Pathways to Integration: The Effect of Apprenticeships in Understaffed Professions on Refugee Employment

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Abstract

This study investigates the impact of an apprenticeship policy on the employment and welfare use outcomes of male Afghan asylum seekers in Austria using a fuzzy Regression Discontinuity Design. The policy allowed asylum seekers to participate in apprenticeships in understaffed professions during their asylum process. The analysis estimates a Local Average Treatment Effect of an additional 935 days of employment and €67,759 more in earnings over five years for program participants. The policy also reduced welfare dependency, with a 26-month decrease in general welfare receipt and a 27.5-month reduction in reliance on Basic Subsistence Support. No significant effect was found on the probability of remaining insured in Austria. For Syrian asylum seekers, who were generally eligible but were hardly affected by the policy due to shorter asylum process durations, no effects were found. These findings indicate that the apprenticeship policy significantly improved employment outcomes and reduced welfare dependency for asylum seekers in lengthy asylum processes while not impacting the likelihood of leaving Austria.

JEL codes: F22, J31

Keywords: Immigrant integration, refugees, labor demand

*The computational results presented here have been achieved using the LEO HPC infrastructure at the University of Innsbruck. All remaining errors are my own.
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1 Introduction

Refugees encounter a multitude of challenges when integrating into a new society, with successful labor market integration being one of the most significant. Policymakers consider different strategies to not only facilitate this integration but also to achieve broader objectives, such as managing immigration flows, optimizing resource allocation, and sustaining public support for immigration policies. While removing barriers to accessing the welfare state and labor market may encourage greater numbers of individuals to seek refuge in a host country, imposing restrictions can hinder the integration process for those already present.

Research underscores the importance of early labor market access for refugees. For instance, Fasani et al. (2021) found that labor market bans in European countries reduced refugees' employment probability by 15% in the years following the ban. Similarly, Brell et al. (2020) emphasized the critical role of early labor market integration, citing several recent studies. In Germany, Marbach et al. (2018) demonstrated that refugees who experienced a reduction in a working ban by seven months had a 20 percentage point higher employment rate five years later compared to those who were subjected to the full ban.

However, while facilitating quick entry into the labor market has advantages, it also has potential downsides. For example, Arendt (2020) found that Denmark's work-first policy expedited refugees' entry into the labor market, but primarily into precarious jobs with limited hours, leaving the long-term impacts uncertain. This highlights the complexity of labor market integration policies, where the balance between immediate employment opportunities and long-term economic stability remains a critical consideration.

Few studies have examined policies that not only provide refugees with easy access to the labor market but also equip them with the necessary skills for long-term job stability and successful labor market integration. One notable initiative is an Austrian policy that allowed refugees in the midst of their asylum process to begin apprenticeships in understaffed professions, even before their asylum status was granted. This policy, in place from from June 2012 to September 2018 and implemented through decrees by the Ministry of Labor, offered one of the limited pathways for asylum seekers to enter the Austrian labor market.

Unlike short-term employment options in seasonal industries such as tourism or agriculture, these apprenticeships had a significant educational component. Austrian apprenticeships typically last for three years and provide comprehensive training in a specific profession, culminating in an exam that certifies individuals as qualified professionals in their field. This approach not only addressed immediate labor shortages in certain sectors but also provided refugees with valuable skills and qualifications that could enhance their long-term integration

into the labor market. Refugees were eligible for these apprenticeship positions if no Austrian citizen or already accepted refugee could be found to fill the role, thereby ensuring that the policy also supported broader labor market needs. This paper examines the medium- and long-term effects of this policy by leveraging an age and date cutoff for eligibility.

2 Data and Methodology

Data Sources and Sample Selection

I utilize administrative data from the Austrian Social Security Database (ASSD), which includes comprehensive records of all social insurance episodes. This dataset offers detailed information on basic demographics, employment sectors, labor income, and periods of employment, unemployment, and other insurance-related episodes. To enhance the dataset, I have incorporated additional variables from the Federal Ministry of Labour and Economy (BMAW), which include protection type, asylum date, participation in educational programs, language proficiency, marital status, residency ZIP codes, basic needs support, education level, and previous and desired professions for all asylum seekers registered with the Public Employment Service (PES). Moreover, the PES has provided data on work permits issued to foreigners, as well as records of contacts and consultations between asylum seekers and the PES.

asylum seekers in Austria receive special health insurance upon arrival, classified as "O4" or "OE" in the ASSD, which indicates coverage under basic subsistence support. This unique classification allows for the precise identification of asylum seekers, distinguishing them from recipients of other types of insurance. Additionally, the data on work permits enables the unique identification of all apprenticeships that fall under the policy of interest, allowing for a precise definition of the relevant sample most affected by the policy and the corresponding age cutoff.

The primary sample for this analysis consists of male Afghan asylum seekers who arrived in Austria between July 2014 and September 2016, were between 14 and 33 years old at the time of their first insurance registration in Austria, and maintained some form of insurance coverage 78 months after arrival. Because the policy was not uniformly implemented across all federal states, I have restricted the sample to asylum seekers residing in the western states of Austria, where the program was more extensively applied. Consequently, I focus on individuals who lived in Vorarlberg, Tyrol, Salzburg, and Upper Austria 24 months after their arrival. This refinement reduces the sample to 2,383 individuals and allows for multiple placebo checks using other asylum seeker cohorts and federal states that were not as much impacted by this policy.

The decree from 2012 initially permitted all asylum seekers under the age of 18 to access

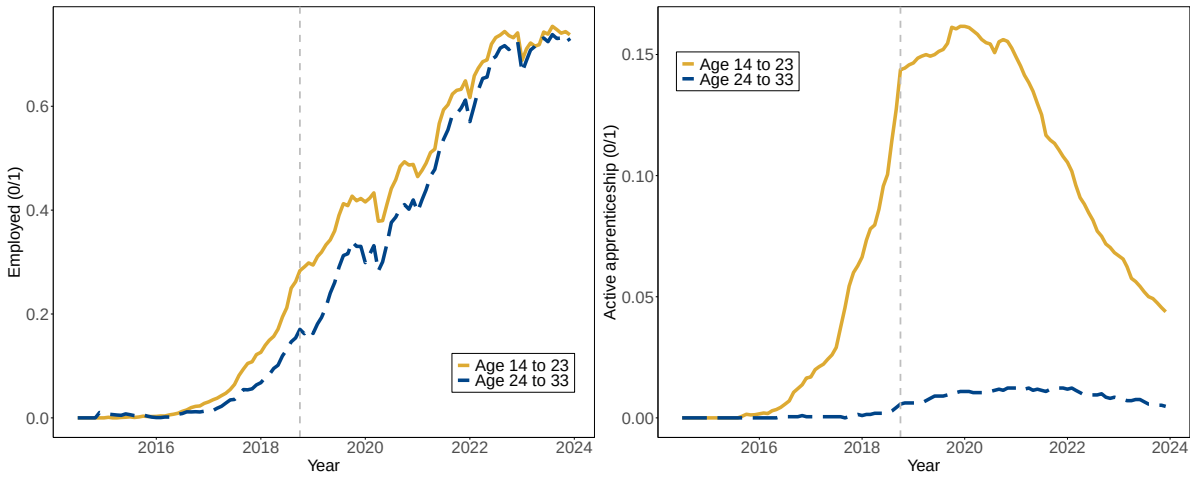
apprenticeships, contingent on a case-by-case evaluation conducted by the PES following an employer's request. However, due to the low number of participants in the early stages, the policy was expanded in 2013 to include individuals up to the age of 25. In 2015, the requirement for case-by-case evaluation was abolished, granting general access to all professions listed on a publicly available list of occupations where labor demand exceeded supply. This policy remained in place until September 12th, 2018, when all related decrees were revoked, creating a sharp cutoff after which no asylum seeker was eligible to apply for an apprenticeship during their asylum process.

