"The (Option-)Value of Overstaying"

Romuald Méango and François Poinas

Toulouse
School of
Economics

The (Option-)Value of Overstaying *

Romuald Méango

University of Oxford, Munich Center for the Economics of Ageing and CESifo

François Poinas

Toulouse School of Economics, University of Toulouse Capitole

This version: July 4, 2023

Abstract

The paper is structured around three main contributions. First, it takes advantage of a unique survey on Afghan asylum seekers in Germany to provide novel descriptive insights into asylum seekers' beliefs about their outcomes and the associated intention to overstay. Second, it estimates asylum seekers' perceived ex ante returns on overstaying, and option values of regularisation, deportation, and experimentation. Third, it assesses and rejects the cost-effectiveness argument for assisted voluntary return policies. Instead, it estimates a sizeable willingness-to-pay of asylum seekers for investments that would guarantee their regularisation.

Keywords: Subjective expectations; Intention to overstay; Asylum seekers; Germany; Afghanistan.

JEL codes: C20, D84, F22, J15, J18, J61, O15.

---

1 Introduction

In the aftermath of the so-called "refugee crisis", many European States have seen a surge in the number of foreigners with a rejected asylum application and a legal obligation to leave the country. According to the European Commission, only about a third of people with no right to stay in the EU return to their country of origin and of those who do, fewer than 30 percent do so voluntarily.[1] The Federal Republic of Germany provides a prototypical example of this development. Between the years 2014 and 2016, it received nearly 1.1 million registrations for asylum, the highest number in its history. As of 2019, more than 1.84 million asylum seekers were accounted for in the country, with Syria, Afghanistan and Iraq being the top three sending countries. The prospect for recognition and the length of the asylum procedure strongly depend on applicant's country of origin. For example, of the total number of applications submitted by Syrian asylum seekers between 2014 and 2019, only 4 percent had been rejected in the initial application phase, whereas the proportion was 49 percent for Afghan asylum seekers.[2] As for the final decisions, after initial and follow-up applications, 96 percent of Syrians had received a protection status as of 2019, whereas only 66 percent among Afghans received similar statuses. Thus, for some groups of asylum seekers, the outcome of an asylum procedure involves a large amount of uncertainty.

Those asylum seekers who see their applications rejected must then decide whether to leave the country, as they are legally obliged, or remain without legal right to stay and face the risk of deportation. The number of foreigners with a rejected asylum application and a legal obligation to leave Germany has risen sharply from 4,500 in 2014 to 152,000 in 2019. Many of them cannot be deported because they do not have a passport and/or their country of origin or nationality has not been confirmed beyond doubt. In addition, there is often little interest on the part of the countries of origin in enabling the forced return of their citizens. Moreover, deportation to countries with ongoing armed conflicts has become a contentious political issue.[3]

This situation implies that the decision to overstay depends largely on individuals' perceptions about their outcomes if staying without the right to, and their outside option. Whereas a tremendous effort has been made by the literature to understand the outcomes and integration of asylum seekers, comparatively little is known about their perception of the uncertainty they face with regard to their legal status, their economic outcome in

---

[1]Source: "Migration management: New EU Strategy on voluntary return and reintegration", URL: https://ec.europa.eu/commission/presscorner/detail/en/ip_21_1931, Accessed on January 28, 2022.

[2]In Germany asylum seeking applicants can file an initial application for asylum and if rejected file up to two subsequent follow-up requests on technical grounds.

[3]FAZ (2019) "SPD-Innenminister gegen Ausweitung von Abschiebungen", last accessed on October 15, 2020 at https://www.faz.net/aktuell/politik/inland/spd-innenminister-gegen-ausweitung-von-abschiebungen-16233710.html.

their host country, and their outside option. The main aim of this research is to partially fill this gap, by shedding some light on asylum seekers' beliefs about current environment and future outcomes, and the motives behind a decision to overstay. For this purpose, we introduced a module on subjective expectations in a survey conducted during the second half of 2019 on Afghan migrants in three large cities in Germany (Berlin, Hamburg and Munich) with the highest number of Afghan citizens. The focus on Afghanistan is motivated by the fact that Afghan citizens represent the second largest group of asylum seekers in Germany and the largest group of foreigners with a legal obligation to leave Germany.

The paper is structured around three main contributions. First, it provides a descriptive presentation of Afghan asylum seekers' beliefs about their outcomes and the associated intention to overstay. The survey elicited subjective beliefs about the chance of obtaining the right to stay in Germany (RtS) and the perceived risk of deportation. It also collected information on expected income depending on legal status, as well as expected access to social services (education, social assistance, health service) and the labour market. Finally, the survey elicited the intention to overstay under different hypothetical scenarios. Note that the data collection was conducted in 2019, two years to the takeover of Kabul by the Talibans and do not reflect this more recent development.

We find that Afghan asylum seekers, on average, have plausible beliefs about the chance of obtaining a protection status and the expected income in Germany. However, the variances of these statistics are large, reflecting the fact that beliefs are very heterogeneous in the population. In particular, beliefs differ significantly by the city of residence, with the most pessimistic beliefs held by residents in Munich.

At the time of the survey, Afghan asylum seekers exhibited upwardly biased beliefs about the risk of deportation. On average, they were 20 percentage points (pp) higher than the actual numbers. This overestimation of the risk of deportation prompted us to alter the survey design and include a Randomised Controlled Trial (RCT) that provided information about the actual proportion of deportation for the Afghan population in Germany to half of the sample. The aim was to explore whether those beliefs are malleable and respond to information about the actual proportion of deportation. The experiment showed that providing information about the actual deportation proportion had neither a sizeable effect on the expectation nor on the intention to overstay.

Intentions to overstay are, on average, relatively high in the population, with respondents stating a 64 percent chance to overstay, were they to be denied the RtS. The empirical analysis suggests a strong association between intention and subjective beliefs about outcomes. In particular, beliefs about the chance of becoming regularised significantly influence the intention to overstay.

The second main contribution of the paper is to assess quantitatively two types of objects, which are fundamental to understand and interpret the high willingness to

3

overstay: the perceived ex ante returns and the option values. Ex ante returns subsume both pecuniary and non pecuniary benefits. They can be understood as either the willingness-to-pay to overstay in Germany or as the minimum transfer necessary to induce departure. Option values arise from the sequential resolution of uncertainty and measure the value added by a specific option to the ex ante returns. For example, delaying departure preserves the option of a later regularisation and provides the opportunity to learn something about the uncertain returns.

We use novel identification results derived in a companion paper (Meango, 2023) to estimate the distribution of these objects. Our methodology builds on a generalised Roy model of the decision to overstay, modified to incorporate uncertainty about the final choice. We achieve identification by exploiting the intended choice of respondents in hypothetical scenarios. Estimates of the distribution of returns portray the great variability in beliefs. Ex ante returns are positive for most of the population, and possibly large with a median present value of between 31,000 EUR and 37,000 EUR for a 6-year overstay. The heterogeneity materialises in a negative tail of the distribution and about one tenth to one fifth of individuals, who, on average, perceive a negative return of overstaying. Estimates of the option value imply that the chance of becoming regularised explains at least 10 percent of returns for more than half of the population. This provides direct evidence that overstay serves to some extent as a *stepping stone* to a regularised status for irregular migrants, in the terminology of Jovanovic and Nyarko (1997).

The final contribution of the paper is to discuss the implications of our findings for European migration policy, in particular, for the implementation of assisted voluntary return policies (VRPs). Faced with high costs and administrative difficulties of forced returns, the European Commission and several members States have promoted voluntary returns as a "cost-effective" strategy to address the issue of overstay, a standpoint illustrated by the following statement of the Commissioner for Home Affairs: "Voluntary returns are always the better option: they put the individual at the core, they are more effective and less costly."[4] To encourage returns, some of the European Union (EU) countries cover travel expenses, participate in their organisation, and provide cash transfers. For example, since 2017, the German government has supplemented its voluntary return program by offering a one-off payment of up to 2,000 EUR to returners. In 2019, the Danish government started offering Syrian nationals around 175,000 Danish crowns (about 23,000 EUR) for leaving the country. The example of Denmark is particularly interesting, as the introduction of these financial incentives was concomitant with controversially stricter asylum policies, such as the non-renewal of temporary protection statuses for some Syrian nationals and a threat of detention in departure centres in case of overstay.[5]

---

[4]Ylva Johansson, Commissioner for Home Affairs, quoted from "Migration management: New EU Strategy on voluntary return and reintegration", URL: https://ec.europa.eu/commission/presscorner/detail/en/ip_21_1931, accessed on January 28, 2022.

[5]Reuters, "Denmark firm on returning refugees to war-torn Syria", URL: https://www.reuters.co

The estimated distribution of perceived returns shed new light on the potential cost of VRPs, if we interpret these returns as a lower bound of the necessary transfer to induce return to the home country.[6] The cost of a VRP is at two levels: (1) the direct transfer needed to match the ex ante perceived returns on overstaying of the marginal individual whose departure a government wishes to incentivise, making him or her indifferent to leaving or overstaying. The higher the perceived returns for this marginal individual, the more generous, i.e. costly, an effective policy will need to be. Perhaps less appreciated, the cost of a VRP also depends on (2) the ex ante perceived returns for the inframarginal population: because VRPs are usually non-discriminating, the transfer received by inframarginal leavers may exceed their returns. Our findings suggest that a cash transfer of the level implemented in Germany in 2017 (2,000 EUR) would increase the departure rate by 1 percentage points (pp) from about 17 percent. However, because of the infra-marginal individuals who would have needed no incentives to leave, each additional leaver costs up to 17 times the cash transfer they actually receive. This cost represents about 10 times the estimated average cost of a forced return. A one-off cash transfer of the level implemented in Denmark for Syrian asylum seekers (23,000 EUR) would increase the departure rate by 15 pp. However, the total cost represents about 17.5 times the estimated average cost of a forced return. Thus, VRPs are either costly or ineffective.

Finally, our analysis allows estimating the willingness-to-pay of asylum seekers for investments that guarantee regularisation. At least 30 percent of asylum seekers are willing to invest at least 100 EUR per month on such an investment, suggesting strong incentives on the asylum seekers side. The implication is that encouraging investments in human capital through the prospect of regularisation might be a welfare-improving alternative to deterrence policies, both for the host country and the asylum seekers.

This paper relates to the rapidly growing literature about the link between individual subjective expectations and individual investment choices (see, e.g., Manski, 2004). Within this framework, several investment decisions and behaviours have been fruitfully investigated, including birth control choice (Delavande, 2008; Miller et al., 2020), risky sexual behavior (Delavande and Kohler, 2016), education choice (Jensen, 2010; Attanasio and Kaufmann, 2014), choice of college major (Wiswall and Zafar, 2015), and career decisions (Van der Klaauw, 2012). Within the literature on migration, the subjective expectation framework has been used to understand migrants' expectations about outcomes at destination and perceived migration costs (e.g. McKenzie et al., 2013; Hoxhaj, 2015; Baláž et al., 2016; Lagakos et al., 2018; Koşar et al., 2021).

---

m/world/europe/denmark-firm-returning-refugees-war-torn-syria-2021-04-27/, accessed on January 28, 2022.

[6]Voluntary returns and forced repatriations were still feasible options at the time of data collection. As of 17 August 2021, due to the deteriorating security situation in Afghanistan, assisted voluntary return to Afghanistan has been suspended until further notice.

This paper uses a probabilistic stated choice methodology, pioneered by Blass et al. (2010), instead of revealed preference analysis or binary stated choice. Examples of the use of the probabilistic stated choice methodology include Shoyama et al. (2013); Delavande and Manski (2015); Wiswall and Zafar (2015); Morita and Managi (2015); Gong et al. (2019); Boyer et al. (2020); Gong et al. (2022).[7] In particular, it is closely related to Wiswall and Zafar (2018); Koşar et al. (2021) who estimate a population distribution of willingness-to-pay for choice attributes using hypothetical scenarios. Contrary to the aforementioned works, our identification strategy is nonparametric, relaxing traditional assumptions on the individual's utility and the resolvable uncertainty. The important identification results are derived in a companion paper, which offers a detailed (more technical) exposition.

This paper also contributes to the research on the determinants of irregular migration. Part of this literature is interested in the effect of migration policies on the flow of undocumented persons, e.g., Orrenius and Zavodny (2003); Gathmann (2008); Amuedo-Dorantes et al. (2013). Another stream of this line of research looks at the effect of individual expectations, (e.g., Mbaye, 2014; Bah and Batista, 2018). Our paper is closely related to the latter, in particular to Bah and Batista (2018) who provide experimental evidence about the importance of the perceived risk of dying *en route* and the perceived chance to be regularised for the intention to migrate irregularly. Whereas most of these contributions look at economic migrants, our focus is on a population of asylum seekers who have already arrived in the host country, yet face a significant risk of illegal stay.[8] To the best of our knowledge, this is the first paper to look at the overstay decision of asylum seekers using a subjective expectations framework.

The rest of the paper is organised as follows. Section 2 gives a brief description of the context of asylum migration in Germany and Section 3 of the data collection. Section 4 provides a descriptive exposition of our evidence on asylum seekers' beliefs and intentions. Section 5 presents a conceptual framework to estimate the distribution of ex ante returns and option values. It includes a stylised model of the decision to overstay and a description of the quantity of interest. Section 6 presents the empirical analysis. Section 7 discusses the policy implications. Finally, Section 8 concludes the paper.

2   Context

This section provides a brief contextual description of the asylum migration to Germany and the motivation of the survey.[9] We focus on statistics up to 2019, the year of the

---

[7]A larger literature on stated choice analysis is referenced in Koşar et al. (2021), footnotes 6 and 7.
[8]Asylum seekers with a rejected application form a large proportion of migrants with a legal obligation to leave Germany (about 152 thousand from an estimated total of 250 thousand in 2019).
[9]All sources for official statistics are collected in Appendix G.

survey, to give a better context of the information respondents may have had at this time. The data collection for this application was conducted two years prior to the takeover of Kabul by the Talibans. Voluntary returns and forced repatriations were still feasible options at the time of data collection. As of 17 August 2021, due to the deteriorating security situation in Afghanistan, assisted voluntary returns to Afghanistan have been suspended until further notice.

According to the German Federal Statistical Office, the number of asylum seekers living in Germany has tripled between 2013 and 2019. From a little more than 615 thousand in 2013, it spiked to more than 1.84 million in 2019. With 214 thousand registered asylum seekers as of 2019, Afghanistan was the second most important source country, before Irak (193 thousand) and after Syria (587 thousand). At the height of the asylum migrant crisis, about 150 thousand Afghans entered Germany (between 2014 and 2016).

As of 2019, 15 percent of all asylum seekers in Germany were granted a permanent status, 59 percent a temporary status, and 26 percent were still in a precarious status (pending application, pending appeal or rejected application - *ungesicherten Status*). The prospect of recognition strongly depends on the country of origin. As of 2019, 96 percent of asylum seekers from Syria received some form of protective status (with 3 percent receiving permanent protection), while only 1 percent were legally obliged to leave the country. In contrast, for asylum seekers from Afghanistan, 66 percent were given protection statuses (with 7.6 percent of those receiving a permanent status), while 12 percent were legally obliged to leave. Moreover, the proportion of asylum seekers with a secure status also varies across federal states, e.g. as of 2019, Bavaria 68 percent, Hamburg 80 percent, Berlin 82 percent. This spatial inequality has been linked to the political orientation of the ruling party, with federal states governed by the largest left-wing party (SPD) being less likely to deny an application (Schneider et al., 2020). There is also considerable gender bias, e.g., as of 2019, 59 percent of Afghan males received a positive decision compared to 81 percent of Afghan females.

Asylum seekers with a rejected application are asked to comply with a leave decree within a maximum period of 30 days and may receive financial support if they decide to leave voluntarily. If not complying, they face the risk of deportation. In practice though, deportation is rarely enforced. For example, in 2019, only 391 of the nearly 25,000 asylum seekers from Afghanistan with a legal obligation to leave Germany were returned to their home country, and 582 were returned to another European country under the Dublin-agreement. Additionally, eight out of 10 Afghans who are legally obliged to leave Germany benefit from a temporary suspension of deportation or toleration status (in German, *vorübergehende Aussetzung der Abschiebung* or more simply, *Duldung*). This precarious status is issued when obstacles exist to deportation and can be valid for a period of a few days to a few months (usually not more than six months).[10] A *Duldung*

---

[10]Opposing obstacles to deportations include, for example the right to safeguard the marital and family

does not provide the legal right to stay in Germany, has no guarantee of renewal and can be revoked under diverse circumstances.

Except under special circumstances, foreigners who have held a toleration status for at least three months can work in Germany if they receive a job offer and obtain approval of the Federal Employment Agency. According to the Asylum Seekers Benefits Act (*Asylbeweberleistunggesetz*), asylum seekers with a toleration status are entitled, during the first 15 months of their status, to receive social assistance to cover basic needs (food, accommodation, heating, health care, household consumption goods). After 15 months under a toleration status, the migrant is entitled to the same level of social assistance as a native.

Circumstances under which a toleration status can be transformed into a legal residence status include the completion of a qualified apprenticeship or study, or employment as a skilled worker for a two- to three-year uninterrupted period. Furthermore, in accordance with German law, if a foreigner cannot leave the country for a longer period of time for reasons beyond their control, he or she may be granted a residence permit for humanitarian reasons. However, this usually requires that the foreigner has a passport and has integrated into the local living conditions. This last condition is usually understood as showing proof of language proficiency and being able to provide for one's needs.

Within this context, the "Survey on Migrants' Expectations in Germany" was designed to understand the decision of Afghan asylum seekers to stay in Germany without the legal right to stay or exit to another country. Indeed, departure of Afghan citizens from Germany are not rare. An estimated 5,580 Afghans left Germany in 2019, including 1,766 cases where the asylum seeker had been denied protection. These numbers should be seen as lower bounds, as the exit is not always registered (e.g., when travelling by land).

3 Survey Operations and Sample Characteristics

The data used for the empirical analysis stem from the "Survey on Migrants' expectations in Germany" that was conducted during the second half of 2019. The target population is composed of persons with an Afghan citizenship, aged 18 or over, who arrived in Germany for the first time in 2014 or after, and live in one of the urban areas of the study. Because of budget constraint, we targeted the three urban areas with the highest numbers of Afghan citizens: Berlin, Hamburg, Munich.

A random sample of the population of interest fulfilling the eligibility criteria was drawn from the population registry (*Einwohnermeldeamt Melderegister*). The individuals

---

life or the assertion of illness-related dangers caused by deportation. A deportation is also impossible for factual reasons if travel documents are missing, the destination country refuses admission or traffic routes are interrupted. The immigration authorities also have the possibility of a discretionary tolerance for urgent humanitarian issues, personal reasons, or significant public interest (e.g. immediately upcoming surgery or the completion of a school or training year).

were invited by post to take an interview in one of several possible locations in the urban centers of the study. Participation was compensated with 20 Euros in cash.

