	(0.07)	0.042	(0.14)	-0.064	(0.12)	0.038	(0.14)
Education	-0.013	(0.02)	0.026**	(0.01)	0.013	(0.02)	-0.008	(0.02)	0.010	(0.02)
Missing education[2].	-0.021	(0.24)	0.215	(0.14)	0.191	(0.27)	-0.032	(0.23)	0.159	(0.27)
Children	0.008	(0.03)	-0.004	(0.02)	-0.003	(0.04)	0.003	(0.04)	-0.006	(0.04)
82-90 cohort	0.253*	(0.13)	-0.050	(0.08)	0.204	(0.15)	0.264**	(0.13)	0.242	(0.15)
91-00 cohort	0.046	(0.11)	-0.142**	(0.07)	-0.097	(0.13)	0.020	(0.11)	-0.085	(0.13)
Chg. married			0.040	(0.07)	0.106	(0.12)	0.103	(0.11)	0.090	(0.12)
Chg. children			0.005	(0.02)	-0.012	(0.04)	0.030	(0.04)	-0.026	(0.04)
Constant	0.576*	(0.31)	0.626***	(0.20)	0.211	(0.37)	0.380	(0.32)	0.219	(0.37)
Observations	236		236		236		236		236	

Notes: "Temp. intentions"=1 if the immigrant states an initial intention to return and "Still in Germany"=1 if the migrant is still in Germany in 2020. "Unexpected stayers" (UnexpS=1) are migrants who report an initial intention to leave Germany but who stayed until 2020. In column (4), UnexpSB=1 in case of unexpected staying, and 0 if initial intentions are aligned with actual location ex post, or if the migrant has left unexpectedly. In column (5), UnexpSY=1 for immigrants who initially intended to stay temporarily, are still in Germany in 2020, and have exceeded their intended duration of stay. All regressions include country of origin fixed effects. ***,**,* denote significance at the 1, 5 and 10% level, respectively.

Table A5: Intentions, final location, unexpected staying and Wage-Pessimism

	(1)		(2)		(3)		(4)		(5)	
	Temp. intentions		Still in Germany		UnexpS		UnexpSB		UnexpSY	
	b	se	b	se	b	se	b	se	b	se
W-pessimism	0.108	(0.10)	0.064	(0.07)	0.185*	(0.11)	0.143	(0.10)	0.162	(0.11)
Age	-0.000	(0.01)	-0.002	(0.01)	-0.004	(0.01)	-0.005	(0.01)	-0.006	(0.01)
Female	-0.082	(0.13)	0.028	(0.10)	-0.060	(0.15)	-0.067	(0.13)	-0.019	(0.15)
Married	-0.019	(0.12)	0.072	(0.11)	0.140	(0.16)	-0.021	(0.14)	0.114	(0.16)
Education	0.044	(0.03)	-0.031	(0.02)	-0.000	(0.04)	-0.018	(0.03)	-0.006	(0.04)
Missing education^2.	0.575*	(0.34)	-0.376	(0.27)	0.092	(0.40)	-0.080	(0.35)	0.054	(0.40)
Children	0.064	(0.05)	0.023	(0.04)	0.069	(0.06)	0.030	(0.06)	0.063	(0.06)
82-90 cohort	-0.218	(0.19)	-0.282*	(0.15)	-0.489**	(0.22)	-0.420**	(0.20)	-0.416*	(0.22)
91-00 cohort	-0.126	(0.19)	-0.201	(0.15)	-0.331	(0.23)	-0.279	(0.20)	-0.284	(0.23)
Chg. married			0.086	(0.11)	0.236	(0.16)	0.135	(0.14)	0.233	(0.16)
Chg. children			0.057	(0.04)	-0.002	(0.06)	-0.008	(0.05)	-0.028	(0.06)
Constant	0.266	(0.45)	1.235***	(0.37)	0.658	(0.54)	1.030**	(0.47)	0.739	(0.54)
Observations	126		126		126		126		126	

Notes: "Temp. intentions"=1 if the immigrant states an initial intention to return and "Still in Germany"=1 if the migrant is still in Germany in 2020. "Unexpected stayers" (UnexpS=1) are migrants who report an initial intention to leave Germany but who stayed until 2020. In column (4), UnexpSB=1 in case of unexpected staying, and 0 if initial intentions are aligned with actual location ex post, or if the migrant has left unexpectedly. In column (5), UnexpSY=1 for immigrants who initially intended to stay temporarily, are still in Germany in 2020, and have exceeded their intended duration of stay. All regressions include country of origin fixed effects. ***,**,* denote significance at the 1, 5 and 10% level, respectively.