The data on work permits clearly show that it typically takes several months for refugees to begin apprenticeships, largely because they must first acquire basic German language skills before entering specialized professions. This delay is particularly relevant for asylum seeker groups with prolonged processing times. For instance, while Syrian refugees—who made up the largest group during the 2015 refugee wave—often received asylum decisions within a year, Afghan refugees frequently faced extended waiting periods, sometimes lasting years, due to the uncertainty surrounding the type of asylum they should receive, or whether they should be granted asylum at all, given the complex nature of the conflict in their home country. For young Afghans caught in these lengthy asylum processes, apprenticeships often became the only viable path to stable employment in Austria, making their inclusion in the sample especially pertinent

Given these circumstances, my analysis focuses on the group most likely to be impacted by this policy: young male Afghan refugees who arrived during the policy's active period and remained in Austria. Figure 1 shows the employment rate (left) and the share of individuals engaged in active apprenticeships (right) for this group. The data reveals that individuals aged 14 to 23 have a significantly higher employment rate compared to those aged 24 to 33, particularly around the September 2018 cutoff date, when most apprenticeships commenced. This trend is not observed in other refugee groups, which typically show similar employment rates across these two age cohorts or lower employment for the younger one. Additionally, the figure shows a marked increase in apprenticeship participation up until the cutoff date, followed by a relatively stable share of active apprenticeships thereafter.[1]

[1] Apprenticeships generally last 2 to 4 years, and individuals who had already received asylum could still begin apprenticeships after September 2018, contributing to a slight increase in active apprenticeships post cutoff.

Figure 1: Employment rate and active apprenticeships of Afghan asylum seekers



Notes: The figure shows the employment rate (left) and the share of people in an active apprenticeship for male Afghan asylum seekers who arrived in Austria between September 2008 and August 2018 who were between 14 and 33 years old when they were first insured in Austria and who still had some insurance 78 months after arrival.

Apprenticeships in Understaffed Professions

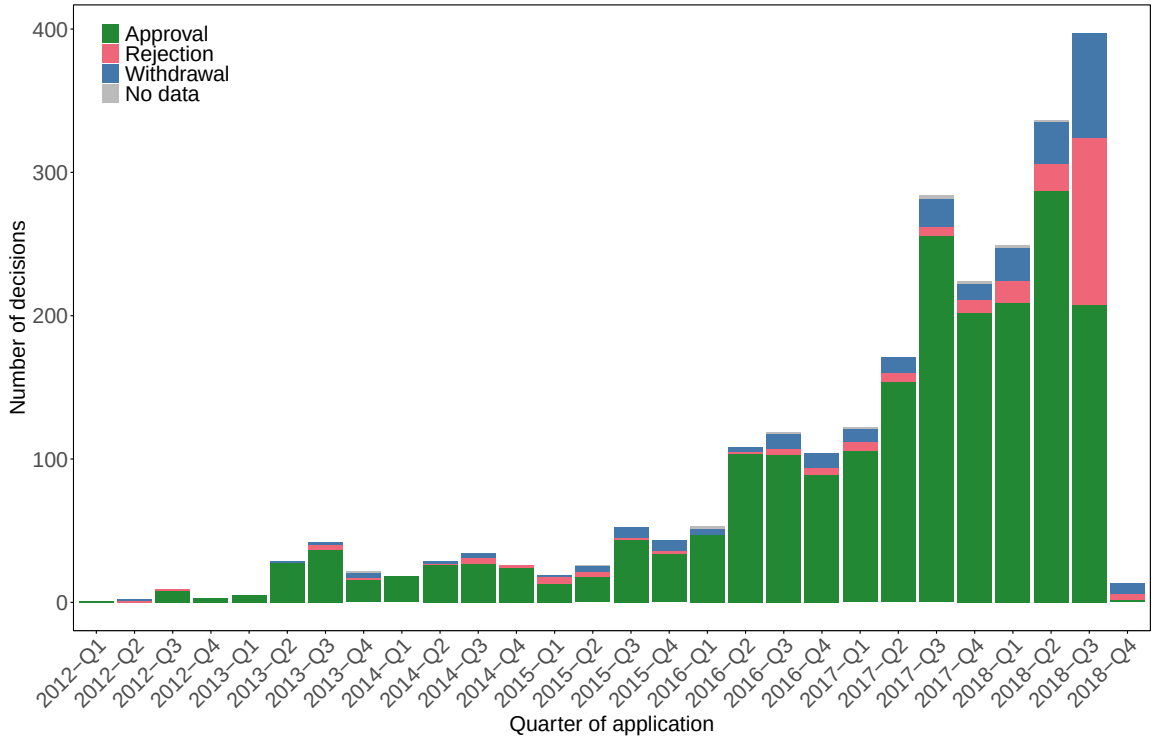
Figure 2 illustrates the number and type of decisions under the apprenticeship policy for asylum seekers during their asylum process, regardless of country of origin, categorized by quarter from 2012 to 2018. The four categories of decision types are approvals, rejections, withdrawals, and cases with no available data.

Between 2012 and 2016, the number of decisions across all categories remained relatively low and stable. However, starting in 2016, there was a sharp increase in the number of decisions, peaking around 2017. This trend reflects a surge in apprenticeship applications during this period, indicating a growing acceptance of this policy among both employers and asylum seekers.

Throughout the period, approved applications consistently outnumbered rejected ones. The typically low number of rejections reached an all-time high in the third quarter of 2018, coinciding with the policy's abolition. At the same time, withdrawals by employers, which had previously remained low, increased in 2018. This, combined with the low number of applications in the fourth quarter of 2018, demonstrates that while the policy saw little use in its early years, its popularity increased over time, with a sharp decline in applications at the cutoff date following its abolition.

Following the analysis of the apprenticeship application decisions, I now turn to evaluating how well the approved apprenticeships have fared over time. Figure 3 illustrates the insurance status of asylum seekers relative to the start date of their apprenticeships, covering a period from 12 months before to 60 months after the apprenticeship start date. The figure categorizes the insurance status into four groups: apprenticeship, employment (which includes all occupations

Figure 2: Number of applications by decision type and quarter of application



Notes: The figure shows the number and type of decisions for apprenticeship applications during the asylum process by the quarter in which the application was made through an employer.

other than apprenticeships), other insurance statuses (including insurance gaps), and cases with no data available before or after an insurance spell.[2] Detailed data for the months -12, 1, 12, 36, and 60 are reported in A.1.

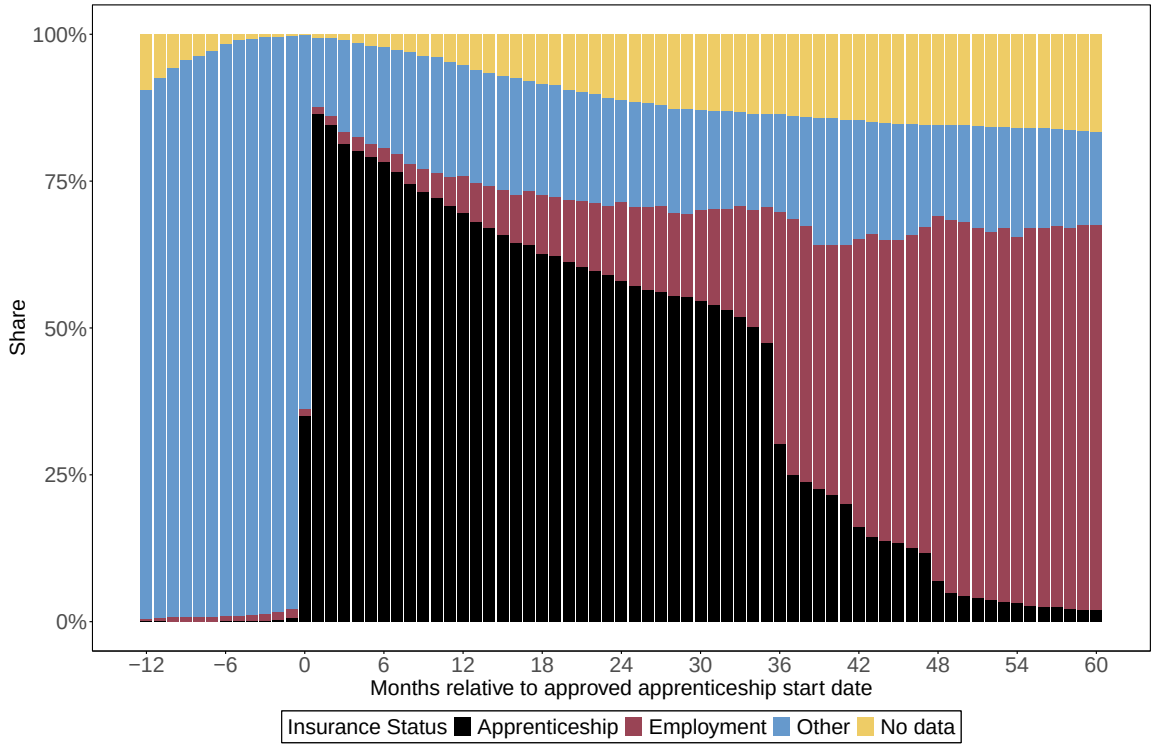
Prior to the apprenticeship start date, the majority of individuals have insurance statuses unrelated to employment,[3] indicating a dependency on welfare benefits. As the apprenticeship begins (month 0 or 1), a significant shift occurs, with a large share of individuals moving into the apprenticeship category. After the first month, there is a decreasing share of people in apprenticeships.