The target population partly consisted of migrants with no legal documentation. This is by nature a "hard-to-reach population" because no registry data is available to sample them. Furthermore, anecdotal evidence suggested that migrants who are legally obliged to leave Germany do not reside at the place where registered in order to avoid overnight deportation. To reach this sub-population, the survey utilised the Respondent-Driven Sampling (RDS) strategy developed by Heckathorn (1997). Participants with a completed interview were asked to recruit up to three acquaintances who satisfy the eligibility criteria. A successful recruiter was compensated 10 Euros for inviting one person, 15 Euros for inviting two persons, and 20 Euros for inviting three persons.

Before and during fieldwork, the survey team contacted with influential members of the Afghan community (Imams, NGO's, social workers, community leaders, etc.) in each city to raise awareness about the study. Due to the nature of the target population and the questions asked, the survey was anonymous and no information regarding the individual's identity was kept. A coupon system, which uniquely identified participants and their recruits, was implemented to record the recruitment chains while protecting the respondents' identity at all time. To avoid multiple participation by the same individual, a staff member was assigned at the interview center on a permanent base, and conducted a screening before the start of an interview.

Fieldwork was carried out in the second half of 2019 for three months in each city.[11] Computer assisted personal interviews were conducted by native speaking interviewers in Dari and Pashto, the two main languages spoken in Afghanistan. Table 1 shows the estimated size of the target population and the sample size in each city. Overall, the recruitment was quite successful in Berlin and Munich but less so in Hamburg. Still, in each city, the sample represents a non-negligible part of the population of interest.

Table H.2 shows some demographic characteristics by city of residence. The sample is dominated by males, consistent with the resident population. At the local level, however, women are slightly under-represented in Munich and over-represented in Hamburg and Berlin. The sample population is young (median age 28), and less educated than Germans with close to two third of respondents having obtained a lower secondary education or below. The average length of stay in Germany is 3.6 years. The three most important stated emigration motives are war, political reasons, and persecution (results available upon request).

The bottom part of Table H.2 presents additional characteristics related to the current stay in Germany. Nearly six out of 10 respondents have received some form of protection. This statistic varies considerably across city and is slightly lower than official statistics

---

[11]From 28/05/2019 until 31/08/2019 in Munich, from 19/09/2019 until 14/12/2019 in Berlin and Hamburg.

in 2019 available from the Federal Statistical Office at the federal state level: Berlin 5.6 (official statistics 6.8), Hamburg 7.4 (8.1), Munich 5.2 (6.8 in Bavaria).[12] This is to be expected though, because, contrary to the population register that accounts for all Afghan citizens, our sample is restricted to those who arrived recently and, thus, are less likely to have a final decision on their status.

According to the respondents' answers, access to work and education in Germany show a gender component. Occupational level in Germany is low and unequal across genders (26 percent for men, 4.5 percent for women), so is participation into education in Germany (23 percent for men, 18 percent for women), predominately in vocational education. Four out of five of the respondents have been or are currently enrolled in a German language class. Note that attendance of German classes is lowest in Munich, while the occupation rate is highest in this city.

Overall, the sample characteristics are similar with those of the IAB-BAMF-SOEP survey (Brücker et al., 2018), a representative survey of asylum seekers in Germany. To sum up, the sample reflects well key characteristics of the population of interest.

4   Descriptive Investigation of Beliefs and Intentions

The survey elicited subjective expectations that can be divided in to three categories: (i) subjective beliefs about population averages, (ii) subjective beliefs about individual outcomes if leaving or staying, and (iii) intention to overstay expressed as probability measures. Section 4.1 describes the subjective beliefs. Section 4.2 presents the results of an RCT that provides part of the population with information about the true rate of deportation. Section 4.3 describes the intention to overstay. The reader pressed for time can refer to Section 4.4 for a summary of the main findings.

The survey included questions that required the respondent to state subjective probabilities as a number between 0 and 100. The module on subjective expectations included a training phase where respondents were trained to state subjective expectation with a number between 0 and 100. For example, respondents were asked to state how many out of 100 Afghans they thought could speak Dari, the most common language spoken in Afghanistan. Then the interviewer was asked to help respondents rephrase the answer in the form of a probability, and a counter-probability.[13] The same exercise was repeated for the proportion of Afghan migrants to Europe who came to Germany, and the proportion of Afghan migrants who obtain the right to stay in Germany. The questions were complemented with visual aids to facilitate understanding.[14]

---

[12]Berlin and Hamburg are city states. See Appendix G for a link to the source data.

[13]The interviewer asked: (1) "So the percent chance that a person from Afghanistan can speak Dari is:... " (2) "It means that the percent chance that a person from Afghanistan cannot speak Dari is:... "

[14]The complete Questionnaire module is available under https://www.dropbox.com/sh/fb8ytdovg 0scboz/AADgwGi5AQ53lsRq68dEc8Sfa?dl=0.

4.1 Subjective beliefs

This section provides a description of beliefs with respect to the outcome of asylum applications and other outcomes related to legal status. At the population level, the survey elicited respondents' beliefs with respect to the proportion of Afghans who obtain the RtS in Germany and the proportion of Afghans who were deported in the last years. At the individual level, the survey elicited respondents' beliefs with respect to the chance of obtaining the RtS in Germany for the next three years, the chance of obtaining the RtS in three-year time conditional on staying in Germany without the RtS, and the probability to be deported conditional on not obtaining the RtS. The exact phrasing of the questions is presented in Appendix A.[15]

Table 2 presents the average and standard deviation for each city and the whole sample. On average, respondents expect that around 45 out of 100 Afghans who arrived in Germany receive the RtS. This average belief is closer to the official statistics of positive decision in the initial application (51) than to the level of final decisions as of 2019 (66). There is significant variation across cities with respondents in Munich displaying most pessimism. The standard deviations are large, which also suggests a significant variation between individual beliefs. The first quartile of the sample distribution is at 30, and the third at 60.

With respect to their own chance of obtaining the RtS if the current status were to expire, respondents expect, on average, a 68 percent chance. This represents a 22 percentage points (pp) difference with the expected population average. As before, beliefs in Munich are the most pessimistic with a 14 to 17 pp difference between it and the other two cities. The average belief in Munich (56/100) is 12 pp below the proportion of asylum seekers with some protection in Bavaria in 2019 (68), and slightly higher than this statistic in 2017 (51). The average belief in Berlin is slightly above the 2019 official proportion (73 v.s. 68), and is below in Hamburg (70 v.s. 80). Standard deviations are also large here, suggesting significant variations between individual beliefs.

Beliefs about the chance of obtaining the RtS conditional on overstaying three years are slightly lower (by 6 pp, on average) than the own chance of obtaining the RtS if the current status were to expire. Nevertheless, the same city patterns persist as with the elicited chance of obtaining the RtS.

Figure 1 compares the distribution of beliefs about the population average and the own chance of obtaining the right to stay. Compared to the distribution of belief about the average population, the distribution relative to the own chance is shifted to the right, which implies that a large proportion have high expectation to obtain the RtS. In

---

[15]The 3+3-year window was selected for three reasons. First, it provides a time-horizon not too distant to form realistic expectations. Second, most protection statuses have a maximum validity of three years. Third, conversations with experts suggested that exit from a toleration status could be expected in a window of five to eight years.

particular, a little more than 21 percent report a 100 percent chance.

Beliefs about the proportion of Afghans forcibly removed and sent back to Afghanistan and the chance to be deported when not obtaining the RtS are upwardly biased. On average, respondents believe that one out of five Afghans has been sent back to Afghanistan in the past few years, and that there is a 37.74 percent chance to be deported conditional on not obtaining the RtS. As discussed in section 2, deportation to Afghanistan is a rare event. In 2019, only 1.8 out of 1000 Afghan asylum seekers and 1.6 out of 100 Afghan asylum seekers with a rejected asylum application were deported. This overestimation appeared very early in this survey. This prompted us to alter the survey design and insert an information experiment that is described in Section 4.2.

Table 3 presents a linear regression of the beliefs on the individual characteristics: gender, years of education, legal status, age, and city of residence. Women are more optimistic than men about the chance of obtaining the RtS, which is consistent with the fact that, proportionally, more women obtain a protection status than men. Individuals with an already secure status are more optimistic, which also aligns with the nature of their status. Older individuals appear more optimistic about the chance of obtaining the RtS and less pessimistic about the risk of being deported. The regression analysis confirms the importance of the city of residence on the beliefs held by the respondents.

The survey elicited further beliefs about outcomes in Germany, depending on the legal status of the individual. Table 4 presents the average expected monthly income with or without RtS. With the RtS, respondents expect to earn, on average, 1,666 Euros per month. This amount is lowest in Munich (1,612 Euros), which also displays the lowest variance, and highest in Hamburg (1,731 Euros). Without RtS, respondents expect on average 1,193 Euros. As before the average is lowest in Munich (1,108 Euros), and highest in Hamburg (1,386 Euros). These numbers imply an expected monthly return on legalisation between 350 Euros and 500 Euros on average, depending on the city. According to Brücker et al. (2020), the average monthly gross income of refugees who entered Germany between 2013 and 2016 was 1,282 Euros in 2018, and 1,863 Euros for those in a full-time occupation. This represents between 54 percent and 89 percent of the average gross income of comparable German workforce, depending on the category considered. Therefore, the average elicited beliefs about income sound plausible.

Finally, the survey elicited beliefs about the perceived access to social services and the labor market given their current status and in case of not obtaining the RtS. The perceived access is measured for four dimensions (education, social assistance, health services and the labor market) on a likert-scale: full access, somewhat limited access, very limited access, no access at all. Table 4 shows the proportion of individual who expect a decrease of their access to social services, were they not to obtain the RtS in the next years. A decrease is expected most often for the access to social assistance (82 percent of respondents), followed by labor market (60 percent). These proportions vary noticeably

between cities but without a clear ordering.

To sum up, we find important differences in beliefs not only across individuals, but also across cities. Beliefs about the proportion of Afghan who obtain the RtS are on average lower than the available official statistics, but respondents are optimistic about their own chance of obtaining the RtS. The beliefs about the prevalence of deportation are noticeably higher than actual rates. Finally, individuals perceive a clear return on obtaining the RtS, both pecuniary and through access to social services and the labor market.

4.2 Malleability of subjective beliefs about deportation

As discussed before, respondents in our sample overstate the probability to be deported and sent back to their home country by the authorities. Therein, the survey included an RCT to measure the effect of providing an official statistic on migrants' beliefs. A treatment group was informed of the past proportion of Afghan migrants who had been deported from Germany to Afghanistan. The control group received no information. Our interest lies in the difference of beliefs about the perceived future rate of deportation and the perceived own chance to be deported between the treatment and the control group. An analysis plan of the RCT has been registered under the AEA RCT registry.[16] Because the intervention was planned after the start of the survey, the results should be understood as an attempt to explore the malleability of subjective beliefs.

After the training questions, respondents were asked about their perception of the proportion of deportation in the last years. Afterwards, half of the respondents, randomly selected by the survey instrument, were provided with information about the actual statistics on the deportation level for the Afghan population in the past 3 years. More precisely, the treated group received the following information:

QI *There are official statistics about the number of Afghans that were deported from Germany to Afghanistan. From December 2016 to May 2019, in total 565 Afghan were deported from Germany by the German Authorities. This means about one Afghan out of 100 Afghans who arrived in Germany since 2016.*

The respondents who received information QI were also asked if they found this statistic reliable, answers were binary (yes/no). Subjective expectations about the perceived proportion of the population, which would be deported in the next few years were elicited directly after the information was given, for treated group, and for all respondents. Expectations about the own deportation conditional on not obtaining the RtS were elicited after a few minutes. Figure B.1, in Appendix B, presents the flow-chart of the intervention.

---

[16]ID: AEARCTR-0004828 can be found under the following link: https://www.socialscienceregistry.org/trials/4828

Table 5 presents the average treatment effect of the shown information on the beliefs for the future deportation proportion in the population and own probability to be deported conditional on not obtaining the RtS.[17] As a placebo, beliefs about past proportion of deportations are also displayed. This belief was elicited prior to the treatment and shows that the randomisation worked reasonably well in each city. It also shows these expectations are very high, 20 pp larger than the true value, in the population.

In the control group, expectations about future deportations are high. Respondents expect an increase in the rate of deportation in the next few years. The averages range from 23.35 percent chance in Hamburg to 29.88 percent chance in Berlin. The information treatment leads to a decrease in expected number of deported in the future in Berlin and Munich, -10pp and -8pp respectively. However, these expectations remain rather high, given the reported official statistics. In Hamburg, where the lowest probabilities in the control group are given, the information does not seem to affect average beliefs. If anything, it suggests a confirmation bias. Nonparametric equality of median tests and regressions controlling for individual characteristics and interviewer fixed effects yield qualitatively similar results.

A limitation of the above results is that the measured effects can be the result of an "enumerator demand effect", that is respondents are providing lower answer because the interviewer corrected them a few seconds before. Yet, expectations about one's own deportation are elicited a few minutes after the provision of information and should not suffer from bias. The elicited expectation do not differ between treatment and control group. Therefore, it seems that the information has only limited importance for individual beliefs. Appendix C provides additional evidence of this finding by calculating the importance of the provided information in a Bayesian-updating model. Furthermore, we also find that intention to overstay (see next section) is slightly higher in the treatment group, but the difference is not statistically significant.

In summary, beliefs about the risk of deportation are upwardly biased in the population and do not seem to respond to the provision of official statistics.[18]

4.3 Intention to stay and overstay

This section focuses on the intention to overstay in Germany. It investigates its relation with subjective beliefs about the chance of obtaining the RtS in the future, the perceived chance of deportation and the outcomes if in the presence of no RtS.

When asked about the number of years they would like to stay in Gemany, three out of

---

[17]We exclude the observations related to one interviewer from whom it was found later during the fieldwork that he did not understand/follow the instructions of the RCT in Hamburg. *N* decreases in Munich as the treatment was introduced a few weeks after the beginning of the fieldwork.

[18]The question about trust in the information does not seem to convey meaningful information. Whether an individual states that he trusts the information or not appears uncorrelated with the difference between the stated belief about past and future deportation rates.

four respondents report that they would like to stay forever in Germany. Of the remaining quarter, 57 percent would like to stay until conditions in the home country improve, 9 percent for less than 10 years, and 17 percent for 10 to 30 years. The distribution is very similar across the three cities. Accordingly, the willingness to stay in Germany is high.

Table 6 presents the average for the whole sample, and by city, for the intention to stay and intention to stay conditional on not receiving the RtS. Figure 2 presents the conditional density functions (CDF) by city. The stated chance of staying in Germany for the next three years is high, with a mean of 83.04. A large proportion of the population (46.9 percent) reports a 100 percent chance to stay in the next three years. The average chance is lowest in Munich, 76.05 percent. The CDF is first-order stochastically dominated by the two other cities. Consequently, respondents in Munich are the most pessimistic about their chance to stay in the next three years. This is consistent with their more pessimistic beliefs about the chance of obtaining the RtS and the chance to be deported if not obtaining the RtS.

The intention to stay without RtS is 19 pp lower than the unconditional probability to stay. Fewer respondents state a 100 percent chance to stay (24.72 percent), from which four out of five reside in Berlin. Once again, Munich's CDF is markedly dominated by the CDFs in the two other cities and the difference in average is about 21 pp. Nearly four out of 10 residents in Berlin report a 100 percent chance to stay without RtS.

Of note is that reported alternative destinations, if one would decide to exit Germany, are very diverse. The top three countries mentioned are France (14 percent), Canada (11 percent) and the United Kingdom (8 percent). Four out of 10 respondents mention a European country other than Germany, while only 7 percent mention returning to Afghanistan.

4.3.1 Determinants of the intention to stay without RtS

This section relates the intention to stay without RtS with three types of variables:

  (i) individual characteristics: gender, age, legal status, time since arrival in the EU and city of residence;

 (ii) subjective beliefs about legal status and deportation: chance of obtaining the RtS if staying for three years without the RtS, chance to be deported conditional on not obtaining the RtS;

(iii) expected outcomes in Germany: monthly expected income without the RtS, and the wage return from obtaining a legal status - that is the difference between the income with the RtS and the income without the RtS - as well as indicators of the perceived access to social service without the RtS.[19]

---

[19]Each indicator variable is equal to one if the individual expects a full access or a somewhat limited

Table 7 displays the result of two specifications, where the control variables are introduced progressively. The first specification (OLS(1) and OLS(2)) is a linear regression of the stated chance of stay without RtS on the control variables. In this specification, gender, legal status security and the city of residence of the respondent are the main individual characteristics explaining the intention to stay. Women have higher intention to stay (4 to 5 points), while respondents with a precarious legal status have on average 5 to 6 points lower intention to stay. The effect of the city of residence is sizeable even when controlling for other individual characteristics and subjective beliefs.

The perceived chance of obtaining the RtS if one overstays has a statistically and economically significant effect on intention to overstay. One point increase in the former, increases the latter by 0.43 pp. That is, a one-standard-deviation increase (+28.4 pp) from the mean increases intention to stay by 12.51 pp ($=28.44 \times 0.44$). Subjective beliefs about deportation have a five times weaker effect. A one-standard-deviation increase (+30.5 pp) from the mean increases intention to overstay by 2.4 pp. Expectations about income in Germany without RtS have a statistically and economically significant effect on intention to overstay. A 100 Euros (0.15 sd) increase of expected income from its mean increases by 0.50 pp the intention to overstay. The income returns on regularisation have a weaker effect. Perceived access to health services seems to be an important determinant of the decision to stay without the RtS, with those who expect a full or somewhat limited access to health care being by 5.8 points more willing to overstay.

The second specification is a Least-absolute Deviation estimation of the log-odds of the chance to stay without RtS on the same control variables (LAD (1) and LAD (2) in Table 7). This specification is more robust to extreme observations (0 and 100) and rounding, as argued by Blass et al. (2010).[20]

The conclusions of both specifications are similar and point to the importance of subjective beliefs; in particular, they stress the importance of perceived chance of becoming regularised in the future. We have interpreted the above results as causal effects for ease of exposition. However, there might exist unobservable characteristics influencing both the intention to overstay and individual subjective beliefs, e.g., individual traits, or private information, as suggested by Wiswall and Zafar (2015). Thus, it is more accurate to talk about association between variables.

---

access.

[20]Extreme values are replaced with slightly larger/lower ones: 0 by 0.1 and 100 by 99.9. The coefficients are exponentiated to ease interpretation as they yield the change in odds ratio. For example, the last column (LAD (2)) suggests that women have 51 percent ($1.51 - 1$) higher odds of staying than men, whereas respondents with a secure legal status have 46 percent ($1.46 - 1$) higher odds of staying than their counterparts with a precarious legal status.

4.3.2 Intention to overstay in hypothetical scenarios

To better understand the effect of the expected chance of obtaining the RtS on the intention to overstay, the respondents were presented with hypothetical scenarios where we vary experimentally the chance of regularisation. The survey investigates three scenarios. In the first one, the respondent has almost no chance of becoming regularised in the next three years if he or she overstays ($q = 1$ percent). In the second one, the respondent is almost sure of becoming regularised at the end of a three year overstay ($q = 99$ percent). Finally, we include an intermediate scenario where the chance of becoming regularised at the end of a three-year period stands at 50 percent ($q = 50$ percent). All respondents received all three questions. The order of question was randomly assigned by the survey instrument.