Table A6: Pessimism and short-term decisions

	(1)		(2)		(3)		(4)	
	German spoken		Saving		German spoken		Saving	
	b	se	b	se	b	se	b	se
LS-pessimism	-0.027	(0.02)	0.017	(0.02)				
W-pessimism					0.006	(0.09)	-0.046	(0.14)
Age	-0.012***	(0.00)	0.001	(0.00)	-0.008	(0.01)	-0.004	(0.01)
Female	-0.161**	(0.07)	-0.047	(0.08)	-0.249**	(0.12)	-0.483**	(0.20)
Married	0.160	(0.11)	-0.077	(0.12)	-0.193*	(0.11)	-0.156	(0.17)
Education	0.086***	(0.02)	-0.028	(0.02)	0.086***	(0.03)	-0.062	(0.04)
Missing education^2.	0.904***	(0.24)	-0.354	(0.27)	1.151***	(0.32)	-0.637	(0.44)
Children	-0.075**	(0.03)	-0.014	(0.05)	0.086*	(0.05)	0.056	(0.07)
82-90 cohort	-0.246*	(0.13)	-0.100	(0.24)	-0.152	(0.18)	-0.043	(0.27)
91-00 cohort	-0.193*	(0.11)	0.007	(0.11)	-0.213	(0.18)	-0.051	(0.21)
Constant	1.526***	(0.31)	1.948***	(0.33)	1.607***	(0.42)	2.434***	(0.58)
Observations	236		181		126		76	

Notes: "German spoken" is used as a proxy for integration and is defined as the minimum level of German spoken ever recorded for the migrant. It is measured on a scale from 1 (Not at all) to 3 (Good - Very good). The "Saving" is a binary variable equal to 1 when the migrant declares that they put money aside. ***,**,* denote significance at the 1, 5 and 10% level, respectively.

model, in contrast to the coefficients associated to W-pessimism. However, the coefficients are usually close to 0 and never statistically significant, and we rely on imperfect proxies for integration and savings.

B.5 Robustness checks

In this Section, we provide different robustness checks. Table A7 uses binary pessimism measures and replicates the specifications from column (1) and (4) from Tables 5 and 6. The binary version of LS-pessimism is equal to '1' for respondents whose realized life satisfaction exceeded their prediction. It is equal to '0' for respondents who correctly predicted their life satisfaction or whose realized life satisfaction was below their predicted value. The binary version of W-pessimism is equal to '1' for individuals who predicted a job loss but were still employed two years later, and it is equal to '0' for all others. The positive correlation between unexpected staying and the two measures of pessimism is maintained. LS-pessimism is associated with a 12.7 to 14.7 percentage points higher probability of unexpected staying, whereas W-pessimism is associated to a 20.5 percentage points higher likelihood of unexpected staying. However, none of the coefficients is statistically significant.

The focus of our paper is to explain why immigrants' *early* return intentions are frequently wrong. Hence, we need to ensure that this information is collected sufficiently close to the time of arrival, before the immigrant has had time to adjust their expectations according to their experience in the host country. Therefore, we restrict our sample to individuals who provide their return intentions up to four years upon arrival. The restriction on years since arrival imposes important constraints on our sample sizes. Table A8 shows that the positive correlation between our two measures of pessimism and unexpected staying is maintained under four alternative conditions for the years since arrival: 2, 3, 10 or no constraint. In addition, for the LS-pessimism measure, which is available for a larger sample, the coefficient size decreases as expected when immigrants who had more time to adjust their expectations and learn about life in the destination country are included in the sample.

Our baseline regressions always include country of origin fixed effects, which allow to control for time invariant origin country as well as bilateral characteristics (given that the data includes Germany as sole destination country). Table A9 shows that, despite changes in the sample composition, results are qualitatively robust to excluding the fixed effects (columns (1) and (3)) or controlling for country of origin-survey year fixed effects (columns (2) and (4)).

Table A7: Unexpected staying and binary pessimism variables

	Unexpected staying							
	(1)		(2)		(3)		(4)	
	b	se	b	se	b	se	b	se
LS-pessimism (bin)	0.147	(0.09)	0.127	(0.09)				
W-pessimism (bin)					0.205	(0.15)	0.204	(0.15)
Age	0.001	(0.00)	0.001	(0.00)	-0.003	(0.01)	-0.006	(0.01)
Female	-0.075	(0.08)	-0.079	(0.08)	-0.134	(0.14)	-0.079	(0.15)
Married	-0.012	(0.12)	0.038	(0.14)	0.026	(0.13)	0.172	(0.16)
Children	0.036	(0.04)	0.008	(0.04)	0.041	(0.06)	0.070	(0.06)
Education			0.010	(0.02)			0.007	(0.04)
Missing education[2].			0.130	(0.27)			0.167	(0.39)
82-90 cohort			0.185	(0.15)			-0.498**	(0.22)
91-00 cohort			-0.092	(0.13)			-0.355	(0.23)
Chg. married			0.105	(0.13)			0.238	(0.16)
Chg. children			-0.008	(0.04)			0.001	(0.06)
Constant	0.285	(0.17)	0.185	(0.38)	0.389	(0.24)	0.619	(0.54)
Observations	236		236		126		126	

Notes: Unexpected stayers (with UnexpS=1) are migrants who report an initial intention to leave but who are still in Germany in 2020. All regressions include country of origin fixed effects. ***,**,* denote significance at the 1, 5 and 10% level, respectively.