Following the apprenticeship, there is a gradual transition from the apprenticeship status to regular employment. This shift suggests that the apprenticeship program effectively integrates participants into the broader labor market. Most apprenticeships last three years, with some exceptions ranging from two to four years. Transitions into regular employment before the completion of the apprenticeship indicate either an unsuccessful completion (e.g., dropping out)

[2]No data before the apprenticeship start indicates that an asylum seeker did not have any insurance, suggesting either recent arrival in Austria or lack of registration for any form of insurance. No data after the apprenticeship start might indicate that a person left Austria or no longer has any recorded insurance status.

[3]Most asylum seekers are covered by Basic Subsistence Support (BSS) during their asylum process, which provides housing and basic needs.

Figure 3: Insurance statuses by month relative to apprenticeship start date



Notes: The figure shows the insurance status relative to the apprenticeship start date for all asylum seekers whose applications were approved. Employment includes all occupations other than apprenticeships. $n = 1755$.

or a voluntary shift to regular employment, likely after receiving asylum approval. Individuals who remain in apprenticeships for more than four years may have either received an extension or started a second apprenticeship within this period. The sustained increase in employment following apprenticeship completion indicates that many individuals successfully transition into other forms of employment, reflecting the long-term benefits of the apprenticeship program.

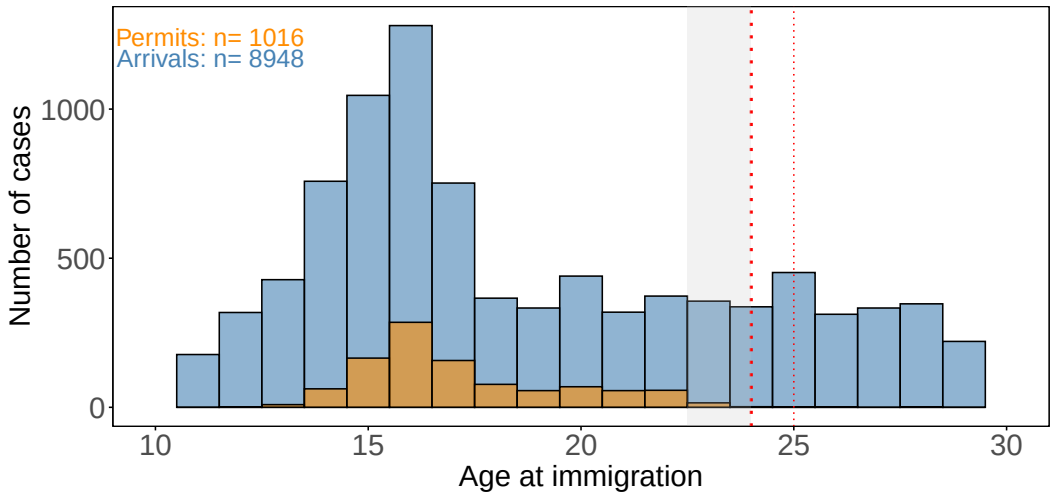
Additionally, the "Other" and "No data" categories remain relatively stable and low throughout the period, suggesting that most individuals either stay within the labor market or are well accounted for in the data. The gradual decline in the apprenticeship category corresponds with a rise in regular employment rather than an increase in other or no insurance, indicating that the apprenticeship serves as a stepping stone to broader employment opportunities rather than merely a three-year labor program. However, it is important to note that this correlation does not imply causality, as selection into apprenticeships by both employees and employers is non-random.

Fuzzy Regression Discontinuity Design

The presence of a date cutoff in September 2018 and an age cutoff of 25 years for eligibility provides an ideal context to apply a Regression Discontinuity Design (RDD), a robust method

widely applied in quasi-experimental research settings. RDDs leverage predefined cutoffs at an underlying running variable to compare individuals just above and below the cutoff, allowing for the estimation of the causal effect of the treatment by assuming that those near the cutoff are otherwise similar in all respects except for their treatment status (Thistlethwaite and Campbell, 1960; Black, 1999, e.g.,). This approach estimates the treatment effect as the difference in outcomes for individuals immediately on either side of the threshold, capturing the impact of the treatment under the assumption that, at the cutoff, any discontinuity in the outcome can be attributed solely to the treatment itself.

Figure 4: Approved apprenticeships and arrivals for Afghans by age at immigration



Notes: The figure shows the absolute number of permits for apprenticeships issued to Afghan asylum seekers and the absolute number of asylum seekers' arrivals by age groups. Included are all asylum seekers who arrived between 2014-07-01 and 2016-09-12 at the ages 11 to 29 whose asylum processes didn't take less than half a year and were not positively processed until 2012-06-26, as well as all permits for apprenticeships issued to asylum seekers between 2016-01-01 and 2018-09-12 to that group. The dotted lines indicate official and adjusted cutoff and the grey area the donut hole for the RDD.

The running variable in my RDD is the age at immigration, measured in months. Figure 4 presents the absolute number of arrivals and apprenticeship permits issued by the PES to Afghan citizens in Austria under the aforementioned policy. The figure illustrates that very few permits have been issued to asylum seekers under the age of 14[4] or over the official cutoff of 25 years. Notably, within the age range of 22.5 to 25 years at immigration, there are few observed compliers with the intended treatment. Given the unlikelihood of individuals starting an apprenticeship within their first year in Austria, and supported by empirical evidence, I adjust the cutoff to one year below the official threshold, setting it at 24 years of age. This adjustment enhances the validity of the instrument by ensuring that the estimated treatment

[4]The younger age cohorts also participated in apprenticeships but often did not rely on this policy because their asylum processes were completed before they began an apprenticeship.

effect reflects individuals who are genuinely eligible for the program. Additionally, a one-sided donut hole is applied below the adjusted cutoff, excluding observations in the age range of 22.5 to 24 years. This exclusion is necessary because only a small number of individuals in this range received a permit, likely due to insufficient time to qualify.[5] Given the observed lack of perfect compliance with the eligibility criteria—where not all individuals who met the age cutoff received the treatment (i.e., the apprenticeship permit)—a fuzzy Regression Discontinuity Design (fuzzy RDD) is employed. Unlike a sharp RDD, where the treatment assignment is strictly determined by the cutoff, a fuzzy RDD accounts for situations where the treatment is not perfectly adhered to. This allows me to estimate the Local Average Treatment Effect (LATE) rather than just the Intention-to-Treat (ITT) effect. The LATE specifically captures the effect of the policy on those who were induced to receive the treatment because of the cutoff, providing a more precise and relevant measure of the policy's impact on the population that actually received the apprenticeship permits. By focusing on LATE, the analysis directly addresses the effectiveness of the policy among the compliers, thus offering a clearer understanding of the true causal effect of the intervention.

Given the nature of the fuzzy RDD and the certainty of missing data points near the cutoff, using a simple kernel regression estimator could lead to poor boundary behavior. As highlighted by Hahn et al. (2001), kernel regression estimators can suffer from bias at the boundaries when the density of data points is low, making them less reliable in such contexts. To address this, I employ local linear regressions, which offer a more robust alternative by fitting a linear relationship within a specified bandwidth around the cutoff. Specifically, I use a bandwidth of 120 months, selected to balance bias and variance in the estimates and to account for the donut hole before the cutoff. Additionally, I apply a triangular kernel for weighting observations. The triangular kernel is particularly effective in RDD settings because it assigns more weight to observations closest to the cutoff, where the treatment assignment changes.