Table 8 presents the average of answers to the three questions and Figure 3 represents the CDFs by city. Intention to overstay is very large when $q = 99$ percent, with an average of 93.23 percent chance. The CDFs in this case are highly-skewed as 68 percent of the sample answer 100, and close to 90 percent give answers of 75 or above. This pattern is very consistent across all cities. Berlin has the highest proportion of "100 percent" answers.

The average intention to overstay drops by about 15 pp when $q = 50$ percent. The magnitude of this change depends strongly on the city: Berlin -10 pp, Hamburg -16 pp and Munich -25 pp. While the distribution is more spread for $q = 50$ percent, still 42 percent of the sample answer 100, and close to 90 percent give answers of 45 or above.

Even when $q = 1$ percent, 30 percent of the sample answers 100. Of those, 80 percent reside in Berlin. The drop in the average intention to stay from the case where $q = 99$ percent is on average of 35 pp. Again, the magnitude of this change differs strongly by city: Berlin -26 pp, Hamburg -44 pp and Munich -54 pp. Thus, Munich residents appear less willing to stay when there is almost no chance to be regularised. The difference in intention to stay between Berlin and Munich is about of 33 pp and the median intention to overstay is only at 30 percent in Munich. Hence, the chance of obtaining the RtS three years ahead appears to have a significant effect on the intention to stay without RtS.

Eliciting the data under several hypothetical scenarios creates a "pseudo-panel". We observe for each individual a vector: $((1, p_i(1)), (50, p_i(50)), (99, p_i(99)), (q_i, p_i(q_i)))$, where $p_i(q)$ denotes the intention to stay without the RtS when the chance of obtaining the RtS three years ahead is q.[21] To calculate the elasticity of interest, we can use fixed-effects methodologies to purge the bias from individual-specific unobserved characteristics. We

---

[21] q_i corresponds to the answer to $Q4$, and $p_i(q_i)$ to the answer to question $Q8$. See Appendix A.

estimate the following models:

$$p_i(q) = \beta q + \alpha_i + u_{it}, \; q = 1, 50, 90, q_i \text{ (Linear FE)}$$

$$\log\left(\frac{p_i(q)}{1 - p_i(q)}\right) = \beta q + \alpha_i + u_{it}, \; q = 1, 50, 90, q_i \text{ (LAD FE)}$$

The first specification (Linear FE) uses the elicited intention to overstay as the dependent variable, where as the second specification (LAD FE) uses a log-odd transformation of it. α_i represents individual fixed-effect that captures observed and individual specific characteristics, and u_{it} can be thought of as a measurement error. Regressions are conducted for the each city as well as the whole sample.

Table 9 presents the estimates of the coefficient β. Due to the presence of extreme value observations, the LAD FE does not converge for the Berlin sub-sample. Instead, we present the result for a quantile regression at the first-quartile.

The linear FE estimation implies that one-point increase in the perceived chance of obtaining the RtS increases the intention to overstay by 0.35 pp. That is, a one-standard-deviation increase from the mean raises the intention to overstay by 9.95 pp ($= 28.44 \times 0.35$). This effect is stronger in Munich than in the other cities. The same increase from the mean raises intention to overstay by 14.8 pp, against 9.39 pp in Hamburg and 7.96 pp in Berlin. Similarly, the LAD FE estimation implies a twice as large increase of the odds of overstaying in Munich as in the two other cities. These findings illustrate the importance of the perceived chance of obtaining the legal right to stay.

4.3.3 Credibility of the elicited intentions to overstay

At this point, it is appropriate to discuss the reliability of the elicited intention to overstay, given that the answers are not incentivised.[22] Do respondents report their true intention to overstay? There are four main reasons for trusting the elicited answers. First, the survey was anonymous, that is, no information was recorded about name and address of participants. The information obtained from the population register were solely used for the purpose of invitation and could not be merged with the survey answers. The survey team took great care in advertising this feature through the invitation letter and pamphlet, and before the start of the interview. Participants were also informed that the survey team had no connection with the State authorities. Answering the subjective expectation

---

[22]We decided against incentives for three reasons. First, the survey already compensates for participation with an amount of up to 40 Euros. For some participants, this represents as much as one eighth of their monthly allowance. Further incentives might have created incentives for repeated participation, which was by design difficult to monitor. Second, there is a monthly cap on cash transfer (about 130 Euro at the time of the survey) that refugees can receive without declaring it to the authorities. Above this cap, the amount has to be declared and deducted from their allowance. For those receiving otherwise other sources of revenue, further incentives increased the risk of them hiding these transfers from the authorities, which would be illegal. Third, an incentive scheme would have further complicated the design of the questionnaire and the practical survey operation.

module was optional and any question could be skipped, without any consequence for the participant's compensation.

Second, the German context described in Section 2, provides some form of legal and social acceptance to the decision to overstay. Although it does not provide the legal right to stay to those with a rejected asylum application, it documents the over-stayers, offers an access to the labour market, and covers basic needs. Thus, the decision to overstay may be associated with less stigma than in other contexts, and yield less social desirable answers.

Third, the questionnaire was designed so as to build some trust between the interviewer and the respondent before reaching the sensitive questions on the individual's intention to overstay. Building trust with the interviewee was also at the core of the interviewers training. That the questions design and sequence can (at least partially address) the concern of social desirable answers is illustrated from the answers to Q4 and Q6 to Q8. Q4 represents the unconditional intention to overstay, which is asked first. Q6 to Q8 represent the intention to overstay conditional on various hypothetical scenarios, and are asked some intermediate questions. Figure H.3 in Appendix H shows the predicted intention to overstay given the chance of obtaining the RtS. On average, respondents tend to understate their intention to overstay when elicited through Q4. However, they correct these intentions upwardly, when answering Q6 to Q8.[23]

Finally, the elicited data are consistent with what should be expected in the German context. On average, the intention to overstay is high, as suggested by the number of over-stayers in the official statistics. In addition, women are more likely to report a higher chance of obtaining the RtS and to overstay, which is consistent with the gender gap observed in official data. Furthermore, people who already have a temporary permit are also more likely to report a greater chance of obtaining the RtS in the future and overstaying. Finally, the striking difference between Munich respondents and their counterparts from the other cities is consistent with the political context in Bavaria. At the time of the survey, the Parliament of Bavaria was governed by a Center-Right party (CSU) that had advocated a harder line on migration. It had been openly critical of the political course of the federal government during the so-called migrant-crisis of 2014 and 2015, and campaigned for an upper limit of 200 thousand asylum seekers per year. Bavaria was one of the two states (the other being Saxony) that regularly deports people to Afghanistan who are neither Islamist threats nor criminals.[24] All these reasons strengthen the case for the credibility of the elicited intentions.

Another important question is whether the elicited intentions predict actual deci-

---

[23]This discrepancy is accounted for in the estimation by adding a dummy indicator to the vector Z when $Q = q_i$.

[24]See for example: Spiegel (2017), last accessed on October 15, 2020 "Obergrenze! Obergrenze?" https://www.spiegel.de/politik/deutschland/csu-wahlprogramm-bayernplan-ein-bisschen-obergrenze-a-1158350.html.

sions. Unfortunately, the survey cannot follow individuals overtime because it guarantees anonymity to the participants. The case for the predictive power of the elicited intentions rests on the growing literature that substantiates this fact in many different contexts (see, e.g., Hurd, 2009; Bah and Batista, 2018; de Bresser and van Soest, 2019; Gong et al., 2019).

4.4 Summary

On average, Afghan asylum seekers' beliefs about the chance of obtaining a protection status and the expected income in Germany are close to average actual levels in population. Thus, they seem plausible. However, beliefs are very heterogeneous in the population and differ by observational characteristics. In particular, beliefs differ significantly by the city of residence, with the most pessimistic beliefs held by residents in Munich.

Afghan asylum seekers overestimate the risk of deportation. On average, they are 20 percentage points (pp) higher than the actual numbers. Their expectation at the time of the survey was that the future rate would be even higher. When provided with information about the actual proportion of deportation, these beliefs change little, and the information has no sizeable effect on their own chance of being deported.

The intention to stay in Germany is high in the population, and remains high even in the case when the individual would not obtain the RtS. The latter intention varies with the expected income in case of overstay, the risk of deportation, and, most importantly, with the perceived chance of becoming regularised. The next section presents a model of the decision to overstay, which allows identifying the distribution of perceived ex ante returns and a set of option values.

5 Identification and Estimation of Ex Ante Returns and Option Values

This section presents a model of the decision to stay or leave Germany conditional on not receiving the legal right to stay (RtS). The goal is to assess quantitatively the perceived ex ante returns on overstaying and the option values, which are fundamental drivers of the decision to overstay.

The general framework sees the decision to overstay as a utility maximisation decision as conceptualised by Sjaastad (1962). Utility gains stem from a difference between relative income gains of overstaying and private costs as in a generalised Roy model. The generalised Roy model is widely used in applied econometrics (see, for example, Amemiya, 1985; Heckman, 2001; Heckman and Vytlacil, 2005) and is the workhorse model for explaining migration decisions (see, for example, Borjas, 1987; Grogger and Hanson,

2011). The following exposition uses the terminology of this model to define pecuniary benefits, non-pecuniary costs and surplus (see for example Eisenhauer et al., 2015).

The proposed model includes uncertainty about the final decision. The uncertainty stems from the fact that beliefs are elicited before the actual decision, and perceived utility might be affected by additional shocks between the time of elicitation and the time of decision. Agents are assumed to entertain probabilistic beliefs about the magnitude of these shocks.

Appendix D presents a stylised model, which links the reduced-form formulation of the generalised Roy model of Section 5.1 to a structural model with inter-temporal utility maximisation. This stylised model allows decomposing private costs into net perceived amenities and costs of deportation.

5.1 Timing and notations

Denote by i an Afghan asylum seeker currently living in Germany without the RtS. Suppose three consecutive periods. The first period is the time of elicitation, where the researcher elicits i's beliefs about different outcomes and i's intention to overstay. The second period is the time of decision. At the beginning of this period, the asylum seeker can take one of two decisions: stay in Germany without the RtS or exit to another country (not necessarily Afghanistan). Exit is an absorbing state in that i will not return to Germany in the next period. If i decides to exit, he or she receives in the subsequent periods (the second and third period) a monetary income and an additional utility that captures the amenities in the third country and the cost of moving. The asylum seeker forms beliefs about these quantities.

If i decides to overstay, he or she faces a risk of deportation, associated with a cost of deportation. However, he or she has a chance of obtaining the RtS at the end of the second period associated with a different stream of income and different amenities. The asylum seeker can also choose to exit at the end of the second period. The individual forms subjective beliefs about the chance to be deported, to become regularised, or subsequently exit the host country.

If the asylum seeker has not been deported at the end of the second period, the legal status of next period is revealed. Hence, at the beginning of the third period, the asylum seeker is in either one of two states: with a RtS or without a RtS. At this point, the asylum seeker may re-optimise the overstay decision (See Figure H.1 for a visual description of the model). We assume that if they obtain the RtS, asylum seekers will almost surely stay in Germany. This is in line with our data that reveal a high willingness to stay.

Congruent with our data, we assume that the analyst elicits individuals beliefs and overstay intention in a number of scenarios, that will be denoted by the subscript t. The notation distinguishes two types of scenarios. First, denote by $t = 0$ the *actual* individual

21

situation, that is, the *actual* beliefs and intentions. Second, denote by $t = 1, \ldots, T$, a number of counterfactual scenarios that corresponds to varying choice attributes, e.g. counterfactual chance of becoming regularised.

Furthermore, denote by B_{it}, the *ex ante* net pecuniary benefits expected if overstaying in scenario t, X_{it}, a vector of individual beliefs about further outcomes in Germany in scenario t, and P_{it}, the intention to overstay in Germany in scenario t.

B_{it} is the expected income difference between overstaying and leaving Germany in scenario t. This quantity is derived from the answers to Q12 in Appendix A. In practice, it is calculated from the elicited beliefs about income streams under different hypothetical legal statuses and the beliefs about different outcomes in the future. The exact formula is detailed in Appendix D. It suffices here to say that these benefits represent a weighted average of the expected income when one obtains the RtS, and the expected income when one does not obtain the RtS, relative to the expected income in the outside option of exiting.

X_{it} encompasses: (1) the probability of obtaining the RtS (becoming regularised) at the end of second period, after spending this period in Germany without the RtS, (2) the chance of being deported during the time of stay, and (3) the perceived probability to exit Germany after a period of overstay. The chance to exit Germany after a period of overstay is calculated through the elicited belief Q9, the chance of deportation through Q5, and the probability to become regularised through Q4. The hypothetical scenarios that vary the chance of becoming regularised between 1, 50 and 99 percent implicitly change the risk of deportation and the chance of later exit. For example, when the chance of becoming regularised is very large, the *total* chance of being deported is very small.

Finally, P_{it} is the intention to overstay elicited as a choice probability for different scenarios. P_{i0} corresponds to the actual intention to overstay, elicited through the survey question Q8. $P_{it}, t > 0$ corresponds to the intention in hypothetical scenarios elicited through the survey questions Q10-Q12.

Whereas the above quantities are observed by the researchers, the following ones are not. Denote by α_i the private information about the utility of overstaying, ν_i, the *resolvable uncertainty*, and $C_{it} := C(X_{it}, \alpha_i, \nu_i)$, the ex ante non-pecuniary cost of overstaying, for beliefs X_{it}.

α_i is a utility shifter that remains unobserved by the researcher, but is known by the asylum seeker. It captures i's private information or (heterogeneous) taste for overstaying. The random variable α varies with the perceived level of amenities enjoyed in Germany or abroad, and the private cost of deportation (see the stylised model of Appendix D).

ν_i is the source of uncertainty about i's final decision. It is revealed to the asylum seeker only after belief elicitation, at the time of decision. The random variable ν summarises all unforeseeable events that may shift the utility to stay between the time of elicitation and the time of decision. Examples include sickness, mating, or improvement of conditions in

Afghanistan. At the time of elicitation, the realisation ν_i is observed neither by i, nor by the researcher; however, this uncertainty will be resolved at the time the asylum seeker will actually decide to stay or leave.[25]

The agent is assumed to hold beliefs about the distribution of ν conditional on their information set. Denote by $F_{\nu|\mathcal{I}_i}$ this distribution, where $\mathcal{I}_i$ is the information set of individual i at the time of elicitation. There is no other resolvable uncertainty; the uncertainties about X_{it} or the pecuniary benefits are assumed to be unresolved by the time of location decision.

Finally, C_{it} represents i's private cost of overstaying. This cost can be positive or negative and summarises utility components other than expected income differences that influence the stay decision. It depends on the choice attribute X_{it}, the private information α_i, and the resolvable uncertainty ν_i. The stylised model presented in Appendix D decomposes C_{it} in the perceived amenities when i obtains the RtS, the perceived amenities even if i does not obtain the RtS, and the cost associated with the risk of deportation.[26] The cost function $\nu \mapsto C(x, \alpha, \nu)$ is assumes to be strictly monotone in ν for each x, α.[27]

Finally, define the ex ante returns (or surplus):

$$S_{it} := S(B_{it}, X_{it}, \alpha_i, \nu_i) = B_{it} - C_{it}. \tag{5.1}$$

The utility maximisation framework implies that, at the time of decision, the individual i stays in Germany if and only if $S_{it} \geq 0$. The ex ante returns variable S_{it} defines the pecuniary transfer that makes an agent indifferent between staying or leaving Germany. Alternatively, it measures the minimum compensation to give to an agent i with beliefs and characteristics B_{it}, X_{it}, α_i and a resolved uncertainty ν_i to induce him or her to leave Germany.[28]

At the time of elicitation, that is prior to the actual decision, the individual's expected probability to stay in Germany is obtained as follows:

$$\begin{aligned}
\Pi_{it} &= \Pr\left(S_{it} \geq 0 | \mathcal{I}_i\right) \\
&= \Pr\left(B_{it} - C(X_{it}, \alpha_i, \nu_i) \geq 0 | B_{it}, X_{it}, \alpha_i\right) \\
&= \int \mathbb{1}\left\{B_{it} - C(X_{it}, \alpha_i, u) \geq 0\right\} dF_{\nu|B_{it},X_{it},\alpha_i}\left(u | B_{it}, X_{it}, \alpha_i\right).
\end{aligned} \tag{5.2}$$

---

[25]See for example Blass et al. (2010) and Wiswall and Zafar (2015) for a thorough discussion of resolvable uncertainty.

[26]Amenities enjoyed without the RtS include, for example, a limited access to the labor market, education, social assistance, and health services, as well as living with the family in case the family is also in Germany. Amenities enjoyed with the RtS include, for example, a full access to the aforementioned market and services.

[27]The usual assumption in the literature is that ν is additively separable from the cost, hence C_{it} is strictly monotone in ν. The framework does not impose separability.

[28]In other contexts, this quantity would define the willingness-to-pay for securing an overstay (See, for example, Maestas et al., 2018; Koşar et al., 2021).

Equation (5.2) formalises the idea that when revealing their intention to overstay, the asylum seeker averages over the resolvable uncertainty ν given their beliefs about its distribution $F_{\nu|\mathcal{I}_i}$. A useful way of representing Equation (5.2) is through the following reduced-form representation:

$$\Pi_{it} = m(B_{it}, X_{it}, \alpha_i). \tag{5.3}$$

Finally, the empirical model allows for the possibility of (classical) measurement error, so that the elicited/stated intention, may differ from the true intention, for example because of rounding:

$$P_{it} = m(B_{it}, X_{it}, \alpha_i + \epsilon_{it}). \tag{5.4}$$

5.2 Objects of interest

The main parameter of interest is the individual-specific distribution of ex ante returns. Indeed, at the time of elicitation, ν is unobserved by the agent (and so is S). Because each agent entertains probabilistic beliefs about ν, each agent perceives a different distribution of ex ante returns. The measure for different option values derives from this distribution.

5.2.1 Ex ante returns

To describe the individual-specific distribution of returns, one has several options: the mean, the median, the spread or more generally the quantiles. In the following, we choose to discuss the distribution of mean and quantiles. As explained in Meango (2023), identifying the distributions of τ-quantile of ex ante returns, say $F_Q(s;\tau)$ for $\tau \in (0,1)$, allows a more complete description of returns, and more accurate prediction of realised returns than relying just on the distribution of the mean ex-ante returns as is often the case in the literature.