Table A8: Changing sample selection criteria: years since migration

	Unexpected Staying															
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
	ysm<=2		ysm<=3		ysm<=10		no restric.		ysm<=2		ysm<=3		ysm<=10		no restric.	
	b	se	b	se	b	se	b	se	b	se	b	se				
LS-pessimism	0.043	(0.03)	0.041*	(0.02)	0.036**	(0.02)	0.021***	(0.01)								
W-pessimism									0.012	(0.18)	0.030	(0.14)	0.137**	(0.07)	0.064*	(0.03)
Age	0.005	(0.01)	0.001	(0.00)	-0.002	(0.00)	-0.005***	(0.00)	-0.003	(0.02)	-0.012	(0.01)	-0.007	(0.00)	-0.012***	(0.00)
Female	-0.161	(0.10)	-0.126	(0.09)	-0.001	(0.06)	-0.017	(0.03)	0.260	(0.27)	-0.031	(0.18)	0.057	(0.07)	0.004	(0.03)
Married	0.127	(0.18)	0.029	(0.15)	0.007	(0.10)	0.062	(0.05)	0.391	(0.28)	0.284	(0.23)	0.135	(0.10)	0.089*	(0.05)
Children	-0.029	(0.06)	-0.007	(0.05)	0.058*	(0.03)	0.057***	(0.01)	0.197	(0.13)	0.065	(0.08)	0.018	(0.03)	0.038***	(0.01)
Education	-0.004	(0.03)	-0.015	(0.03)	-0.011	(0.02)	-0.008	(0.01)	0.007	(0.06)	0.014	(0.04)	0.004	(0.02)	0.001	(0.01)
Missing education^2.	-0.112	(0.33)	-0.159	(0.29)	-0.003	(0.19)	-0.064	(0.11)	0.041	(0.64)	0.166	(0.46)	0.118	(0.23)	0.042	(0.12)
82-90 cohort	0.246	(0.20)	0.224	(0.16)	-0.026	(0.11)	-0.049	(0.05)	-0.980**	(0.41)	-0.345	(0.29)	-0.196**	(0.08)	-0.226***	(0.05)
91-00 cohort	0.044	(0.15)	-0.077	(0.14)	-0.076	(0.11)	-0.130**	(0.06)	-0.841**	(0.40)	-0.299	(0.28)	-0.197**	(0.09)	-0.223***	(0.06)
Chg. married	0.093	(0.17)	-0.006	(0.13)	0.016	(0.09)	0.089*	(0.05)	0.133	(0.32)	0.107	(0.20)	0.032	(0.09)	0.057	(0.05)
Chg. children	-0.047	(0.05)	-0.036	(0.04)	0.052*	(0.03)	0.041**	(0.02)	0.035	(0.09)	-0.015	(0.07)	0.065*	(0.03)	0.047**	(0.02)
Constant	0.191	(0.48)	0.526	(0.41)	0.453*	(0.27)	0.571***	(0.15)	0.746	(0.85)	0.574	(0.63)	0.510*	(0.27)	0.782***	(0.14)
Observations	148		196		399		1484		55		93		370		1593	

Notes: Unexpected stayers (with UnexpS=1) are migrants who report an initial intention to leave but who are still in Germany in 2020. All regressions include country of origin fixed effects. ***,**,* denote significance at the 1, 5 and 10% level, respectively.

Table A9: Unexpected staying and LS pessimism - different fixed effects

	Unexpected staying							
	(1)		(2)		(3)		(4)	
	no FE		origin-syear FE		no FE		origin-syear FE	
	b	se	b	se	b	se	b	se
LS-pessimism	0.035*	(0.02)	0.047	(0.03)				
W-pessimism					0.109	(0.09)	0.238	(0.17)
Age	0.002	(0.00)	0.008	(0.01)	-0.006	(0.01)	-0.002	(0.01)
Female	-0.044	(0.07)	-0.090	(0.10)	-0.159	(0.12)	0.302	(0.20)
Married	0.102	(0.12)	0.176	(0.22)	0.185	(0.15)	0.132	(0.24)
Children	-0.014	(0.04)	-0.001	(0.05)	0.048	(0.06)	0.019	(0.08)
Education	0.024	(0.02)	0.021	(0.03)	0.024	(0.03)	0.080	(0.06)
Missing education[2].	0.342	(0.23)	0.238	(0.40)	0.381	(0.36)	0.743	(0.66)
82-90 cohort	0.297**	(0.13)	0.029	(0.57)	-0.300*	(0.18)	-0.009	(0.31)
91-00 cohort	-0.099	(0.10)	-0.003	(0.45)	-0.262	(0.17)	0.000	(.)
Chg. married	0.116	(0.11)	0.048	(0.18)	0.195	(0.14)	0.180	(0.21)
Chg. children	0.008	(0.04)	-0.049	(0.05)	0.039	(0.05)	0.051	(0.09)
Constant	-0.031	(0.31)	-0.109	(0.67)	0.324	(0.46)	-0.614	(0.82)
Observations	253		165		143		92	

Notes: Unexpected stayers (with UnexpS=1) are migrants who report an initial intention to leave but who are still in Germany in 2020. Columns (1) and (3) include no fixed effects and columns (2) and (4) include country of origin-survey year fixed effects. ***,**,* denote significance at the 1, 5 and 10% level, respectively.