The primary objective of this study is to estimate the causal effect of the apprenticeship policy the following labor market outcomes:

Days employed over five years: The total number of days an individual was employed within five years after immigration, providing insight into how the policy influences early labor market integration.

Total earnings over five years: The aggregate income from labor earnings over five years, helping to assess the economic benefits of the apprenticeship program and its impact on participants' financial well-being.

[5]Both the mean and median time until the first apprenticeship started for those who did receive a permit are over two years.

Months receiving welfare benefits over five years: The number of months individuals received general welfare benefits, which serves to evaluate whether the program reduces dependency on social welfare and promotes economic self-sufficiency.

Months in Basic Subsistence Support (BSS) over five years: The duration individuals spent in the BSS program, a specific welfare initiative for asylum seekers.[6]

The model can be specified as follows:

Model Specification

To estimate the causal effect of the apprenticeship policy on labor market outcomes, I employ a fuzzy RDD. The running variable in this context is Age_I, measured in months, with a cutoff at 288 months (24 years). The fuzzy RDD design leverages the discontinuity in the probability of receiving treatment at this cutoff to identify the LATE of the policy for compliers on their labor market outcomes.

The model is specified as a two-stage process:

$$Y_i = f(\text{Age\_I}_i) + \tau \hat{D}_i + \epsilon_i$$

where Y_i is the labor market outcome for individual i, Age_I_i is the running variable representing age at immigration in months, $\hat{D}_i$ is the predicted treatment from the first stage, and ϵ_i is the error term. The parameter τ represents the LATE of the apprenticeship policy on labor market outcomes. The function $f(\text{Age\_I}_i)$ captures the smooth relationship between the running variable and the outcome, controlling for how labor market outcomes vary with age at immigration.

Since treatment is not perfectly assigned at the cutoff, the first stage models the probability of receiving treatment (apprenticeship) as follows:

$$D_i = f(\text{Age\_I}_i) + \pi_1 T_i + \xi_{1i}$$

where D_i is the treatment indicator, which equals 1 if individual i received the apprenticeship and 0 otherwise. The indicator $T_i = (\text{Age\_I}_i \geq 288)$ takes the value 1 if the individual's age at immigration is greater than or equal to the cutoff (288 months), representing the discontinuity in treatment probability. The function $f(\text{Age\_I}_i)$ is modeled using local linear regression, capturing the smooth relationship between age at immigration and the likelihood of treatment.

[6]The BSS is a welfare program for asylum seekers, providing support if their income doesn't exceed 110€ plus 80€ per family member—a threshold typically exceeded during an apprenticeship. Including both general welfare benefits (incl. BSS) and BSS specifically allows for a comprehensive analysis of the policy's effect on different forms of welfare dependency, distinguishing between broader support needs and targeted aid for asylum seekers.

The parameter π_1 measures the jump in the probability of receiving the apprenticeship at the cutoff, and ξ_{1i} is the first-stage error term.

In the second stage, $\hat{D}_i$ is the predicted treatment from the first-stage regression. The same functional form $f(\text{Age\_I}_i)$ is used to control for the smooth relationship between the running variable and labor market outcomes in the second stage, ensuring consistency with the first stage.

Given that the sample includes both accepted refugees and individuals whose asylum outcomes are unknown, the quality of some variables in the dataset is inconsistent. Due to these data limitations, additional covariates are excluded from the RDD model. However, in regression discontinuity designs, the assignment mechanism near the cutoff approximates random assignment, making individuals just above and below the cutoff comparable in both observed and unobserved characteristics (Lee 2010). Therefore, the exclusion of covariates simplifies the model without compromising the validity of the estimates.

3 Results

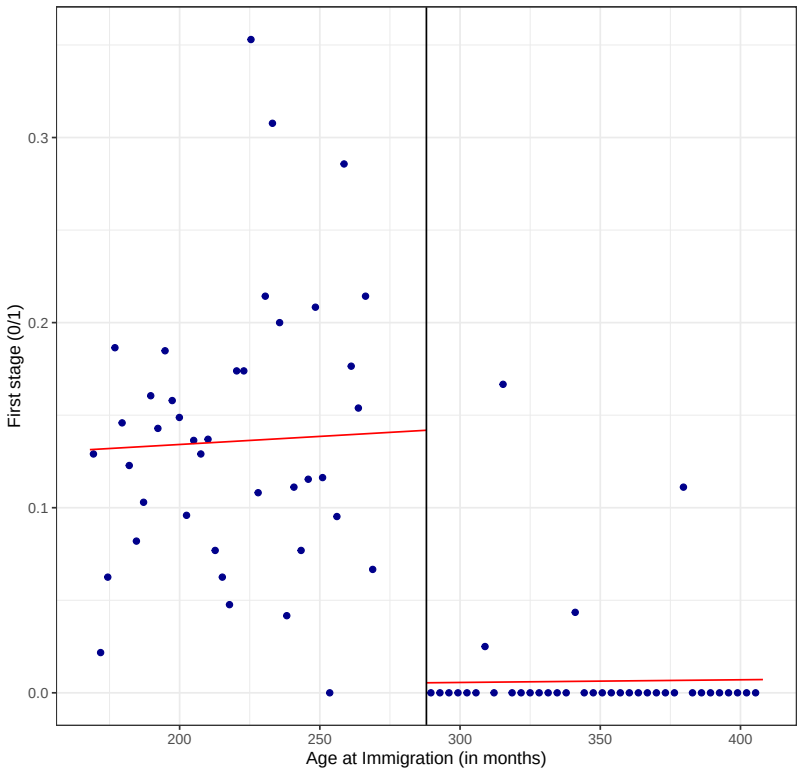
Discontinuity in the Probability of Participation

The first stage analysis, presented in Figure 5, reveals a clear and substantial discontinuity at the cutoff of 288 months (24 years) of age at immigration. The local linear regressions on either side of the cutoff show a significant increase in the probability that asylum seekers receive a permit to work in an understaffed apprenticeship before obtaining asylum status.

The first stage estimate, detailed in Table 1, column (1), highlights the statistically significant jump at the cutoff, using a bandwidth of 120 months, a triangular kernel, and a first-order polynomial. This specification ensures a robust estimation, balancing bias and variance while giving more weight to observations near the cutoff. Columns (2) and (3) confirm the robustness of the results, showing that the estimate remains significant even when alternative specifications are used, such as omitting the donut hole or employing a second-order polynomial with a uniform kernel.

This pronounced discontinuity underscores the effectiveness of the age cutoff as an instrument for treatment assignment. Importantly, within the age range of 24 to 25 years (288 to 300 months), there are no observed compliers, which justifies the adjustment of the cutoff to one year below the official threshold. This adjustment improves the validity of the instrument by ensuring that the estimated treatment effect is driven by individuals who are plausibly eligible for the program.

Figure 5: Discontinuity in the probability of participating in an understaffed apprenticeship



(a) Employment

Notes: The x-axis shows the age at immigration with the cutoff at 288 months. The y-axis displays the share of asylum seekers who started an apprenticeship before receiving asylum. A left-sided donut hole is applied.

Labor Market Outcomes

The results of the fuzzy RDD, depicted in Figure 6 and detailed in Table 2, reveal significant effects of the apprenticeship policy on key labor market outcomes five years after immigration.

Days Employed (a): The analysis shows that participation in the apprenticeship program leads to a significant increase in employment duration. Specifically, the LATE estimate indicates an increase of approximately 935 days of employment over five years for those who were just eligible for the program compared to those who were not. This substantial gain, which is significant at the 95% confidence level, highlights the effectiveness of the apprenticeship policy in enhancing long-term labor market attachment for asylum seekers.

Total Earnings (b): The results also show a significant positive impact on total earnings over the five-year period. The LATE estimate suggests an increase of around €67,759, indicating that individuals who participated in the apprenticeship program earned considerably more than those who did not. This effect is both statistically significant and economically meaningful, suggesting that the apprenticeship program not only increases employment but also improves

Table 1: First stage

Specification	(1) Main	(2) No Donut	(3) 2nd order poly.
Apprenticeship	-0.136	-0.074	-0.186
SE	(0.033)	(0.018)	(0.081)
95% CI	[-0.20, -0.07]	[-0.11, -0.04]	[-0.34, -0.03]
Bandwidth	120	120	100
Sample Size	1648 / 727	1795 / 737	1278 / 638
Kernel	triangular	triangular	uniform
Poly. order	1	1	2
Cutoff	288	288	288
Donut hole	Yes	No	Yes

financial well-being through higher earnings.