Define the individual-specific mean and quantile function of ex ante returns:

$$
\begin{aligned}
\mu_S(B, X, \alpha) &:= \mathbb{E}\left(S(B, X, \alpha, \nu)|B, X, \alpha\right) \\
Q_S(\tau; B, X, \alpha) &:= Q_{S(B,X,\alpha,\nu)|B,X,\alpha}(\tau|B, X, \alpha) \\
&= \inf\{s : \Pr\left(S(B, X, \alpha, \nu) \leq s|B, X, \alpha\right) \geq \tau\},
\end{aligned}
$$

where $Q_{Y|X}(\tau|X)$ denotes the conditional quantile function of Y evaluated at some $\tau \in [0,1]$, the probability between the curly brackets is over $F_{\nu|B,X,\alpha}$, the conditional distribution of the resolvable uncertainty. Our interest lies in the population distribution of $\mu_S(B, X, \alpha)$ and $Q_S(\tau; B, X, \alpha)$, which takes the form $F_\mu(s) := \Pr\left(\mu_S(B, X, \alpha) \leq s\right)$, and $F_Q(s; \tau) := \Pr\left(Q_S(\tau; B, X, \alpha) \leq s\right)$, where the probability distribution is over $F_{B,X,\alpha}$, the joint distribution of beliefs (B, X, α). $F_Q(s; \tau)$ characterises the proportion of the population, which expects the τ-quantile of returns not to exceed an amount s. For

example, if $s = 0$, and $\tau = 0.50$, it characterises the proportion of the population who expects that their median returns are negative.

5.2.2 Option values

To better understand asylum seekers' willingness to overstay, we also seek to characterise the option values attached to their returns. These option values arise from the sequential resolution of uncertainty and measure the value added by a specific option to the ex ante returns. This section characterises the value added by two types of options: the value-added of further investment possibilities, and the option value of waiting.

Take, for example, the ex ante option value generated by the option of obtaining the RtS in the future, say X^{reg}. It can be defined as:

$$OV_1(q; B, X, \alpha) := \mu_S(B, X, \alpha)|_{X^{\mathrm{reg}}=q} - \mu_S(B, X, \alpha)|_{X^{\mathrm{reg}}=0}, \qquad (5.5)$$

where $q \in (0, 1]$ and $\mu_S(B, X, \alpha)|_{X^{\mathrm{reg}}=q}$ denotes the mean function evaluated at $X^{\mathrm{reg}} = q$. This parameter measures the increase in *ex ante* surplus created by the chance of becoming regularised with probability q. It arises because overstaying preserves the chance of becoming regularised in the future, if one wishes. This class of options is studied, for example, by Comay et al. (1973), Trachter (2015), Lee et al. (2015), and Bhuller et al. (2022) in the context of post-secondary education, where the chance of further education increases the value of lower-level degrees, or by Katz and Rapoport (2005) in the context of the brain drain. Section 6 also studies the option value generated by the chance of being deported, using Equation (5.5) with the chance of deportation replacing the chance of regularisation.[29] Moreover, it studies the option of exiting after experimenting a period of (three years of) overstay, using Equation (5.5) with the chance of exiting replacing the chance of regularisation. This measures the added value of the possibility of experimenting and exiting soon after, when one wishes, rather than committing on overstay for a longer period.

The second type of option value relates also to the concept of experimenting/waiting. It arises from the fact that the individual can delay the decision to leave until the uncertainty characterised by ν is resolved. The idea of an option value of waiting, suggested by Dixit (1992), has been developed by Burda (1995) in the context of migration decisions. It is otherwise related to the value of experimentation in the context of post-secondary education empirically studied, for example, by Heckman and Navarro (2007), Stange (2012) and Gong et al. (2019). In our context where asylum seekers with a rejected application must decide whether to overstay, delaying departure provides the opportunity

---

[29]Deportation is not strictly speaking an 'option', in the sense that, when it comes, the individual cannot decide on it. The treatment here stretches the concept of an option value, to consider deportation as an 'option' because of the uncertainty in this outcome.

to learn about their uncertain returns. In our model, the option value of experimentation can be defined as:

$$OV_2(B, X, \alpha) = \mathbb{E}\left(\max\{S(B, X, \alpha, \nu), 0\}|B, X, \alpha\right) - \max\{\mu_S\left(B, X, \alpha\right), 0\}. \qquad (5.6)$$

The first term on the right-hand side measures the expected average returns when the individual has the possibility to learn about the value of ν and take a decision given the collected information. The second term is the expected return when ν remains unknown and the individual has to make a choice based on the expected value. The difference measures the option value. Intuitively, the increase in the expected average returns results from the possibility to learn about the value of ν and take a decision given the collected information, rather than deciding based on its expected value.[30]. Section 6 also studies the option of exiting after experimenting a period of (three years of) overstay.

Note that each of these objects is defined at the individual level. The purpose of the empirical analysis is to learn about the distribution of these objects in the population.

5.3   Identification and estimation

The companion paper, Meango (2023), provides a characterisation for the individual distribution of ex ante returns and the option value as defined in Equation (5.5), as a function of (i) the reduced form (5.3) and (ii) the joint distribution of observable and unobservable characteristic (B, X, α). It also discusses novel, mild conditions for nonparametric identification of (i) and (ii) from an elicitation design like the one used in this study. Proposition 1 in Appendix E complements these results with a characterisation for the option value of waiting, as defined in Equation (5.6).

The characterisation results rest on the assumption that the resolvable uncertainty is independent of the observed beliefs, conditional on α, that is $\nu \perp\!\!\!\perp B, X|\alpha$. This assumption relaxes traditional assumptions about the resolvable uncertainty in two ways. First, it does not assume a particular distribution for the purpose of identification. Second, under this assumption, the distribution of resolvable uncertainty remains individual-specific (up to α).

The identification result is constructive and makes uses of the pseudo-panel structure, by which the researcher observes elicited beliefs and intentions both in the actual scenario and in hypothetical scenarios. The usual approaches in the literature consist in using hypothetical scenarios to directly estimate the reduced form (i), while 'breaking' the association between observed and unobserved beliefs (see, for example, Blass et al., 2010; Wiswall and Zafar, 2018). This usually requires a large number of hypothetical scenarios. The approach in Meango (2023) consists instead in using the hypothetical scenarios to

---

[30]Compare with Gong et al. (2020), Equation (1), p. 944.

learn about the joint distribution of observed and unobserved beliefs (ii), and then, use the actual scenario to estimate the reduced form (i). This requires only as much hypothetical scenarios as the dimension of the unobserved heterogeneity that the researcher wishes to fit. In the case of the model (5.4), because α is univariate, only one hypothetical scenario is required.

The companion paper also presents a semiparametric estimation procedure using a distribution regression approach and bounds to control for measurement error. Inference can be conducted using a weighted bootstrap procedure. We refer the interested reader to the companion paper for an in-depth discussion on identification, estimation and inference assumptions and results. Estimation choices are detailed in Appendix F.

6   Empirical Analysis

This section presents the estimation results for the distributions of *ex ante* benefits, returns and option values in the population of Afghan asylum seekers.

6.1   Pecuniary benefits

The expected pecuniary benefits B_{it} can be directly calculated from elicited observations given Equation (D.14) in Appendix D. The yearly discount factor is set to 0.95 and the number of sub-periods T to 36 months. Pecuniary benefits, costs, and surpluses are all expressed in monthly amount equivalents over a six-year period. The lifetime-equivalent of these estimates depend on the time horizon considered. However, Appendix D shows that the relative importance of each component does not.

Figure 4 presents the cumulative distribution at different values of the chance of becoming regularised, $q = 0.10, 0.50, 0.90$, and at the elicited value. At the elicited value (solid black line), the bulk of expected pecuniary benefits is between 0 and 500 EUR, with the first quartile being 0 and the third quartile 412 EUR. The CDF has a negative tail on the left; about 17 percent of the observations show a negative expected pecuniary benefit from overstaying, while 95 percent of the population expect benefits below 1,000 EUR monthly. Variations in the chance of becoming regularised moves the CDF to the right. The increase is, on average, 48 EUR from $q = 0.10$ to $q = 0.50$, and a further 48 EUR from $q = 0.50$ to $q = 0.90$.

6.2   Ex ante returns

Perceived ex ante returns depend on the individual-specific perception of resolvable uncertainty. As discussed in Section 5, the individual-specific returns can be described by either their quantiles or mean. Figure 5, panel (a), represents the distribution of returns,

$F_Q(s; \tau)$, at the first, the second and third quartiles, while Figure 5, panel (b), compares the distribution of median and mean returns, $F_\mu(s)$.

s is measured in monthly equivalent and varies on the x-axis between -500 and 1,500 EUR. The solid middle line represents the estimated distribution based on the point-identified procedure, whereas the lower and upper dotted lines represent the bound procedure (with $c = 0.05$ in Equation (C.9) in Meango (2023)).

Figure 5, panel (a), reveals important variations of perceived returns with the resolvable uncertainty. At the first quartile, between 27 and 38 percent of the population perceives negative ex ante returns, and the median individual perceives returns between 150 and 300 EUR. At the median, the proportion of population that perceives negative returns is 8 to 16 percent, and the median individual perceives returns between 500 and 600 EUR per month. At the third quartile, virtually everyone perceives positive returns on overstaying, with a median individual largely above 1,000 EUR per month. Figure 5, panel (b), reveals few discrepancies between mean and median returns. The distribution of median has a slightly thicker tail, mirroring the influence of large positive returns at larger quantiles on the mean.

The picture is then one of essentially positive perceived returns in the population, which is congruent with the high willingness to overstay. However, uncertainty about these returns seems also important: as one moves across quantiles, the distribution of returns shifts on a wide range.

It is possible to decompose returns between their pecuniary and non-pecuniary components. The results (available upon request) suggest that pecuniary components explain less than a quarter of these returns for half of the population, and less than 50 percent for three quarters of the population. Thus, for the majority of the population, returns on overstaying are driven by the non-pecuniary utility.

6.3 Option values

We turn to the values that are generated by the presence of an option. Here, we look at (1) the additional value generated by the option of becoming regularised, (2) the dis-utility generated by the chance of being deported, and (3) the value of being able to wait, experiment overstay, and exit afterwards.

In (1), we compare the returns when the chance of becoming regularised is set to 0 to the returns with individual's current beliefs. In (2), we compare the returns when the chance of being deported is set to 0 to the returns with individual's current beliefs. The option value of experimentation/waiting in (3) is measured in two ways. First, in our model, the agent has the possibility to re-optimise the decision after three years of overstay. We compare the returns when the chance of exit is set to 0 to the returns with individual's current beliefs. This removes the possibility of experimentation. Second, the

agent has the option to stay until the resolvable uncertainty ν is revealed. The value of this option is given the parameter OV_2, in Equation (5.6). The first three measures are related to the parameter OV_1 in Equation (5.5).

A crude way of assessing the importance of the different option values, is to look at the change induced on the distribution. Figure 6 represents the change in the median distribution of returns, for various values of the chance of becoming regularised (panel (a)), the chance of being deported (panel (b)), and the chance of exit after three years of overstay (panel (c)).

The figures make it evident that the chance of becoming regularised contributes most to the perceived returns, by shifting the distribution of returns to the right as it increases. When the chance of becoming regularised rises above 50 percent, virtually all individual perceive positive returns on overstaying. The other options have no comparable effect.

Figure 7, panel (a), represents the distribution of the option value generated by chance of becoming regularised, as in Equation (5.5). Although, the bounds are wide, one can discern that this option value plays a role for at least 40 percent or as much as 90 percent of the population. The value exceeds 100 EUR per month for 20 to 65 percent of the population, and 200 EUR for 10 to 35 percent of the population. Considering the point estimates, this option value represents at least 10 percent of ex ante returns for half the population.

Figure 7, panel (b) represents the distribution of the option value of waiting, as in Equation (5.6). The bounds are wide, but suggests that the ability to wait rather than committing to a decision adds value for at least 25 percent of the population. The contribution to ex ante returns is more modest than in the previous case: taking the point estimate, the option value represents at least 10 percent of ex ante returns for only one fifth of the population.

7 Policy Implications

The descriptive and empirical analyses offer three main insights. First, non-pecuniary considerations, such as perceived amenities in Germany, dwarf pecuniary concerns. Second, the perceived chance of becoming regularised is a key determinant of the decision to overstay. Third, perceived returns on overstaying are essentially positive, although there is considerable heterogeneity, which stems partly from heterogeneous beliefs, and partly from uncertainty.

These insights help to derive some implications for European migration policies. The presents section discusses two issues: (1) the cost-effectiveness argument of assisted voluntary returns policies (VRPs),[31] and (2) the willingness-to-pay of asylum seekers for

---

[31]Part of the present analysis is presented as an illustration in the companion paper.

an investment (e.g., vocational education, language acquisition, etc.) that guarantees regularisation.

7.1 Assisted voluntary return policies

A VRP is 'effective' if the level of (cash) transfers matches the ex ante perceived returns on overstaying of the marginal individual whose departure a government wishes to incentivise, making him or her indifferent to leaving or overstaying. The higher the perceived returns for this marginal individual, the more generous, i.e. costly, an effective policy will need to be. As discussed in the introduction, the cost of a VRP also depends on the ex ante perceived returns for the inframarginal population. Indeed, VRPs are usually non-discriminating and the transfer received by inframarginal leavers may exceed their returns. In the extreme case where these returns are negative, VRPs may transfer funds to individuals who would have required no transfer to eventually leave the country.

The estimated distributions of perceived returns sheds new light on the potential cost of VRPs, if we interpret these returns as a lower bound of the necessary transfer to induce return to the home country. As discussed in the companion paper, neither the distribution of mean or median return is appropriate for the counterfactual exercise. Indeed, from the perspective of the policy maker, the resolution of uncertainty will generate a mixture of shocks ν in the population. For some individuals, the realised uncertainty ν will correspond to lower quantiles τ, whereas for others, it will correspond to higher quantiles τ. Thus, if preferences and observed beliefs are stable, the realised distribution of returns will be a mixture of the ex ante distribution of quantiles $F_Q(s; \tau)$. Assuming that the policy maker considers that all asylum seekers have equally valid prior on the distribution of ν, the best predictor for the realised distribution of returns is a mixture of the distributions of quantiles with equal weights; that is:

$$\overline{F}_S(s) := \int_0^1 F_Q(s; \tau) \omega_\tau d\tau \,, \tag{7.1}$$

where $\omega_\tau = 1$ for all τ.

Figure 8 compares the distribution $\overline{F}_S(s)$ to the distributions of the median and the mean returns. Equipped with this distribution, one can understand the effect of a cash transfer to asylum seekers. Such a transfer is easy to analyse since it shifts the distribution of returns to the left by a mere translation.

To induce the departure of one quarter of asylum seekers, a VRP should transfer at least 200 EUR per month, that is 13,400 EUR in Net Present Value (NPV). This number rises to 46,540 EUR in NPV for moving up to half of the population. The current "Voluntary Return Programmes" offers a one-off payment of up to 2,000 EUR

to returners.[32] A one-off cash transfer of the level implemented in Germany from 2017 (2,000 EUR ≈ 32.2 EUR/month for 72 months in NPV) would increase the departure rate by 1 percentage point (pp) from a baseline level of 16.9 percent. However because of the inframarginal individuals who would have needed no incentives to leave and may cash in the transfer, each additional leaver may cost up to 17 times the cash transfer they actually receive. This cost represents about 10.4 times the estimated average cost of a forced return, as estimated by the European Parliamentary Research Service.[33]

A one-off cash transfer of the level implemented in Denmark for Syrian asylum seekers (23,000 EUR) would increase the departure rate by 15 percentage point (pp) from a baseline level of 16.9 percent. The additional cost from inframarginal individuals implies that each leaver may cost up to 1.6 times the cash transfer they actually receive. The total cost represents about 17.5 times the estimated average cost of a forced return.

Notwithstanding the specificity of Afghan asylum seekers and the limitations of the present analysis, these results put into perspective the argument of cost-effectiveness of VRPs. Unless they are large, transfers have little effect on overstay decisions, and may be more expensive than they appear at first sight.

7.2 Willingness-to-pay for regularisation investments

The empirical analysis revealed the role of the chance of becoming regularised in individuals' perceived returns. In the German context, good language skills, taking a professional education and strong attachment to the labour market are known to increase the chance of regularisation, although there was, up to the time of the survey, few systematic pathways.[34] Our framework allows measuring the willingness-to-pay in the population for an investment that would guarantee regularisation (e.g. vocational education, language acquisition, etc.)..

Figure 9 shows the distribution of WTP in two situations. The first case is for a guarantee of regularisation in case of investment, leaving the chance of regularisation untouched in case of no investment. The second case guarantees regularisation in case of investment ($q = 1$), and otherwise makes regularisation impossible ($q = 0$). In the first case, between 30 and 65 percent of the population would be ready to invest at least 100 EUR per month (6,200 EUR in NPV) for a measure that would guarantee their right to

---

[32]The traditional mechanism *REAP/GARP* covers travel costs and offers financial travel assistance (200 EUR), as well as one-time financial start-up assistance of up to 1,000 EUR (REAG/GARP). The more recent *StartHilfePlus* tops up this amount by 800 EUR for asylum seekers with a rejected application. See sources in Appendix G. As of 17 August 2021, due to the deteriorating security situation in Afghanistan, assisted voluntary return to Afghanistan has been suspended until further notice.

[33]The European Parliamentary Research Service has estimated that forced return costs 3,414 EUR per individual and voluntary returns 560 EUR per individual. Source: 'The EU strategy on voluntary return and reintegration', URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3 A52021DC0120&qid=1632401748181 Accessed on January 22, 2022.

[34]See for example: Deutschlandfunk - Spurwechsel zwischen Asyl und Einwanderung „Stichtagsregelung wird kommen" https://www.deutschlandfunk.de/spurwechsel-zwischen-asyl-und-einwanderun g-100.html, accessed on January 22, 2022.

stay. The effect is stronger in the second case, with between 31 and 55 percent of the population that would be ready to invest at least 200 EUR per month (13,400 EUR in NPV).

Overall, the results of our analysis suggest that deterrence policies such as voluntary return policies and deportation can be costly but not necessarily effective at deterring overstay. If these are doomed to fail, and rejected asylum seekers are unlikely to leave, one should maybe change paradigm. Encouraging investments in much needed human capital through the prospect of regularisation might be a welfare-improving alternative both for the host country and the asylum seekers.

8   Conclusion

The paper is structured around three main contributions. First, it provides unprecedented insights in asylum seekers' beliefs about their outcomes and the associated intention to overstay. We find that Afghan asylum seekers, on average, have plausible but noisy beliefs about the chance of obtaining a protection status and the expected income in Germany. However, they exhibit upwardly biased beliefs about the risk of deportation. On average, these beliefs are 20 pp higher than the actual numbers and not easily malleable. Intentions to overstay are, on average, relatively high in the population, with respondents stating a 64 percent chance to overstay, were they to be denied the RtS. The empirical analysis suggests a strong association between intention and subjective beliefs about outcomes. In particular, beliefs about the chance of becoming regularised significantly influence the intention to overstay.

The second contribution is to calculate asylum seekers' ex ante returns on overstaying to shed some light on the decision to overstay. Returns are positive for the majority of the population, potentially large, but very heterogeneous across individuals. Asylum seekers also perceive much uncertainty about these returns. Thus, the sequential resolution of uncertainty yields some values from waiting, or using overstay as a stepping stone for regularisation.

Finally, the counterfactual analysis shows that assisted voluntary return policies will be either costly or ineffective. By contrast, there exists a high willingness in the population to invest into programs that could guarantee regularisation. Thus, we argue that, instead on focusing on deterrence policies, providing a guarantee for regularisation against some investment in human capital might be a welfare-improving alternative both for the host countries and the asylum seekers.