Months Receiving Welfare Benefits (c): On the flip side, the policy significantly reduces dependency on welfare benefits. The LATE estimate indicates a reduction of about 26 months in the number of months receiving welfare benefits over five years. This reduction suggests that the apprenticeship program is effective in promoting economic self-sufficiency among participants, decreasing their reliance on social welfare systems.

Months in Basic Subsistence Support (BSS) (d): Similarly, the apprenticeship policy leads to a significant decrease in the number of months individuals spent in BSS, a targeted welfare program for asylum seekers. The LATE estimate indicates a reduction of approximately 27.5 months in BSS dependency. This finding underscores the program's role in reducing long-term dependency on targeted welfare support, thereby promoting broader economic integration for asylum seekers.

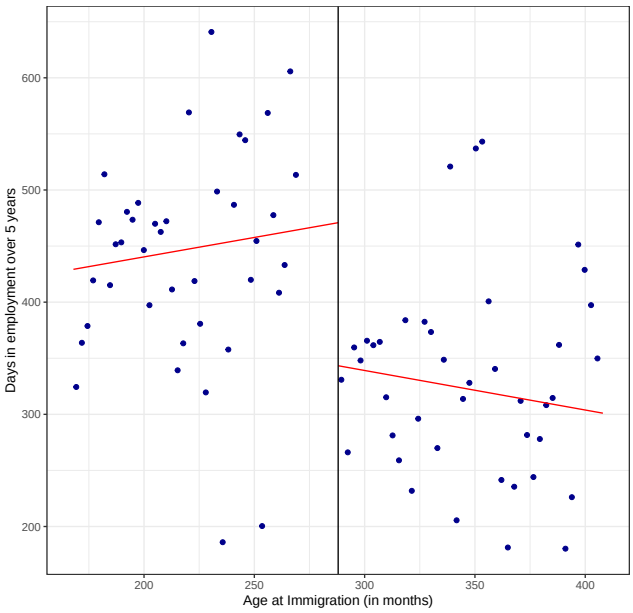
It is important to note that the gaps observed in the figures within Figure 6 represent the ITT effects rather than the LATE. These gaps provide a visual representation of the differences between the treated and untreated groups, while the LATE estimates provided in Table 2 capture the causal effect of the policy on those who actually received the treatment. While the ITT is interesting in itself, showing the average effect on all people around the cutoff, my results focus on the LATE.

Overall, these results demonstrate the substantial and positive impact of the apprenticeship program on labor market outcomes, highlighting its effectiveness in fostering employment, increasing earnings, and reducing welfare dependency among asylum seekers. The consistency of these findings across all outcomes, combined with their statistical significance, reinforces the robustness of the estimated treatment effects.

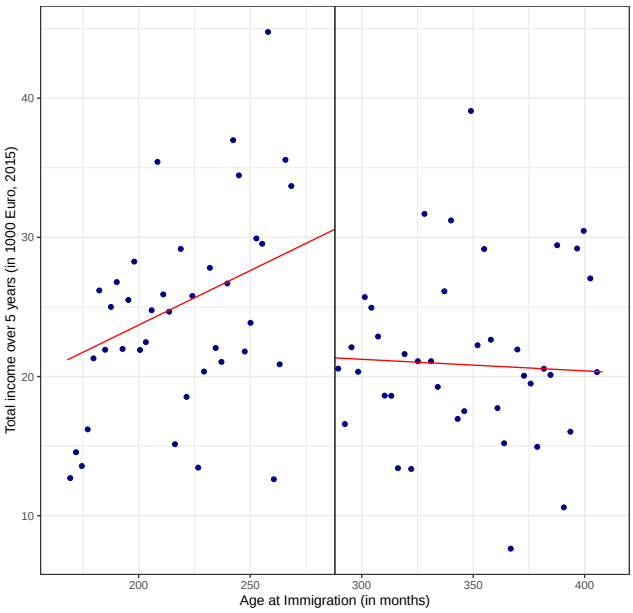
Table 2: Apprenticeships during the asylum process: Fuzzy RDD estimates, main outcomes.

Outcome	Days employed	5-yr earnings	Months benefit	Months BSS
LATE	934.646	67.759	-26.312	-27.457
SE	(357.793)	(27.455)	(12.625)	(13.491)
95% CI	[233.4, 1635.9]	[13.9, 121.6]	[-51.1, -1.6]	[-53.9, -1.0]
Bandwidth	120	120	120	120
Sample	1648 / 727	1648 / 727	1648 / 727	1648 / 727
Kernel	triangular	triangular	triangular	triangular
Poly. order	1	1	1	1
Cutoff	288	288	288	288
Donut	Yes	Yes	Yes	Yes

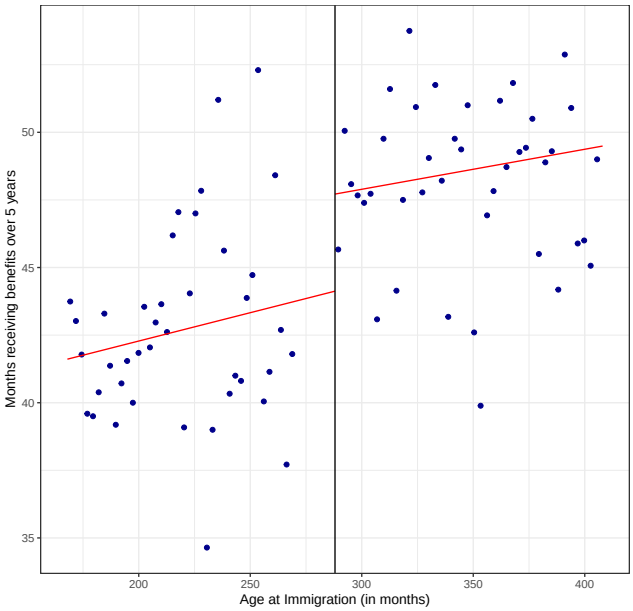
Figure 6: Discontinuity in the main outcomes at the cutoff after 5 years



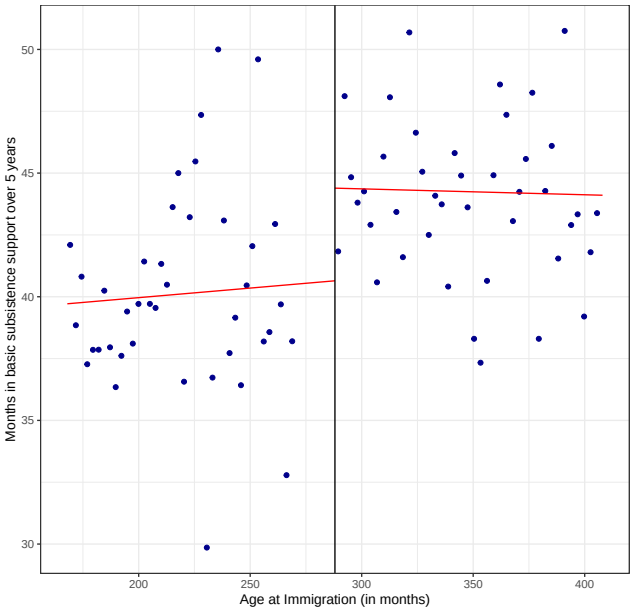
(a) Days employed



(b) Total Earnings (in 1000€)



(c) Months receiving welfare benefits

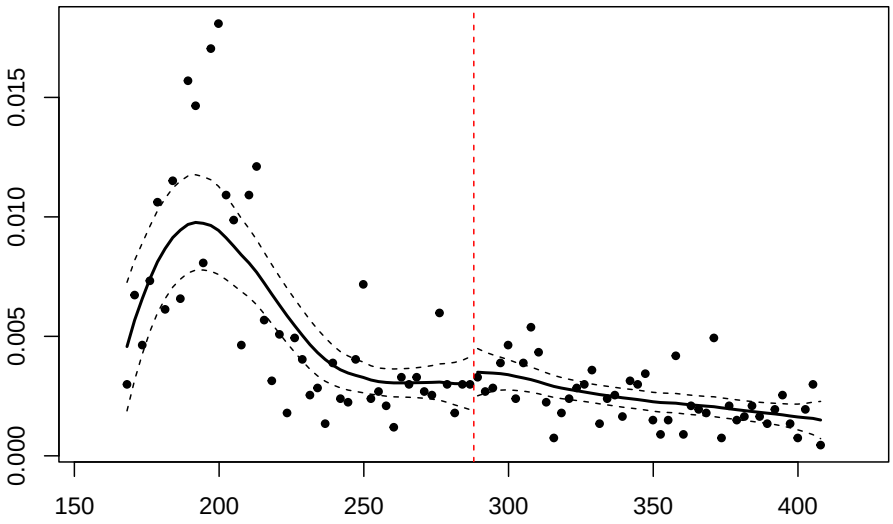


(d) Months in basic subsistence support

(No) Manipulation at the Cutoff

The validity of my RDD hinges on the assumption that there is no manipulation of the forcing variable, age at immigration, around the cutoff. To assess this, I employ the McCrary (2008) density test, which examines the continuity of the forcing variable's distribution at the cutoff point.

Figure 7: McCrary density test for forcing variable at the cutoff



Notes: The McCrary density test checks for the continuity of the forcing variable, age at immigration (in months), around the cutoff point.The plot shows the estimated density on both sides of the cutoff, along with confidence intervals.

As illustrated in Figure 7, the McCrary density test reveals no significant discontinuity in the density of the forcing variable at the cutoff. This finding indicates that there is no evidence of manipulation or sorting around the threshold, supporting the robustness of my RDD framework. The McCrary test also offers valuable insight into a debate surrounding the apprenticeship policy, which was abolished in 2018. This decision was partly influenced by political concerns that the policy might allow asylum seekers to remain in Austria even if they later received negative outcomes in their asylum process[7]. Specifically, there was apprehension that participation in the apprenticeship program could influence deportation decisions, potentially enabling asylum seekers to avoid deportation after a potentially rejected claim.

To investigate whether the policy had any impact on the likelihood of remaining in Austria, I conditioned my main analysis on individuals having any insurance coverage in Austria 78 months after arrival. If the policy had increased the probability of staying in the country, we

[7]These discussions led to the introduction of a law in December 2019 aimed at preventing deportations of asylum seekers during their asylum process.

would expect to observe a discontinuity in the density at the cutoff, which would suggest that non-participants were more likely to leave Austria.

However, the absence of such a discontinuity in the density at the cutoff provides no evidence that the policy affected the likelihood of remaining in Austria. This suggests that the apprenticeship policy did not serve as a means to avoid future deportation, despite the political concerns that led to its abolition.

Continuity Assumption

A critical assumption in the RDD is the continuity assumption, which posits that, in the absence of the treatment, there would be no discontinuity in the outcome variable at the cutoff. This assumption is crucial for ensuring that the observed treatment effect is indeed due to the treatment and not to some other factor that changes discontinuously at the cutoff.

To validate this assumption, we can analyze a group that received negligible treatment. Syrian asylum seekers provide a useful comparison group in this context. As shown in Figure A.1, there were only 34 permits issued to Syrian asylum seekers under our selection criteria, compared to 8,408 arrivals. This stark contrast suggests that Syrian asylum seekers were largely unaffected by the apprenticeship policy, making them an ideal group to test the continuity assumption.

Figure 8 presents the RDD results for Syrian asylum seekers, displaying the same outcomes as in the main analysis: days employed, total earnings, months receiving welfare benefits, and months in basic subsistence support. Importantly, the RDD graphs show no significant discontinuities at the cutoff, indicating that there is no evidence of a treatment effect for this group. The absence of a discontinuity reinforces the idea that the observed effects in the main analysis are driven by the treatment and not by other factors at the cutoff.

These findings provide strong support for the continuity assumption. The lack of a significant discontinuity for Syrian asylum seekers, who did not receive the treatment in any meaningful number, suggests that the results observed in the main analysis are attributable to the treatment itself and not to other variables that might coincidentally change at the cutoff.

The results presented in Figure 9 examine three additional variables at the cutoff to assess whether any other factors might influence our RDD estimates. Specifically, we test for discontinuities in the asylum process durations (in months), the months from immigration to policy abolition, and the months from asylum approval to policy abolition for all asylum seekers in our sample for whom we have information on positive asylum granting.

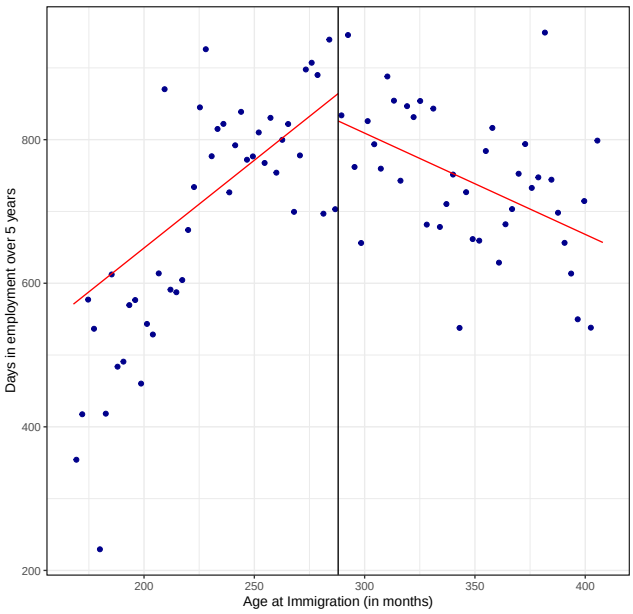
The first plot in the figure reveals no significant discontinuity in the process durations

at the cutoff. This is a critical finding because it suggests that both treated and untreated groups had similar durations of asylum processing, which means they had comparable access to the labor market. In the context of RDD, this supports the assumption that any observed treatment effect is likely due to the apprenticeship policy itself, rather than differences in the timing of process durations that could confound the results.

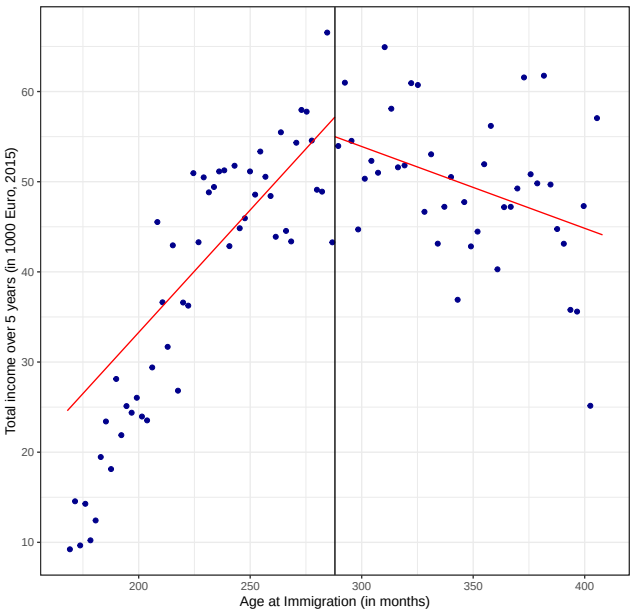
However, the second and third plots indicate slight discontinuities for the number of months from immigration to policy abolition and the months from asylum approval to policy abolition. These findings suggest that the treated group tends to have arrived in Austria and received asylum approval slightly later than the untreated group. This difference in timing could potentially introduce bias if not properly addressed. To mitigate this, our analysis focuses on outcomes measured 60 months after arrival, ensuring that the slight delay in arrival and asylum approval does not distort the estimated treatment effects.

Overall, the absence of a significant difference in process durations at the cutoff (as shown in the first plot) bolsters the validity of the RDD design. The slight timing differences identified in the second and third plots are addressed through the timing of outcome measurement, ensuring that our conclusions about the causal impact of the apprenticeship policy remain robust.