In our view, given the importance of asylum seekers' beliefs about their outcomes, it remains to understand how they form their expectations about the different risks they face while overstaying, the role of their peers in the belief formation, and whether those beliefs are malleable.

References

Amemiya, T. (1985). *Advanced econometrics*. Harvard university press.

Amuedo-Dorantes, C., Puttitanun, T., and Martinez-Donate, A. P. (2013). How do tougher immigration measures affect unauthorized immigrants? *Demography*, 50(3):1067–1091.

Attanasio, O. P. and Kaufmann, K. M. (2014). Education choices and returns to schooling: Mothers' and youths' subjective expectations and their role by gender. *Journal of Development Economics*, 109:203–216.

Bah, T. L. and Batista, C. (2018). Understanding willingness to migrate illegally: Evidence from a lab in the field experiment. Working Paper No. 1803. Universidade Nova de Lisboa, Faculdade de Economia, NOVAFRICA.

Baláž, V., Williams, A. M., and Fifeková, E. (2016). Migration decision making as complex choice: Eliciting decision weights under conditions of imperfect and complex information through experimental methods. *Population, Space and Place*, 22(1):36–53.

Bhuller, M., Eisenhauer, P., and Mendel, M. (2022). Sequential choices, option values, and the returns to education. *arXiv preprint arXiv:2205.05444*.

Blass, A. A., Lach, S., and Manski, C. F. (2010). Using elicited choice probabilities to estimate random utility models: Preferences for electricity reliability. *International Economic Review*, 51(2):421–440.

Borjas, G. J. (1987). Self-selection and the earnings of immigrants. *The American Economic Review*, 77:531–553.

Boyer, M. M., De Donder, P., Fluet, C., Leroux, M.-L., and Michaud, P.-C. (2020). Long-term care insurance: Information frictions and selection. *American Economic Journal: Economic Policy*, 12(3):134–69.

Brücker, H., Kosyakova, Y., and Schuß, E. (2020). Fünf jahre seit der fluchtmigration 2015: Integration in arbeitsmarkt und bildungssystem macht weitere fortschritte. Technical report, IAB-Kurzbericht 04/2020.

Brücker, H., Rother, N., and Schupp, J. (2018). *IAB-BAMF-SOEP-Befragung von Geflüchteten 2016: Studiendesign, Feldergebnisse sowie Analysen zu schulischer wie beruflicher Qualifikation, Sprachkenntnissen sowie kognitiven Potenzialen*, volume 30. DEU.

Burda, M. C. (1995). *Migration and the option value of waiting*. IIES.

Chernozhukov, V. and Hansen, C. (2005). An iv model of quantile treatment effects. *Econometrica*, 73(1):245–261.

Comay, Y., Melnik, A., and Pollatschek, M. A. (1973). The option value of education and the optimal path for investment in human capital. *International Economic Review*, pages 421–435.

de Bresser, J. and van Soest, A. (2019). The predictive power of subjective probabilities: probabilistic and deterministic polling in the dutch 2017 election. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 182(2):443–466.

Delavande, A. (2008). Pill, patch, or shot? subjective expectations and birth control choice. *International Economic Review*, 49(3):999–1042.

Delavande, A. and Kohler, H.-P. (2016). Hiv/aids-related expectations and risky sexual behaviour in malawi. *The Review of Economic Studies*, 83(1):118–164.

Delavande, A. and Manski, C. F. (2015). Using elicited choice probabilities in hypothetical elections to study decisions to vote. *Electoral Studies*, 38:28–37.

Dixit, A. (1992). Investment and hysteresis. *Journal of economic perspectives*, 6(1):107–132.

Eisenhauer, P., Heckman, J. J., and Vytlacil, E. (2015). The generalized roy model and the cost-benefit analysis of social programs. *Journal of Political Economy*, 123(2):413–443.

Gathmann, C. (2008). Effects of enforcement on illegal markets: Evidence from migrant smuggling along the southwestern border. *Journal of Public Economics*, 92(10-11):1926–1941.

Gong, Y., Lochner, L., Stinebrickner, R., and Stinebrickner, T. R. (2019). The consumption value of college. Technical report. National Bureau of Economic Research, Working Paper No. 26335.

Gong, Y., Stinebrickner, T., and Stinebrickner, R. (2020). Perceived and actual option values of college enrollment. *Journal of Applied Econometrics*, 35(7):940–959.

Gong, Y., Stinebrickner, T., Stinebrickner, R., Yao, Y., et al. (2022). The role of non-pecuniary considerations: Locations decisions of college graduates from low income backgrounds. Technical report, University of Western Ontario, Centre for Human Capital and Productivity (CHCP).

Grogger, J. and Hanson, G. H. (2011). Income maximization and the selection and sorting of international migrants. *Journal of Development Economics*, 95(1):42–57.

Heckathorn, D. D. (1997). Respondent-driven sampling: a new approach to the study of hidden populations. *Social problems*, 44(2):174–199.

Heckman, J. J. (2001). Micro data, heterogeneity, and the evaluation of public policy: Nobel lecture. *Journal of Political Economy*, 109(4):673–748.

Heckman, J. J. and Navarro, S. (2007). Dynamic discrete choice and dynamic treatment effects. *Journal of Econometrics*, 136(2):341–396.

Heckman, J. J. and Vytlacil, E. (2005). Structural equations, treatment effects, and econometric policy evaluation 1. *Econometrica*, 73(3):669–738.

Hoxhaj, R. (2015). Wage expectations of illegal immigrants: The role of networks and previous migration experience. *International Economics*, 142:136–151.

Hurd, M. D. (2009). Subjective probabilities in household surveys. *Annu. Rev. Econ.*, 1(1):543–562.

Jensen, R. (2010). The (perceived) returns to education and the demand for schooling. *The Quarterly Journal of Economics*, 125(2):515–548.

Jovanovic, B. and Nyarko, Y. (1997). Stepping-stone mobility. In *Carnegie-Rochester Conference Series on Public Policy*, volume 46, pages 289–325. Elsevier.

Katz, E. and Rapoport, H. (2005). On human capital formation with exit options. *Journal of Population Economics*, 18(2):267–274.

Koşar, G., Ransom, T., and Van der Klaauw, W. (2021). Understanding migration aversion using elicited counterfactual choice probabilities. *Journal of Econometrics*.

Lagakos, D., Mobarak, A. M., and Waugh, M. E. (2018). The welfare effects of encouraging rural-urban migration. Technical report, National Bureau of Economic Research.

Lee, S. Y. T., Shin, Y., and Lee, D. (2015). The option value of human capital: Higher education and wage inequality. Technical report, National Bureau of Economic Research.

Maestas, N., Mullen, K. J., Powell, D., Von Wachter, T., and Wenger, J. B. (2018). The value of working conditions in the united states and implications for the structure of wages. Technical report, National Bureau of Economic Research.

Manski, C. F. (2004). Measuring expectations. *Econometrica*, 72(5):1329–1376.

Mbaye, L. M. (2014). "barcelona or die": Understanding illegal migration from senegal. *IZA Journal of Migration*, 3(1):21.

McKenzie, D., Gibson, J., and Stillman, S. (2013). A land of milk and honey with streets paved with gold: Do emigrants have over-optimistic expectations about incomes abroad? *Journal of Development Economics*, 102:116–127.

Meango, R. (2023). Identification of ex ante returns using elicited choice probabilities. *arXiv preprint arXiv:2303.03009.*

Miller, G., De Paula, Á., and Valente, C. (2020). Subjective expectations and demand for contraception. Technical report, National Bureau of Economic Research. NBER Working Paper 27271.

Morita, T. and Managi, S. (2015). Consumers' willingness to pay for electricity after the great east japan earthquake. *Economic Analysis and Policy*, 48:82–105.

Orrenius, P. M. and Zavodny, M. (2003). Do amnesty programs reduce undocumented immigration? evidence from irca. *Demography*, 40(3):437–450.

Schneider, G., Segadlo, N., and Leue, M. (2020). Forty-eight shades of germany: Positive and negative discrimination in federal asylum decision making. *German Politics*, pages 1–18.

Shoyama, K., Managi, S., and Yamagata, Y. (2013). Public preferences for biodiversity conservation and climate-change mitigation: A choice experiment using ecosystem services indicators. *Land Use Policy*, 34:282–293.

Sjaastad, L. A. (1962). The costs and returns of human migration. *Journal of Political Economy*, 70(5, Part 2):80–93.

Stange, K. M. (2012). An empirical investigation of the option value of college enrollment. *American Economic Journal: Applied Economics*, 4(1):49–84.

Trachter, N. (2015). Stepping stone and option value in a model of postsecondary education. *Quantitative Economics*, 6(1):223–256.

Van der Klaauw, W. (2012). On the use of expectations data in estimating structural dynamic choice models. *Journal of Labor Economics*, 30(3):521–554.

Wiswall, M. and Zafar, B. (2015). Determinants of college major choice: Identification using an information experiment. *The Review of Economic Studies*, 82(2):791–824.

Wiswall, M. and Zafar, B. (2018). Preference for the workplace, investment in human capital, and gender. *The Quarterly Journal of Economics*, 133(1):457–507.

Zafar, B. (2011). How do college students form expectations? *Journal of Labor Economics*, 29(2):301–348.

Tables

	Berlin	Hamburg	Munich	Total
Pop. (est.)	6,485	7,337	3,006	16,828
Sample	534	226	264	1,024

Note: Target population estimates calculated from excerpt
of the "Ausländerzentralregister" accessed on 31.07.2018

Table 1: Number of Afghan citizens with initial entry from 2014 onward from 18 years of age - Sample size

	Berlin	Hamburg	Munich	Total sample
Obtain RtS population (Q1)	46.61	53.92	35.16	45.24
	(21.21)	(19.08)	(22.54)	(22.12)
Deport. past population (Q2)	21.52	21.42	20.34	21.27
	(18.77)	(17.06)	(16.33)	(18.01)
Obtain RtS (Q3)	73.20	70.07	56.22	68.05
	(26.39)	(23.83)	(27.36)	(27.03)
Obt. RtS after 3 yrs w/o RtS (Q4)	66.13	67.81	51.35	62.62
	(27.97)	(25.95)	(26.90)	(28.04)
Be deported if no RtS (Q5)	32.53	37.12	48.58	37.74
	(32.73)	(26.75)	(24.88)	(30.27)

Notes: Mean values calculated on non-missing observations. Berlin N=534, Hamburg N=226, Munich N=264, Total N= 1,024. Standard deviation in parentheses.

Table 2: Subjective beliefs by city

	RtS (pop)	RtS now	Deport. (pop.)	Deport.
Female	9.36***	3.84**	5.38***	-2.73
	(1.39)	(1.79)	(1.36)	(2.04)
Years of education	-0.19	0.09	-0.15	-0.15
	(0.12)	(0.16)	(0.12)	(0.18)
Secure Status	6.22***	8.19***	-2.27	-0.80
	(1.42)	(1.83)	(1.42)	(2.09)
Age	0.11**	0.15**	-0.11**	-0.29***
	(0.05)	(0.07)	(0.05)	(0.08)
Hamburg	14.85***	10.72***	-0.03	-10.19***
	(1.89)	(2.41)	(2.13)	(2.76)
Berlin	9.92***	15.79***	0.45	-15.79***
	(1.54)	(1.99)	(1.61)	(2.27)
Observations	1005	987	801	992
R^2	0.186	0.109	0.030	0.067

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The sub-sample for the regression "Deport. (pop)" exclude the observation for one interviewer who did not understand/follow the instructions.

Table 3: Regression analyses of subjective beliefs

	Berlin	Hamburg	Munich	Total sample
Income with RtS	1666.91	1731.19	1611.67	1666.12
	(745.5)	(567.0)	(517.8)	(653.4)
Income w/o RtS	1148.26	1385.99	1108.44	1193.44
	(647.5)	(487.5)	(535.5)	(590.6)
Decr. Acc. Educ.	0.50	0.71	0.58	0.56
	(0.500)	(0.456)	(0.494)	(0.496)
Decr. Acc. lab. mrkt.	0.53	0.68	0.72	0.60
	(0.500)	(0.469)	(0.451)	(0.490)
Decr. Acc. Soc. Ass.	0.82	0.84	0.83	0.82
	(0.385)	(0.365)	(0.374)	(0.388)
Decr. Acc. health	0.44	0.72	0.57	0.53
	(0.497)	(0.452)	(0.496)	(0.499)

Notes: Mean values calculated on non-missing observations. Berlin N=534, Hamburg N=226, Munich N=264, Total N= 1,024. Standard deviation in parentheses. "income with / w/o RtS" average income expected in the three next years with the corresponding legal status. Distribution is trimmed at 95 percentile. "Decr. Acc." corresponds to a decrease of the perceived access from the current status to the situation w/o RtS in the corresponding domain.

Table 4: Subjective beliefs about further outcomes by city

	Treated	Non-treated	TE	p-value
Berlin (N=532)				
Deport. past (population)	20.80	22.51	-1.71	0.31
Deport. next 3 yrs (population)	19.24	27.25	-8.01	0.00
Be deported (if no RtS)	32.02	31.04	0.98	0.73
Stay w/o RtS	71.29	67.10	4.19	0.19
Hamburg (N=135)				
Deport. past (population)	20.62	22.21	-1.59	0.60
Deport. next 3 yrs (population)	27.65	23.35	4.30	0.34
Be deported (if no RtS)	30.97	28.78	2.19	0.65
Stay w/o RtS	66.36	61.73	4.63	0.39
Munich (N=162)				
Deport. past (population)	21.52	18.65	2.87	0.26
Deport. next 3 yrs (population)	19.33	29.88	-10.55	0.00
Be deported (if no RtS)	43.89	47.21	-3.32	0.42
Stay w/o RtS	53.34	52.60	0.75	0.88

Note: P-value calculated for a t-test on the non-missing values.

Table 5: Treatment effects by city

	Berlin	Hamburg	Munich	Total sample
Stay in Germany (Q7)	85.51	85.45	76.05	83.04
	(22.66)	(21.29)	(27.74)	(24.13)
Stay w/o RtS (Q8)	69.75	69.76	49.05	64.39
	(32.59)	(26.31)	(28.46)	(31.51)

Notes: Mean values calculated on non-missing observations. Berlin N=534, Hamburg N=226, Munich N=264, Total N= 1,024. Standard deviation in parentheses.

Table 6: Intention to stay in Germany by city

	OLS (1)	OLS (2)	LAD (1)	LAD (2)
Female=1	4.86**	4.59**	1.43*	1.51***
	(2.07)	(1.97)	(0.31)	(0.21)
Low-Skilled	-1.65	-1.08	0.82	0.86
	(1.98)	(1.93)	(0.15)	(0.11)
Age	0.18**	0.03	1.01*	1.01
	(0.08)	(0.07)	(0.01)	(0.00)
Secure Status	5.79***	5.08**	1.58***	1.46***
	(2.16)	(2.08)	(0.27)	(0.18)
Years in Germany	-1.78**	-1.09	0.81*	0.90*
	(0.81)	(0.83)	(0.09)	(0.05)
Hamburg	17.74***	10.08***	3.83***	1.12
	(2.57)	(2.43)	(0.67)	(0.14)
Berlin	19.45***	10.53***	4.67***	1.65*
	(2.30)	(2.51)	(1.59)	(0.46)
Obt. RtS after 3 yrs w/o RtS (Q4)		0.44***		1.04***
		(0.04)		(0.00)
Be deported if no RtS (Q5)		-0.08**		0.99***
		(0.04)		(0.00)
Income w/o RtS (in 100 EUR)		0.50***		1.06***
		(0.16)		(0.01)
Wage return Legal status (in 100 EUR)		0.25		1.03*
		(0.20)		(0.02)
Acc. Educ. (w/o RtS)=1		0.28		1.06
		(1.93)		(0.13)
Acc. lab. mrkt. (w/o RtS)=1		2.11		1.02
		(2.09)		(0.12)
Acc. Soc. Ass. (w/o RtS)=1		-1.08		0.93
		(2.04)		(0.10)
Acc. health (w/o RtS)=1		5.79***		1.39**
		(2.22)		(0.19)
Constant	46.91***	18.84***	0.98	0.08***
	(4.27)	(5.59)	(0.47)	(0.03)
Observations	983	829	983	829
R^2	0.110	0.314		

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Coefficients of LAD(1) and LAD(2) in exponentiated form.

Table 7: Regression analyses of intention to stay w/o RtS

	Berlin	Hamburg	Munich	Total sample
stay if q=1 (Q10)	70.04	55.92	37.22	58.57
	(35.05)	(32.79)	(32.34)	(36.44)
stay if q=50 (Q11)	85.55	74.39	66.32	78.04
	(22.96)	(22.43)	(26.03)	(25.05)
stay if q=99 (Q12)	95.80	89.81	91.05	93.23
	(13.55)	(16.20)	(18.09)	(15.66)

Notes: Mean values calculated on non-missing observations. Berlin N=534, Hamburg N=226, Munich N=264, Total N= 1,024. Standard deviation in parentheses.

Table 8: Intention to stay in Germany by city

|	Berlin	Hamburg	Munich	All
Linear FE				
Obt. RtS after 3 yrs w/o RtS	0.27***	0.33***	0.52***	0.35***
	(0.01)	(0.02)	(0.02)	(0.01)
LAD FE				
Obt. RtS after 3 yrs w/o RtS	1.02***	1.02***	1.05***	1.02***
	(0.00)	(0.00)	(0.00)	(0.00)
Observations	2023	898	1013	3934

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Coefficients of LAD FE in exponential form. LAD FE for Berlin presents the results of a quantile regression at the first quartile instead of the median.