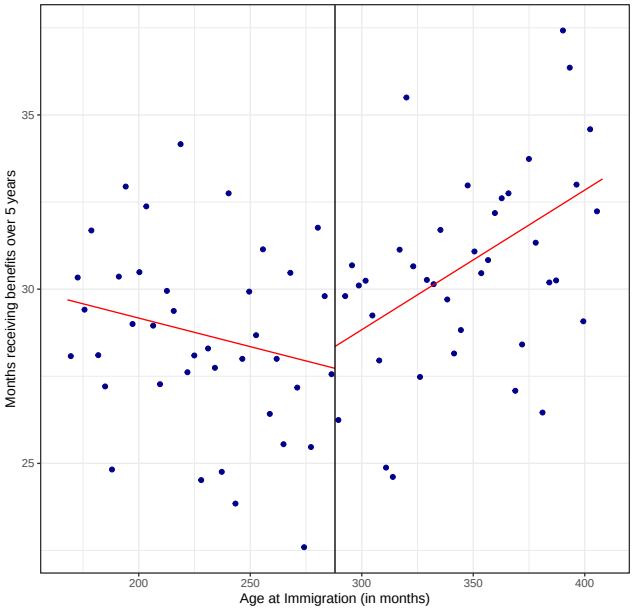
Figure 8: (No) Discontinuity in the main outcomes for Syrian asylum seekers



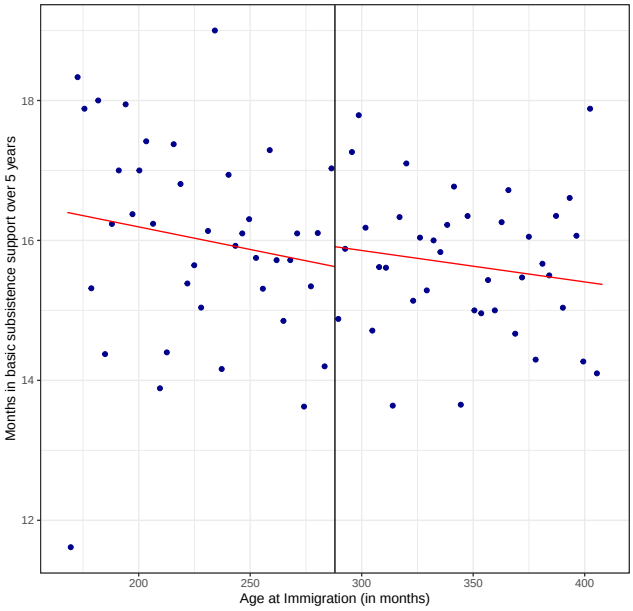
(a) Days employed



(b) Total Earnings (in 1000€)

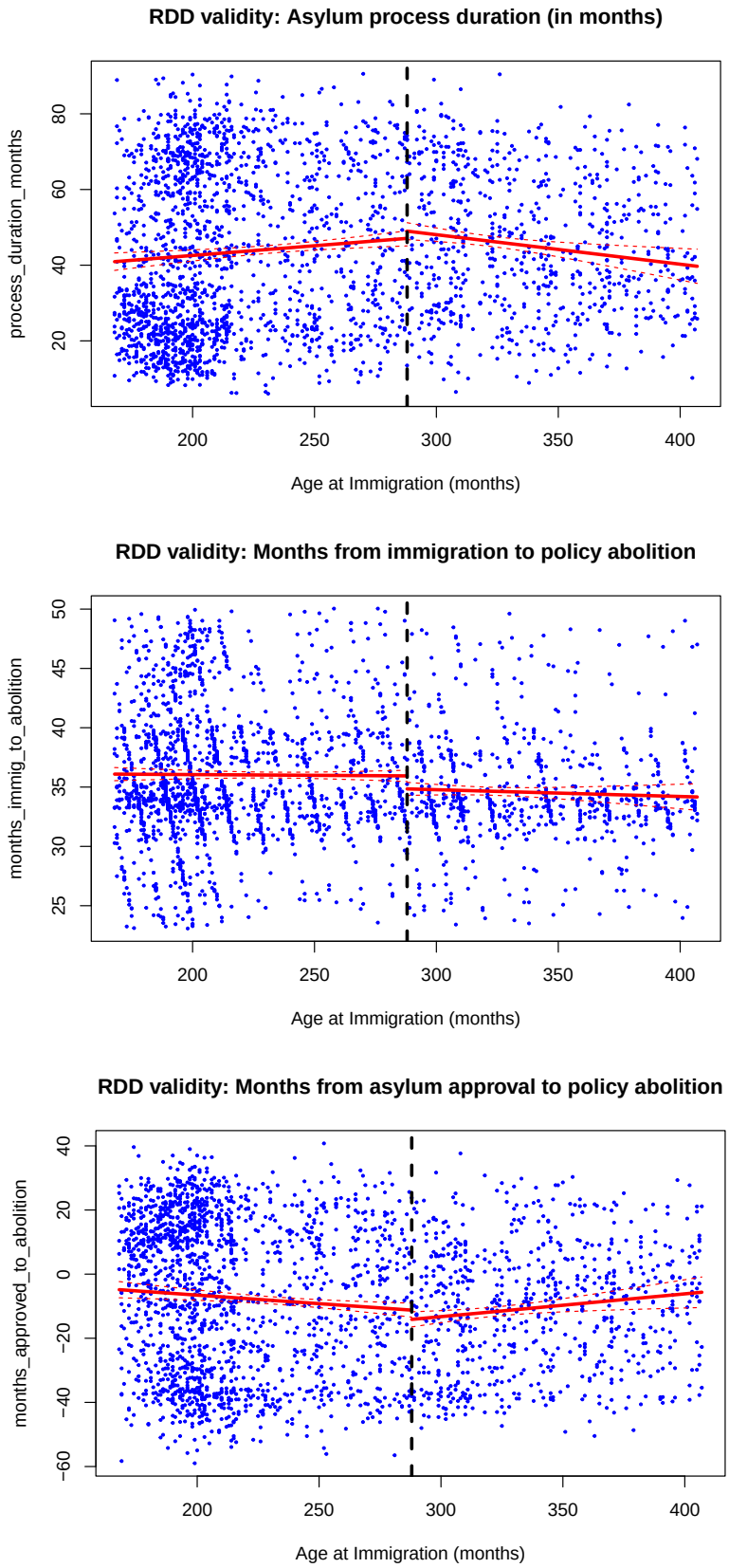


(c) Months receiving welfare benefits



(d) Months in basic subsistence support

Figure 9: Validity Tests by Month Relative to Immigration Date



Notes: The plots represent validity tests for process duration (months), months from immigration to cutoff, and months from asylum approval to cutoff.

Bandwidth Sensitivity

Figure A.4 presents the results of bandwidth sensitivity tests for the RDD estimates. The sensitivity of the first stage and the ITT estimates for the four main outcome variables are examined across a range of bandwidths around the cutoff point.

The reference bandwidth selected for the main analysis is 120 months. This choice balances bias and variance, providing a robust estimate of the treatment effect while ensuring sufficient data around the cutoff for precise estimation.

As shown in the top plot, the first stage estimate remains statistically significant at the 95% confidence level for bandwidths down to approximately 60 months. Beyond this point, the estimate loses significance, indicating that the instrument's strength diminishes as the bandwidth narrows. This finding underscores the importance of selecting an appropriate bandwidth to maintain the instrument's validity.

The lower grid of Figure A.4 illustrates the sensitivity of the ITT estimates for the four main outcomes. For each outcome, the ITT estimates remain statistically significant at the 95% confidence level across a range of bandwidths. Specifically, the estimates for days employed, total income, and months receiving welfare benefits maintain significance down to a bandwidth of approximately 60 months. The estimate for months in BSS remains significant until the bandwidth is reduced to around 40 months, beyond which the confidence intervals widen, and significance is lost.

The RDD results are robust to variations in the bandwidth, particularly in the range of 80 to 120 months. The loss of significance at narrower bandwidths highlights the trade-off between precision and bias in RDD estimation, where a smaller bandwidth reduces the sample size and increases the variance of the estimates. However, the robustness of the results within this range reinforces the reliability of the findings and supports the validity of the chosen bandwidth of 120 months for the main analysis.

4 Conclusion

This study provides a comprehensive evaluation of the apprenticeship policy for asylum seekers in Austria, specifically focusing on its impact on medium-term labor market integration. By employing a fuzzy Regression Discontinuity Design, the analysis offers robust evidence of the policy's efficacy in improving critical labor market outcomes.