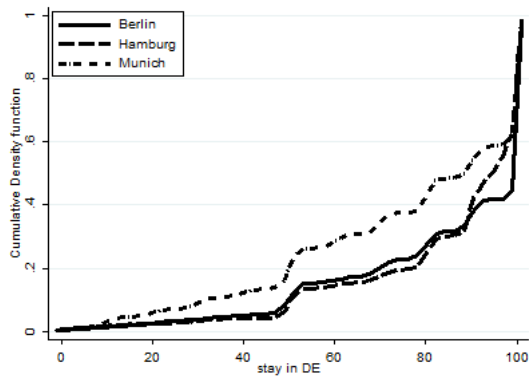Table 9: Regression of intention to stay without RtS
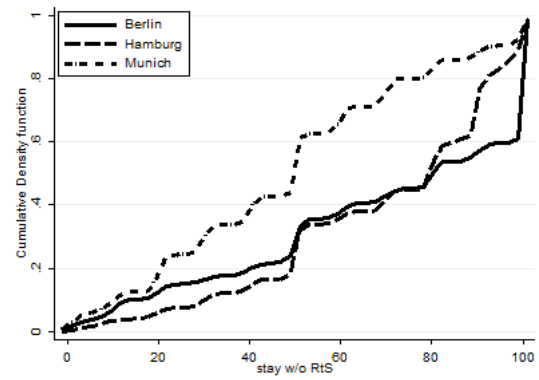
Figures
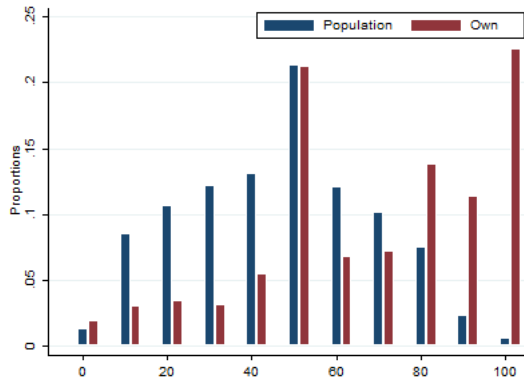
(a) Histogram
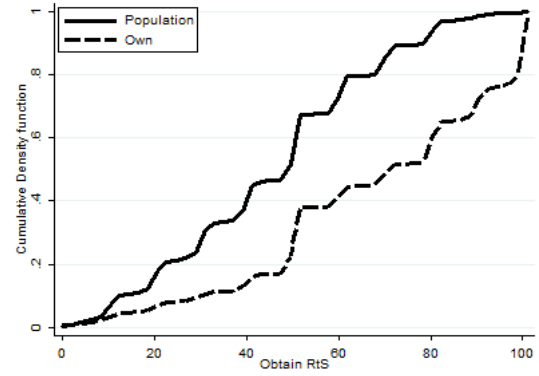
(b) Conditional distribution functions (CDFs)

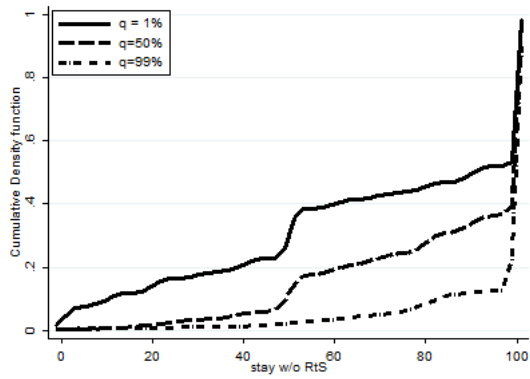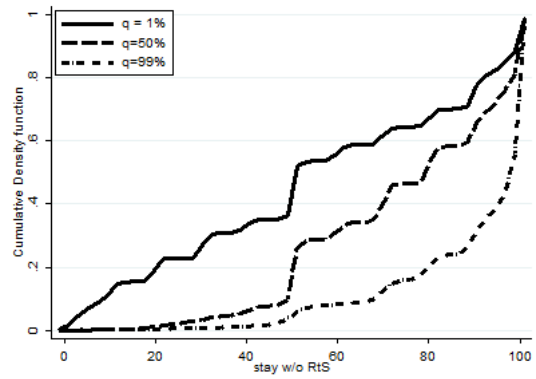Figure 1: Chance of obtaining the legal right to stay

(a) Stay ($Q7$)

(b) Stay w/o RtS ($Q8$)

Figure 2: Conditional density functions of intention to stay and intention to stay conditional on not receiving the RtS by city

(a) CDFs - Berlin

(b) CDFs - Hamburg
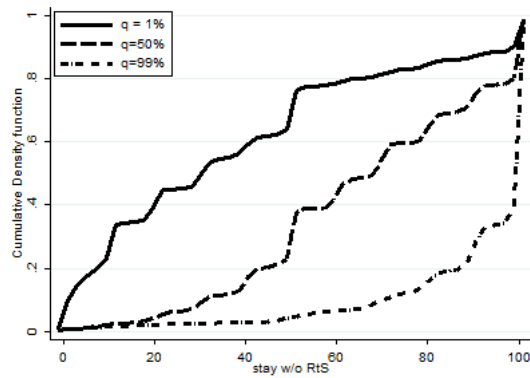
(c) CDFs - Munich

Figure 3: Intention to stay w/o RtS by city for $q = 1, 50, 99$
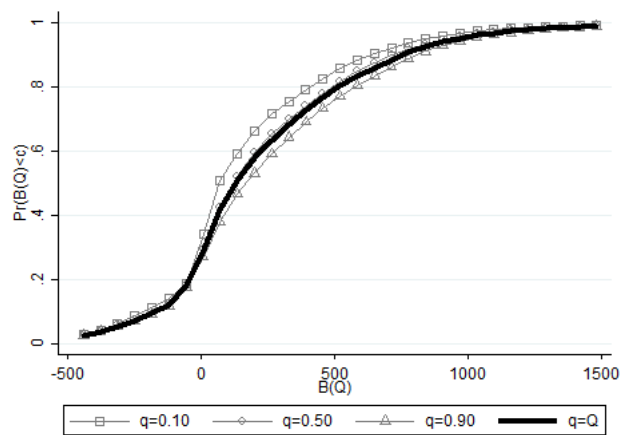
Figure 4: Distribution of B_{it}: pecuniary benefits

43

(a) Returns for $\tau = 0.25, 0.50, 0.75$

(b) Median and mean returns
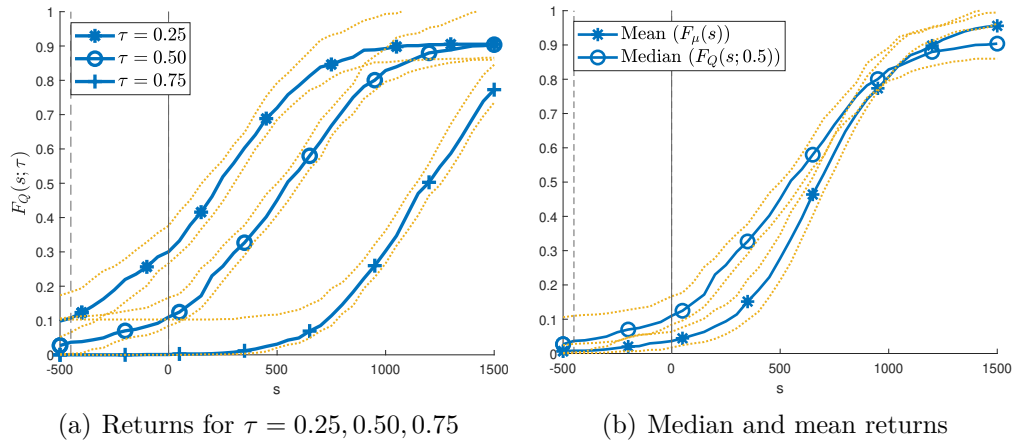
Figure 5: Estimated ex ante returns

(a) Becoming regularised

(b) Being deported

(c) Exit after three years
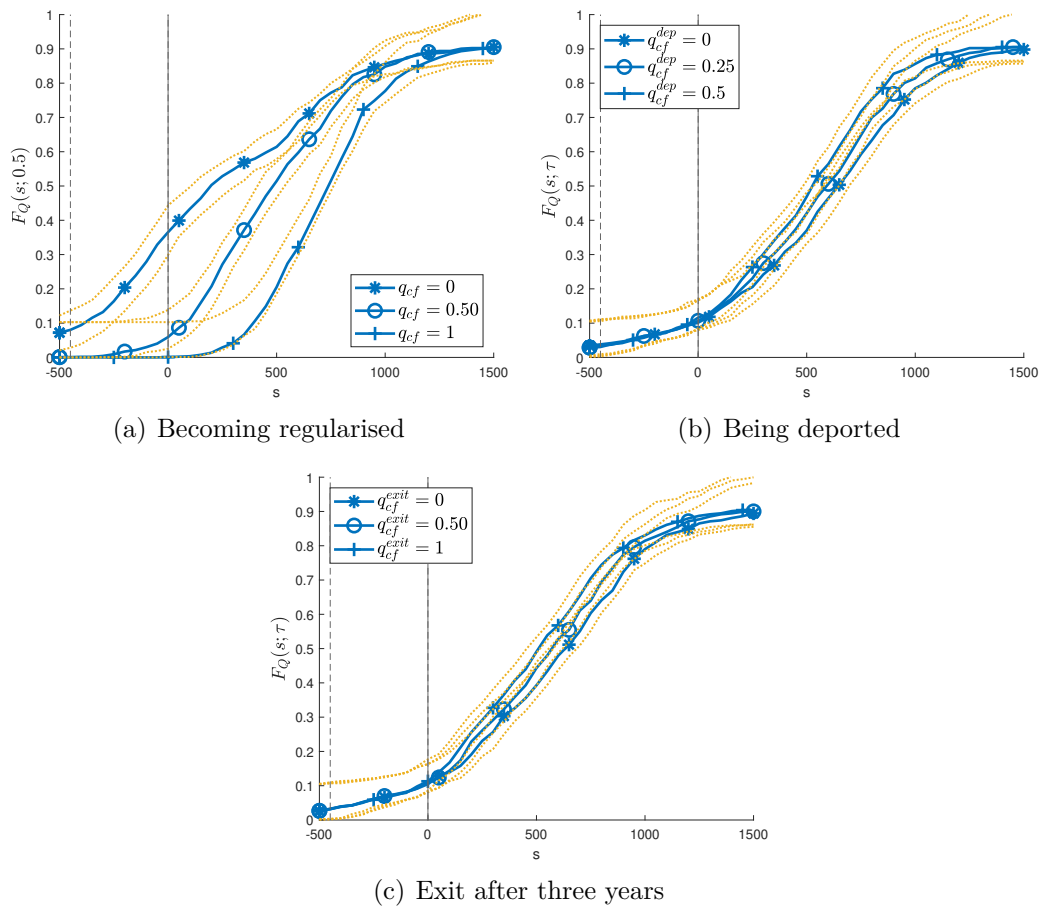
Figure 6: Change in ex ante returns for different values of X

(a) Becoming regularised   (b) Experimenting/waiting

Figure 7: Option values

Figure 8: $\overline{F}_S(s)$ compared to $F_Q(s; 0.5)$ and $F_\mu(s)$

45

Figure 9: WTP for a guarantee of stay

Appendix, For Online Publication

A Questions about Subjective Beliefs and Intention to Overstay

Population proportions

Q1. Not all people from Afghanistan who come to Germany obtain the right to stay in Germany. Out of 100 persons from Afghanistan who arrived in Germany, how many do you think obtain the right to stay in Germany?
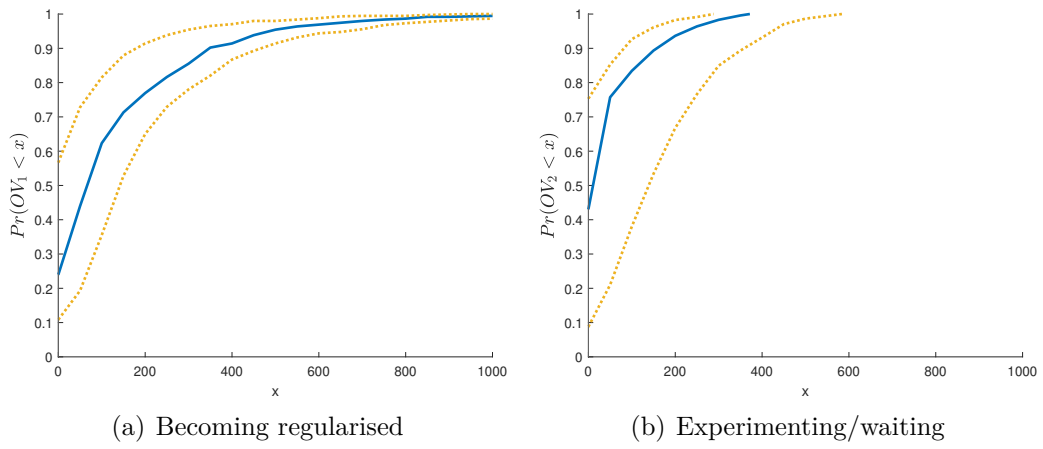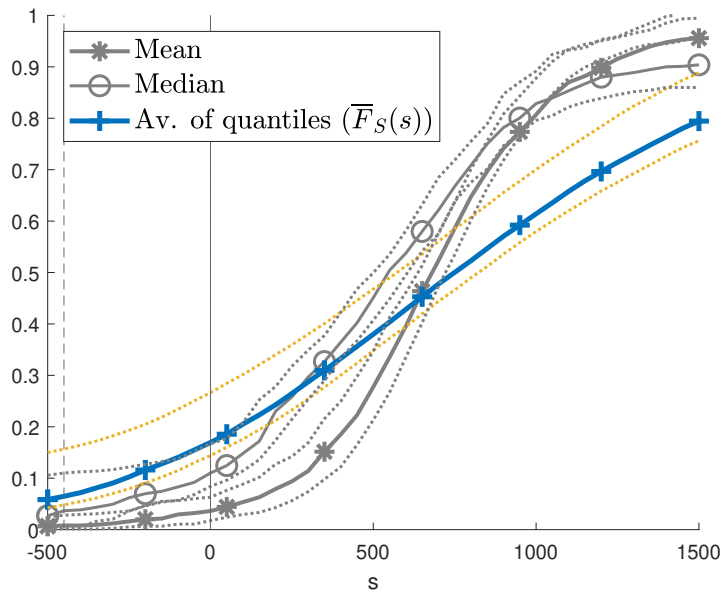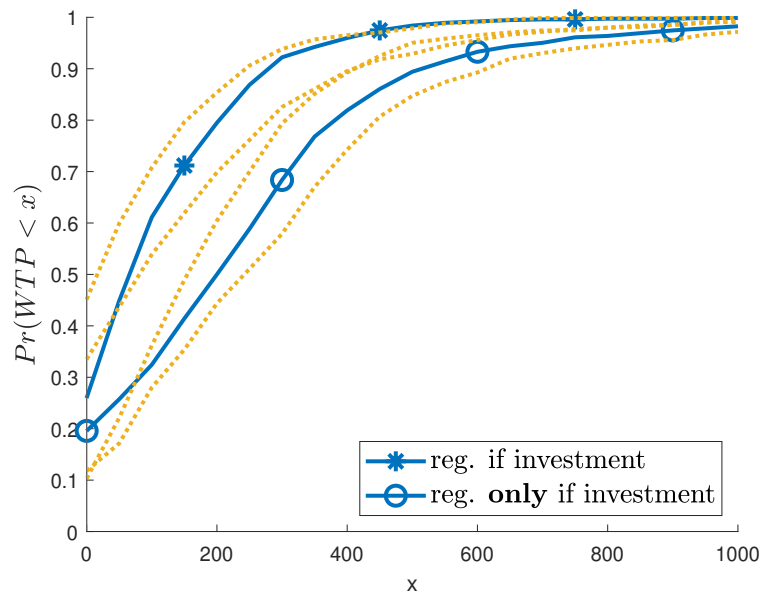
Q2. Out of 100 Afghans who arrived recently in Germany, how many do you think were deported (forcibly removed) and sent back to Afghanistan by the German authorities in the last past years?

Beliefs about own legal status   Imagine that your current status expires.

Q3. What do you think is the percent chance that you would obtain the legal right to stay in Germany for the next three years?

Q4. You are not given the right to stay in Germany. But you decide to stay in Germany for the next three years. What do you think is the percent chance that you would obtain the legal right to stay in Germany by the end of the three years?

Q5. You live in Germany but you do not have the legal right to stay in Germany. What do you think is the percent chance that you would be sent back to Afghanistan within the following three years?

Intention to stay in Germany

Q6. How many more years would you like to stay in Germany?

Q7. What do you think is the percent chance that you would stay in Germany for the next 3 years?

Q8. Imagine that your current status expired. You are not given the right to stay in Germany for the next 3 years. What do you think is the percent chance that you would decide to stay in Germany for the next 3 years?

Q9. Suppose that you have been living for 3 years in Germany without the legal right to stay. If you are not given the right to stay after those 3 years, what is the percent chance that you decide to will stay in Germany for an additional 3 years?

Hypothetical choices

Q10, Q11, Q12. Imagine that your current status expired. You are not given the right to stay in Germany, but if you stay you will obtain with q percent chance the right to stay in Germany at the end of the 3 years. What do you think is the percent chance that you would then decide to stay in Germany for the next 3 years?

The parameter q varies to take value 1, 50 and 99.

Beliefs about income

Q13. For each of the three situations, on average, what is the monthly income (including wage, government subsidies, etc.) that you expect you will have in the next 3 years (in Euros)?

Situation 1: legal right to stay in Germany, Situation 2: without legal right to stay in Germany.
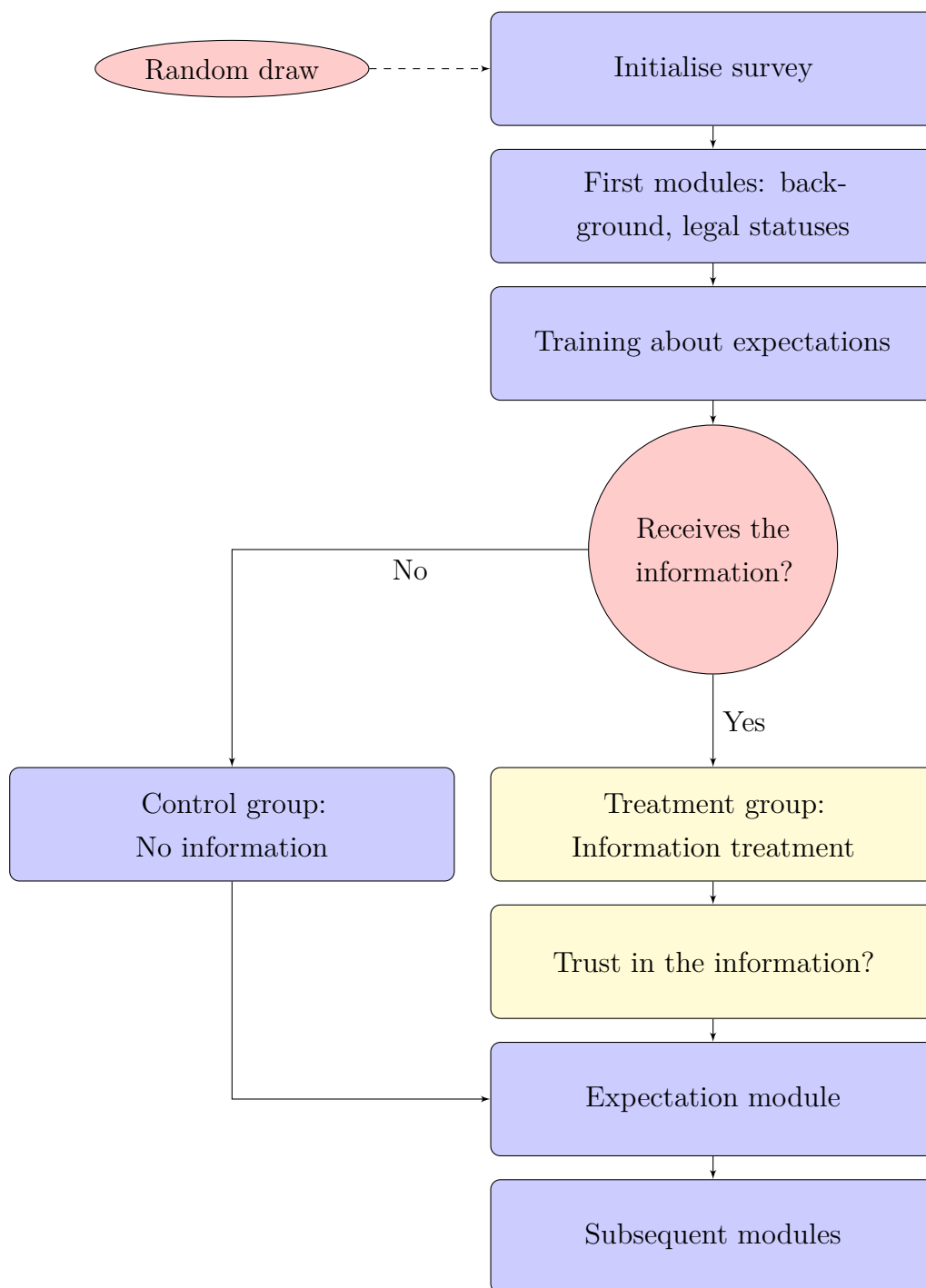
B   Flow chart of RCT

Figure B.1: Flow-Chart of the Survey Design

C Value of Information using a Bayesian-Updating Model

Following Zafar (2011), we can calculate the value of the information provided in the RCT using a Bayesian-updating model on the probability of a binary event (deportation or no deportation). Define:

$$X_{t+1}^{with\ info} = \eta X_{t+1}^{w/o\ info} + (1 - \eta)(I - X_t) \tag{C.1}$$

where $X_{t+1}^{with\ info}$ is the belief about the deportation at time $t + 1$ once the information is received, $X_{t+1}^{w/o\ info}$ the similar belief that would have been held without the information, X_t the belief held about deportation at time t, and I is the content of the information. The parameter η measures the relative importance of the new information compared to previous information for forecasting the proportion of deportation in the future. Denote $\bar{A}$ the population average of a variable A, one can derive an expression of η:

$$\eta = \frac{\bar{X}_{t+1}^{with\ info} + \bar{X}_t - I}{\bar{X}_{t+1}^{w/o\ info} + \bar{X}_t - I} . \tag{C.2}$$

Because information is provided randomly, the average expectation of the treated provides an expression for $\bar{X}_{t+1}^{with\ info}$. Similarly, the average expectation of the treated provides an expression for $\bar{X}_{t+1}^{w/o\ info}$. We report $R = 1/\eta - 1$ as our measure of the importance of the information.

Table C.1 shows the estimated value of R for the whole sample and in each city. It confirms that the information is of relatively low importance in general. The largest importance is for Berlin. Moreover, when distinguish sub-groups of the population, we find that the information is significantly more important for men, and those with poor German. However, the importance of the information is not necessarily larger for people with already more erroneous beliefs (above median beliefs).

All cities	Berlin	Hamburg	Munich
0.141	0.274	-0.130	0.206

Table C.1: Parameter R by city

D Stylised Model

This Section presents first a simplified model for developing the reader's intuition. It considers only three periods. The extended model presented next considers T sub-periods within the last two periods, where the asylum seeker can be deported.

D.1 Simplified model

Consider the timing in Section 5. We use the subscript t to index actual and conterfactual scenarios. Denote by:

- P_{it}^{reg}: belief about the chance of becoming regularised (Q4);

- P_{it}^{dep}: belief about the probability of being deported at the end of period 1 (Q5).

- P_{it}^{exit}: intention to stay in Germany in period 2 conditional on not obtaining the RtS at the end of period 1 (Q9).

The inter-temporal utility of staying in Germany in period 0 without RtS, for scenario t, $V_{i0t}^{N,G}$, can be written:

$$V_{i0t}^{N,G} = \alpha_i^{N,G} + \gamma_i \cdot Y_{it}^{N,G} + \nu_{i0}^G + \beta \mathbb{E} V_{i1t}^{N,G}, \tag{D.1}$$

where $\alpha_i^{N,G}$ represents i's expected (non-pecuniary) utility of residing in Germany without the RtS. $Y_{it}^{N,G}$ is the expected income without the RtS over period 0. γ_i represents the marginal utility of income and is assumed to be strictly positive ($\gamma_i > 0$). ν_{i0}^G is a utility "shock" that is unobserved by the agent at the time of the survey but will be observed at the time of decision. Finally, $\mathbb{E} V_{i1t}^{N,G}$ is the continuation value, the expected utility in period 1, for scenario t.

A similar expression describes the inter-temporal utility of exiting at time 0:

$$V_{i0t}^{E} = \alpha_i^{E} + \gamma_i \cdot Y_{it}^{E} + \nu_{i0}^{E} + \beta \mathbb{E} V_{i1t}^{E}, \tag{D.2}$$

where the terms are defined similarly. The expected utility in period 1 if staying in Germany is described by the following:

$$
\begin{aligned}
\mathbb{E} V_{i1t}^{N,G} &= P_{it}^{\text{dep}} \cdot \left[\alpha_i^{E} + \gamma_i \cdot Y_{it}^{E} - c_i^{D} \right] \\
&\quad + (1 - P_{it}^{\text{dep}}) \cdot P_{it}^{\text{reg}} \cdot (\alpha_i^{R,G} + \gamma_i \cdot Y_{it}^{R,G}) \\
&\quad + (1 - P_{it}^{\text{dep}}) \cdot (1 - P_{it}^{\text{reg}}) \cdot P_{it}^{\text{exit}} \cdot (\alpha_i^{N,G} + \gamma_i \cdot Y_{it}^{N,G}) \\
&\quad + (1 - P_{it}^{\text{dep}}) \cdot (1 - P_{it}^{\text{reg}}) \cdot (1 - P_{it}^{\text{exit}}) \cdot (\alpha_i^{E} + \gamma_i \cdot Y_{it}^{E}).
\end{aligned} \tag{D.3}
$$

The first term on the right-hand side is the utility obtained if deported, an event that induces a cost c_i^{D} and is expected with probability p^{D}. The second term represents the utility when the agent receives the RtS at the end of period 2, which is expected with probability $(1 - P_{it}^{\text{dep}}) \cdot P_{it}^{\text{reg}}$. The third term is the utility when the agent does not receive the RtS but decides to stay in Germany, which is expected with probability $(1 - P_{it}^{\text{dep}}) \cdot P_{it}^{\text{reg}} \cdot P_{it}^{\text{exit}}$. Finally, the last term is the utility attached to the decision of

exiting in period 2, which is expected with probability $(1 - P_{it}^{\text{dep}}) \cdot P_{it}^{\text{reg}} \cdot (1 - P_{it}^{\text{exit}})$. Figure H.1 in Appendix H gives a tree-representation of the model.

The choice of a quasi-linear representation should be understood as a first-order approximation of the individual's utility. Note that the weight associated with the expected income is individual specific. Thus, this approximation is very flexible. The separability of the pecuniary and non-pecuniary components of the utility is key for the identification of some objects of interests. This assumption could be relaxed at the price of introducing a normalisation.

The difference in utility between staying and leaving is given by the expression:

$$V_{i0t}^{N,G} - V_{i0t}^{E} = \gamma_i \cdot B_{it} - \zeta_{i0t} - \zeta_{i1t} \cdot P_{it}^{\text{reg}} + \nu_{i0}^{G} - \nu_{i0}^{E}, \tag{D.4}$$

where:

$$\zeta_{i0t} = \beta \cdot c_i^{D} \cdot P_{it}^{\text{dep}} - (\alpha_i^{N,G} - \alpha_i^{E}) \cdot \left[1 + \beta \cdot (1 - P_{it}^{\text{dep}}) \cdot P_{it}^{\text{exit}}\right] \tag{D.5}$$

$$\zeta_{i1t} = \left[P_{it}^{\text{exit}} \cdot (\alpha_i^{N,G} - \alpha_i^{E}) - (\alpha_i^{R,G} - \alpha_i^{E})\right] \cdot \beta \cdot (1 - P_{it}^{\text{dep}}) \tag{D.6}$$

$$B_{it} = (Y_{it}^{R,G} - Y_{it}^{E}) \cdot \left[\beta \cdot (1 - P_{it}^{\text{dep}}) \cdot P_{it}^{\text{reg}}\right]$$
$$+ (Y_{it}^{N,G} - Y_{it}^{E}) \cdot \left[1 + \beta \cdot (1 - P_{it}^{\text{dep}}) \cdot (1 - P_{it}^{\text{reg}}) \cdot P_{it}^{\text{exit}}\right]. \tag{D.7}$$

At the beginning of period 1, ν_i^{G} and ν_i^{E} are observed by the individual, who chooses a location (stay in Germany or exit) to maximize the expected inter-temporal utility. Hence, i exits if and only if $V_{i0t}^{N,G} - V_{i0t}^{N,E} < 0$.

Equation (D.4) can be rearranged to yield:

$$\frac{1}{\gamma_i} \cdot \left(V_{i0t}^{N,G} - V_{i0t}^{E}\right) = \underbrace{B_{it}}_{\text{pecuniary benefit}} - \underbrace{\frac{1}{\gamma_i} \cdot \left(\zeta_{i0t} + \zeta_{i1t} \cdot P_{it}^{\text{reg}} + \nu_{i0}^{E} - \nu_{i0}^{G}\right)}_{\text{non-pecuniary cost}}, \tag{D.8}$$

which is the traditional representation of a generalised Roy model. In the terminology of this model (see for example Eisenhauer et al., 2015), B_{it} is the *ex ante* pecuniary benefit; $C_{it} := \frac{1}{\gamma_i} \cdot \left(\zeta_{i0t} + \zeta_{i1t} \cdot P_{it}^{\text{reg}} + \nu_{i0}^{E} - \nu_{i0}^{G}\right)$ is the *ex ante* non-pecuniary cost when net utility shock is $\nu_{i0}^{G} - \nu_{i0}^{E}$. This cost can be positive or negative and summarises variables other than expected income that influence the stay decision. Finally, $S_{it} := B_{it} - C_{it}$ represents the *ex ante* surplus or returns when net utility shock is $\nu_{i0}^{G} - \nu_{i0}^{E}$. The individual stays in Germany if and only if $S_{it} \geq 0$.

Denote by ν_i the term $1/\gamma_i \cdot \left(\nu_{i0}^{E} - \nu_{i0}^{G}\right)$. C_{it} and, hence, S_{it} are unobserved by the agent at the time of elicitation. The agent is assumed to hold beliefs about the distribution of ν_i conditional on their information set. Denote by $F_{\nu_i|\mathcal{I}_i}$ this distribution, where $\mathcal{I}_i$ is the information set of individual i at the time of elicitation. At the time of elicitation, that is prior to the actual decision, the individual's expected probability to stay in Germany is

then obtained as follows:

$$P_{it} = \Pr\left(S_{it} \geq 0 | \mathcal{I}_i\right) = \int 1\left\{S_{it} \geq 0\right\} F_{\nu_i | \mathcal{I}_i}\left(d\nu | \mathcal{I}_i\right). \tag{D.9}$$

ν_i represents the resolvable uncertainty in the model. There is no other resolvable uncertainty; the uncertainties about income, the probability of deportation, and the probability of obtaining the RtS are assumed to be unresolved by the time of location decision.

The elicited intention to overstay can be written as:

$$P_{it} = \Pr\left(B_{it} - \bar{C}(X_{it}, \alpha_i) + \nu_i \geq 0 | B_{it}, X_{it}, \alpha_i\right). \tag{D.10}$$

Note that the probability measure is defined over ν_i. $\bar{C}(X_{it}, \alpha_i) + \nu_i$ represents the *ex ante* cost of staying without the RtS, with $X_{it} = (P_{it}^{\text{reg}}, P_{it}^{\text{dep}}, P_{it}^{\text{exit}})$.

The transformation from a two-dimensional idiosyncratic term, $(\zeta_{i0t}/\gamma_i, \zeta_{i1t}/\gamma_i)$, to a one-dimensional term, α_i, is always feasible, as noted by Chernozhukov and Hansen (2005). However, unlike $(\zeta_{i0t}/\gamma_i, \zeta_{i1t}/\gamma_i)$, α_i does not have a structural interpretation. $\bar{C}(X_{it}, \alpha_i)$ can be interpreted as a conditional quantile function and $\alpha_i \in [0, 1]$ as a conditional rank of individual i that summarises the private information i holds about returns on overstaying. *A priori*, α_i is independent neither from B_{it} nor from X_{it}.

D.2 Extended model

This section presents an extension of the model to include a risk of deportation within each period and discusses the possibility of including a longer time horizon. In contrast, the simplified model of Section D.1 has three periods and a risk of deportation only at the end of the second period.

Let λ_{it} be the perceived probability to be deported in each month, with $(1 - P_{it}^{\text{dep}}) = (1 - \lambda_{it})^T$. Denote by β the monthly discount factor. The expected gains in period 1 from staying in Germany without a RtS are given by

$$\sum_{k=1}^{T} \beta^k \left[(1 - \lambda_{it})^k \cdot \left(\alpha_i^{N,G} - \alpha_i^E + \gamma_i \left(Y_{it}^{N,G} - Y_{it}^E\right)\right) - c_i^D \cdot (1 - \lambda_{it})^{k-1} \cdot \lambda_{it}\right].$$

The expected gains in period 2 from staying in Germany without a RtS and obtaining subsequently a RtS in period 2 are

$$\beta^T \cdot (1 - P_{it}^{\text{dep}}) \cdot P_{it}^{\text{reg}} \left[\sum_{k=T+1}^{2T} \beta^{k-T}\left(\alpha_i^{R,G} - \alpha_i^E + \gamma_i\left(Y_{it}^{R,G} - Y_{it}^E\right)\right)\right].$$

The expected gains in period 2 from staying in Germany without a RtS and not obtaining

subsequently a RtS in period 2 are

$$\beta^T \cdot (1 - P_{it}^{\text{dep}}) \cdot (1 - P_{it}^{\text{reg}}) \cdot P_{it}^{\text{exit}}$$
$$\left[\sum_{k=T+1}^{2T} \beta^{k-T} \cdot \left((1 - \lambda_{it})^k \left(\alpha_i^{N,G} - \alpha_i^E + \gamma_i \left(Y_{it}^{N,G} - Y_{it}^E \right) \right) - c_i^D \cdot (1 - \lambda_{it})^{k-1} \cdot \lambda_{it} \right) \right].$$

Thus, with previous notations:

$$
\begin{aligned}
\zeta_{0i} &= \sum_{k=1}^{T} \beta^k \left[c_i^D \cdot (1 - \lambda_{it})^{k-1} \cdot \lambda_{it} - (1 - \lambda_{it})^k \cdot \left(\alpha_i^{N,G} - \alpha_i^E \right) \right] && \text{(D.11)} \\
&\quad + \beta^T \cdot (1 - P_{it}^{\text{dep}}) \cdot P_{it}^{\text{exit}} \cdot \\
&\qquad \left[\sum_{k=T+1}^{2T} \beta^{k-T} \cdot \left(c_i^D \cdot (1 - \lambda_{it})^{k-1} \cdot \lambda_{it} - (1 - \lambda_{it})^k \left(\alpha_i^{N,G} - \alpha_i^E \right) \right) \right] \\
\zeta_{1i} &= \beta^T \cdot (1 - P_{it}^{\text{dep}}) \left[- \sum_{k=T+1}^{2T} \beta^{k-T} \left(\alpha_i^{R,G} - \alpha_i^E \right) \right. && \text{(D.12)} \\
&\quad \left. - P_{it}^{\text{exit}} \sum_{k=T+1}^{2T} \beta^{k-T} \cdot \left(c_i^D \cdot (1 - \lambda_{it})^{k-1} \cdot \lambda_{it} - (1 - \lambda_{it})^k \left(\alpha_i^{N,G} - \alpha_i^E \right) \right) \right] \\
B_{it} &= \left(Y_{it}^{R,G} - Y_{it}^E \right) \beta^T \cdot (1 - P_{it}^{\text{dep}}) \cdot P_{it}^{\text{reg}} \sum_{k=T+1}^{2T} \beta^{k-T} + \left(Y_{it}^{N,G} - Y_{it}^E \right) \cdot && \text{(D.13)} \\
&\quad \left[\sum_{k=1}^{T} \beta^k \cdot (1 - \lambda_{it})^k + \beta^T \cdot (1 - P_{it}^{\text{dep}}) \cdot (1 - P_{it}^{\text{reg}}) \cdot P_{it}^{\text{exit}} \sum_{k=T+1}^{2T} \beta^{k-T} \cdot (1 - \lambda_{it})^k \right].
\end{aligned}
$$

The model considered so far two periods of three years. A possible strategy to extend the time horizon is to assume that individuals repeat the game for S three-year periods, with consistent beliefs about the chance of deportation, P_{it}^{dep}, the chance to obtain the RtS, P_{it}^{reg}, and the chance to exit in the next period, P_{it}^{exit}. Costs and benefits parameters are easy to adapt in this case. For example:

$$
\begin{aligned}
B_{it} &= \left(Y_{it}^{R,G} - Y_{it}^E \right) \sum_{s=2}^{S} \left[\left(\beta^T \cdot (1 - P_{it}^{\text{dep}}) \right)^{(s-1)} (1 - P_{it}^{\text{reg}})^{(s-2)} \cdot P_{it}^{\text{reg}} \sum_{k=(s-1)T+1}^{ST} \beta^{k-(s-1)T} \right] && \text{(D.14)} \\
&\quad + \left(Y_{it}^{N,G} - Y_{it}^E \right) \sum_{s=1}^{S} \left[\left(\beta^T \cdot (1 - P_{it}^{\text{dep}}) \cdot (1 - P_{it}^{\text{reg}}) \cdot P_{it}^{\text{exit}} \right)^{(s-1)} \sum_{k=(s-1)T+1}^{sT} (\beta \cdot (1 - \lambda_{it}))^{k-(s-1)T} \right].
\end{aligned}
$$

Figure D.1 shows that calculation of a monthly equivalent $B_{it}/(S \times T)$ produces a distribution of pecuniary benefits, which depends little on S. Therefore, the results on the relative importance of pecuniary benefits and costs are not affected by the time horizon chosen for the analysis.
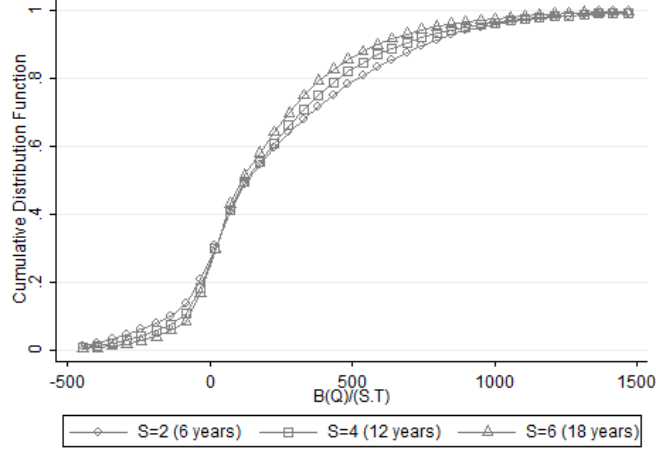
Figure D.1: $B_{it}/(S \times T)$ for $S = 2, 4, 6$ and $T = 36$

E   Characterisation of OV_2

Proposition 1 provides a characterisation for the option value defined in Equation (5.6).

Proposition 1. *Let $\mathcal{S}$ denotes the support of S. Define*

$$A^+(B, X, \alpha) = \int_{\mathcal{S}^+} [m(B - s, X, \alpha)] \, ds,$$
$$A^-(B, X, \alpha) = \int_{\mathcal{S}^-} [1 - m(B - s, X, \alpha)] \, ds,$$

where $\mathcal{S}^+ = \mathbb{R}^+ \cap \mathcal{S}$ and $\mathcal{S}^- = \mathbb{R}^- \cap \mathcal{S}$. Under the conditions of Theorem 1 in Meango (2023) and for μ_S bounded, the population distributions of interest are characterised as follows:

$$\Pr \left(OV_2(B, X, \alpha) \le y \right) = \int_{\mathcal{X}} \int_0^1 1 \left\{ \min\{A^+(b, x, a), A^-(b, x, a)\} \le y \right\} dF_{B,X,\alpha}(b, x, a).$$

Proposition 1 implies that identification of the function $m(B, X, \alpha)$ and the conditional distribution of α is sufficient for identification of the distribution of interest.

Proof. It suffices to note that, by Theorems 1 and 2 in Meango (2023):

$$\mathbb{E} \max\{S(b, x, \alpha, \nu), 0\} = \int_{\mathcal{S}^+} [1 - m(b - s, x, \alpha)] \, ds$$

and

$$\mu_S(B, X, \alpha) = A^+(B, X, \alpha) - A^-(B, X, \alpha)$$

. Hence:

$$
\begin{aligned}
OV_2(b, x, \alpha) &= \int_{\mathcal{S}^+} [1 - m(b - s, x, \alpha)]\, ds \\
&\quad - \max \left\{ \int_{\mathcal{S}^+} [1 - m(b - s, x, \alpha)]\, ds - \int_{\mathcal{S}^-} [m(b - s, x, \alpha)]\, ds, 0 \right\} \\
&= \begin{cases}
\int_{\mathcal{S}^+} [1 - m(b - s, x, \alpha)]\, ds, & \text{if } \int_{\mathcal{S}^+} [1 - m(b - s, x, \alpha)]\, ds \\
& \qquad \leq \int_{\mathcal{S}^-} [m(b - s, x, \alpha)]\, ds \\
\int_{\mathcal{S}^-} [m(b - s, x, \alpha)]\, ds, & \text{otherwise}
\end{cases} \\
&= \min \left\{ \int_{\mathcal{S}^+} [1 - m(b - s, x, \alpha)]\, ds, \int_{\mathcal{S}^-} [m(b - s, x, \alpha)]\, ds \right\}.
\end{aligned}
$$

$\square$

F Estimation Choices

The estimation strategy applies to the data with the following choices for Equation (C.1) in Meango (2023):

$$
\begin{aligned}
\bar{b} &= 0, \ \bar{q} = 0.01, \\
N_a &= 100, \text{ i.e. } a = 0.01, 0.02, \dots, 0.99, 1. \\
\Gamma(x) &= \exp(x)/(1 + \exp(x)) \\
\underline{p} &= 1 - \overline{p} = 0.05; \\
c &= 0.05 \\
r_0(\boldsymbol{X}_{i0}, \boldsymbol{Z}_i^c) &= r_1(\boldsymbol{X}_{i0}, \boldsymbol{Z}_i^c) = [B_{i0}, X_{i0}^{\mathrm{reg}}, X_{i0}^{\mathrm{dep}}, X_{i0}^{\mathrm{exit}}, \boldsymbol{Z}_i^c]
\end{aligned}
$$

with $\boldsymbol{Z}^c$ including controls for the gender, the city of residence, the number of years of education, the age group in four categories, an indicator for the current legal status, the length of stay in Germany, and an indicator for whether the individual has close relatives in Germany. X_{it}^{reg} represents the chance of becoming regularised in scenario $t = 0, 1, 2, 3$, which is varied across hypothetical scenarios. In the model notations, $X_{it}^{\mathrm{reg}} = P_{it}^{\mathrm{reg}}$. Furthermore, X_{it}^{dep} represents the total chance of being deported. It is the sum of chance of not being deported in the first and second period, that is, in the model notations, $X_{it}^{\mathrm{dep}} = (2 - P_{it}^{\mathrm{reg}})P_{it}^{\mathrm{dep}}$. Finally, X_{it}^{exit} is the total chance of exiting. In the model notations, it amounts to $X_{it}^{\mathrm{exit}} = (1 - P_{it}^{\mathrm{reg}})(1 - P_{it}^{\mathrm{dep}})P_{it}^{\mathrm{exit}}$. Note that the quantities X_{it}^{dep} and $X_{it}^{\mathrm{exit}}, t = 1, 2, 3$ vary across the counterfactual scenarios, as the chance of becoming regularised varies. The countefactual scenario $t = 1$ is the reference scenario, as explained in Meango (2023). The additional counterfactual scenarios ($t = 2, t = 3$) are used for the estimation of the conditional CDF $F_{\Pi_t | \boldsymbol{X_t}, \boldsymbol{Z}^c}, t = 0, 2, 3$.

G Sources and Additional Official Statistics

Sources of official statistics accessible online, all last accessed on October 15,2020:

1. Eurostat: First instance decisions on applications by citizenship, age and sex - annual aggregated data (rounded). URL: https://ec.europa.eu/eurostat/data browser/view/MIGR_ASYDCFSTA__custom_55039/default/table?lang=en.

2. Statistisches Bundesamt, DESTATIS, URL: https://www-genesis.destatis.de/genesis/online

   - Code 12531-0008: Persons seeking protection: Germany, reference date, sex, category of protection status/protection status, country groups/citizenship.
   - Code 12531-0026: Persons seeking protection: Länder, reference date, sex, category of protection status/protection status, country groups/citizenship.

3. Deportations and departure statistics from the federal government:

   - 2014 - Deutscher Bundestag, Drucksache 18/4025. URL: http://dipbt.bundestag.de/extrakt/ba/WP18/649/64916.html
   - 2015 - Deutscher Bundestag, Drucksache 18/7588. URL: http://dipbt.bundestag.de/extrakt/ba/WP18/717/71788.html
   - 2016 - Deutscher Bundestag, Drucksache 18/11112. URL: http://dipbt.bundestag.de/extrakt/ba/WP18/794/79434.html
   - 2017 - Deutscher Bundestag, Drucksache 19/800. URL: http://dipbt.bundestag.de/extrakt/ba/WP19/2312/231225.html
   - 2018 - Deutscher Bundestag, Drucksache 19/8201. URL: http://dipbt.bundestag.de/extrakt/ba/WP19/2436/243665.html
   - 2019 - Deutscher Bundestag, Drucksache 19/18201. URL: http://dipbt.bundestag.de/extrakt/ba/WP19/2589/258926.html

4. Compiled statistics on deportations by origin country, state (*Länder*) responsible of the deportation and year of deportation:
   Bundeszentrale für Poltische Bildung, URL: https://www.bpb.de/gesellschaft/migration/flucht/zahlen-zu-asyl/265765/abschiebungen-in-deutschland.

5. Short explanation of the toleration status:
   Bundeszentrale für Poltische Bildung, URL: https://www.bpb.de/gesellschaft/migration/kurzdossiers/233846/definition-fuer-duldung-und-verbundene-rechte?p=all

6. Voluntary Return Programmes:

- Information portal on voluntary return and reintegration, REAG/GARP, URL: https://www.returningfromgermany.de/en/programmes/reag-garp.

- Information portal on voluntary return and reintegration, StarthilfePlus, URL: https://www.returningfromgermany.de/en/programmes/ergaenzende-reintegrationsunterstuetzung-im-zielland-bei-einer-freiwilligen-rueckkehr-mit-reag-garp.

- Information portal on voluntary return and reintegration, specific information for Afghanistan, URL: https://www.returningfromgermany.de/en/countries/afghanistan.

- Media coverage: SWR, Neues Rückkehrprogramm "Starthilfe Plus", URL: https://www.swr.de/international/berlin-neues-rueckkehrprogramm-starthilfe-plus/-/id=233334/did=18909044/nid=233334/119icnw/index.html

H   Additional Tables and Figures

		Germany	Berlin	Hamburg	Bavaria
2016	Open status	68%	71%	48%	67%
	Recognised	27%	24%	48%	26%
	Denied	5%	5%	4%	7%
2017	Open status	41%	42%	24%	41%
	Recognised	51%	52%	72%	51%
	Denied	8%	6%	5%	9%
2018	Open status	30%	29%	18%	30%
	Recognised	61%	62%	76%	61%
	Denied	9%	8%	7%	9%
2019	Open status	22%	20%	13%	21%
	Recognised	66%	68%	80%	69%
	Denied	12%	12%	7%	11%

Source: authors' calculation from DESTATIS

Table H.1: Distribution of status among Afghan migrants by German federal states and year

	Berlin	Hamburg	Munich	Total
Female	0.40	0.49	0.24	0.38
	(0.49)	(0.50)	(0.43)	(0.49)
Age	31.16	33.95	30.30	31.56
	(12.11)	(13.37)	(11.24)	(12.25)
Low-skilled	0.69	0.57	0.63	0.65
	(0.46)	(0.50)	(0.48)	(0.48)
Years in Germany	3.47	3.76	3.67	3.58
	(1.37)	(1.25)	(0.95)	(1.26)
Sampled from register	0.22	0.31	0.22	0.24
	(0.41)	(0.46)	(0.41)	(0.43)
Prev. occupied (in Afg.)	0.54	0.50	0.50	0.52
	(0.50)	(0.50)	(0.50)	(0.50)
Secure status	0.55	0.74	0.50	0.58
	(0.50)	(0.44)	(0.50)	(0.49)
Obtained educ. in Germany	0.30	0.27	0.30	0.30
	(0.46)	(0.45)	(0.46)	(0.46)
No Germ. class	0.16	0.15	0.28	0.19
	(0.37)	(0.36)	(0.45)	(0.39)
Germ. class (up to A2)	0.39	0.48	0.35	0.40
	(0.49)	(0.50)	(0.48)	(0.49)
Germ. class (B1 and more)	0.44	0.36	0.37	0.41
	(0.50)	(0.48)	(0.48)	(0.49)
Curr. occupied	0.13	0.17	0.32	0.19
	(0.34)	(0.37)	(0.47)	(0.39)

Note: Mean values calculated on non-missing observations. Berlin N=534, Hamburg N=226, Munich N=264, Total N= 1,024. Standard deviation in parentheses. "Female" equals one if the respondent identifies as a female. "Low-skilled" equals one if the respondent has studied at most until lower secondary education. "Prev. occupied (Afg.)" refers to a previous occupation held in country of origin before migration. "Secure status" equals one if the respondent has received some form of temporary or permanent protection status. German class level B1 is the lower intermediate level from the Common European Framework of Reference for Languages (CEFR) standard, A2 the upper beginner level.
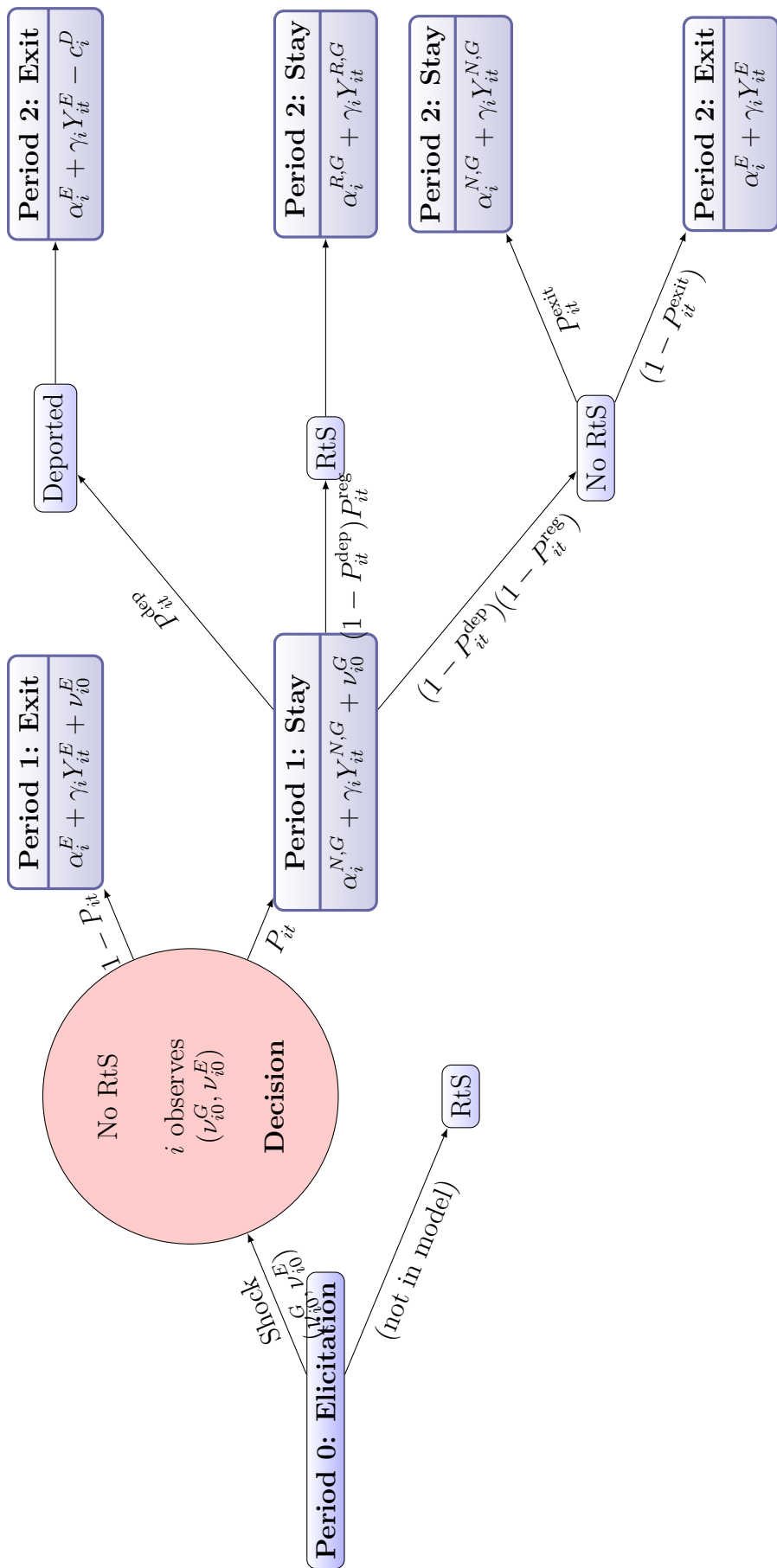
Table H.2: Sample characteristics by city
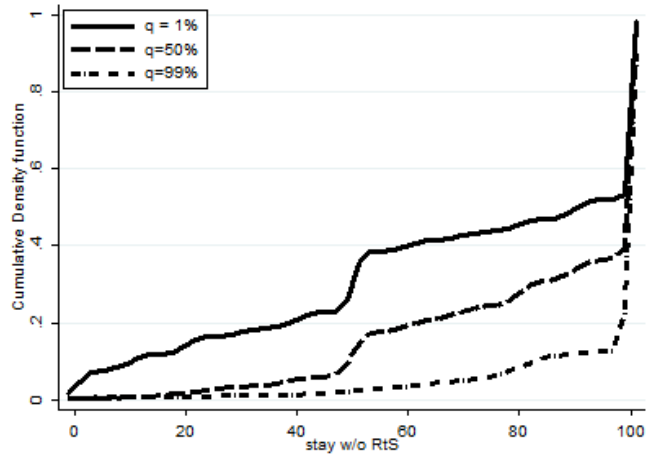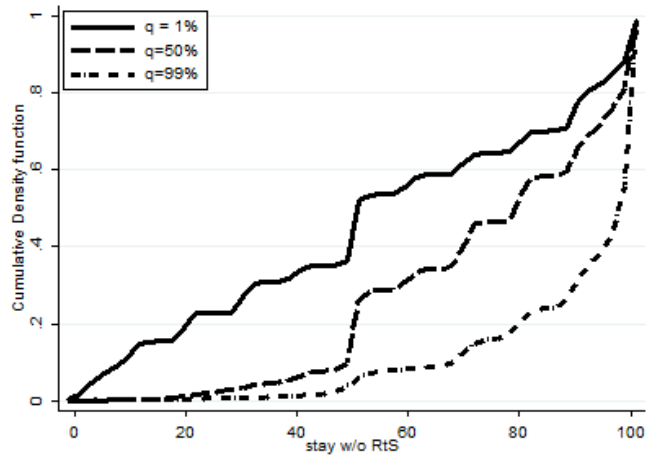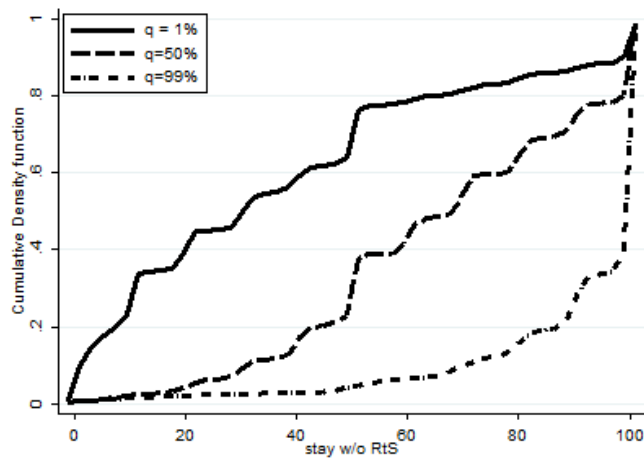
Figure H.1: Schematic representation of the simplified model of Section D.1

(a) CDFs - Berlin

(b) CDFs - Hamburg

(c) CDFs - Munich

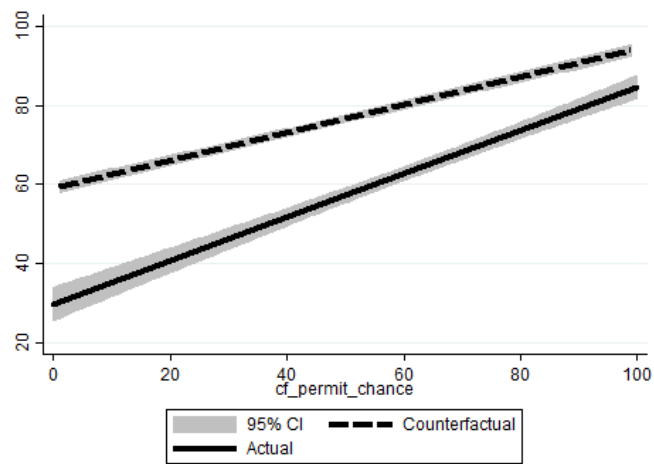Figure H.2: Intention to stay w/o RtS by city for $q = 0.01, 0.50, 0.99$

Figure H.3: Intention to overstay by the chance of obtaining the RtS in three years: current/actual (Q4) vs. hypothetical/counterfactual (Q6 to Q8)