The analysis reveals that, five years post-immigration, individuals who participated in the apprenticeship program were employed for approximately 935 more days than their non-

participating counterparts. This significant increase in employment stability is accompanied by a notable rise in total earnings, with participants earning an additional €67,759 over the five-year period. These findings highlight the program's success in fostering economic self-sufficiency among refugees, contributing to their integration into the Austrian labor market.

Furthermore, the study demonstrates that the apprenticeship program effectively reduces dependency on social welfare. Specifically, there is a reduction of approximately 26 months in the receipt of welfare benefits and a 27.5-month decrease in reliance on BSS. These results suggest that the policy not only promotes employment but also helps asylum seekers transition away from welfare dependency, thereby alleviating the financial burden on public resources.

Importantly, the analysis finds no evidence that the apprenticeship policy unintentionally influenced the likelihood of participants remaining in Austria. Despite political concerns that the policy could potentially prevent deportations after negative asylum outcomes, the results suggest that the observed benefits in terms of employment and reduced welfare dependency do not coincide with an increased likelihood of staying in the country.

The robustness of these findings is further supported by a series of sensitivity analyses, which confirm the consistency of the estimated treatment effects across different bandwidths. The first-stage estimates remain significant until the bandwidth is reduced to around 60 months, while the impact on days employed, total earnings, and welfare dependency also remains significant with slightly narrower bandwidths. These results affirm the reliability of the RDD approach in this context, underlining the causal impact of the apprenticeship policy.

However, it is important to acknowledge the limitations of this study. The analysis is constrained by the availability and quality of data, which may affect the precision of the findings. Additionally, the focus on Afghan asylum seekers raises questions about the generalizability of the results to other refugee groups with different backgrounds and experiences. While Afghan asylum seekers provide a relevant sample for examining the impact of the policy on refugees with long asylum process durations, their unique characteristics may differ significantly from those of other refugee populations, which is not addressed in this study.

Despite these limitations, the findings have important policy implications. The apprenticeship policy serves as a model for targeted labor market interventions that can significantly improve the integration of refugees. By providing structured training and employment opportunities, such programs not only enhance economic outcomes for participants but also contribute to social cohesion and stability. Given the positive impact observed in this study, policymakers in other countries facing similar challenges with refugee integration might consider adopting or adapting similar apprenticeship-based initiatives.

Looking ahead, future research could build on this study by exploring the long-term outcomes of apprenticeship participants beyond the five-year mark, examining the sustainability of employment and earnings gains over time. Additionally, it would be valuable to assess the impact of similar policies on different refugee populations and in varying economic contexts. Such research could provide deeper insights into the mechanisms driving successful integration and inform the development of more effective refugee support programs.

This study highlights the critical importance of targeted labor market integration programs in facilitating the economic integration of refugees. The positive outcomes observed among Afghan asylum seekers in Austria indicate that similar policies could be instrumental in addressing the broader challenges of refugee integration, offering a viable pathway to self-sufficiency and meaningful societal contribution for displaced populations.

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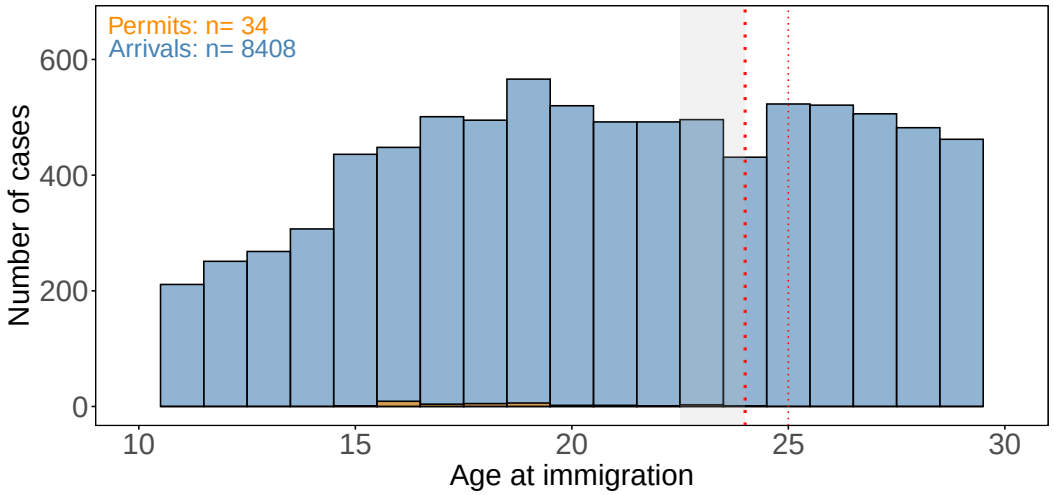
Appendix

Appendix to Wett , V. (2024). Pathways to Integration: The Effect of Apprenticeships in Understaffed Professions on Refugee Employment

A Additional tables and figures

Figure A.1: Approved apprenticeships and arrivals for Syrians by age at immigration



Notes: The figure shows the absolute number of permits for apprenticeships issued to Syrian asylum-seekers and the absolute number of asylum-seekers' arrivals by age groups. Included are all asylum-seekers who arrived between 2014-07-01 and 2016-09-12 at the ages 11 to 29 whose asylum processes didn't take less than half a year and were not positively processed until 2012-06-26 and all permits for apprenticeships issued to asylum-seekers between 2016-01-01 and 2018-09-12. The dotted lines indicate official and adjusted cutoff and the grey area the donut hole for the RDD.

Table A.1: Insurance statuses by month relative to apprenticeship start date

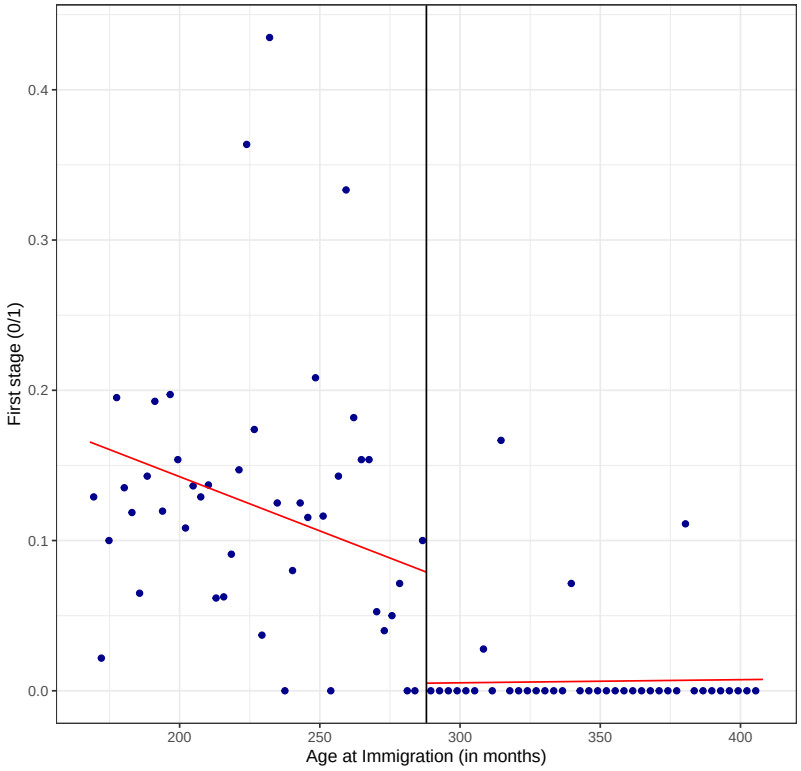
	Months relative to approved start date				
Insurance Status	-12	1	12	36	60
Apprenticeship	0.06	86.41	69.62	30.32	1.99
Employment	0.46	1.31	6.43	39.36	65.70
No data	9.56	0.63	5.23	13.71	16.61
Other	89.93	11.66	18.71	16.61	15.70
N	1758	1758	1758	1758	1758

Notes: The table reports the shares of different insurance statuses for all asylum seekers who received approval to start an apprenticeship during the asylum process. The sample is restricted to 1,758 individuals identified as asylum seekers in the ASSD and granted permission to start an apprenticeship.

Table A.2: Apprenticeships during the asylum process: Fuzzy RDD estimates without donut.

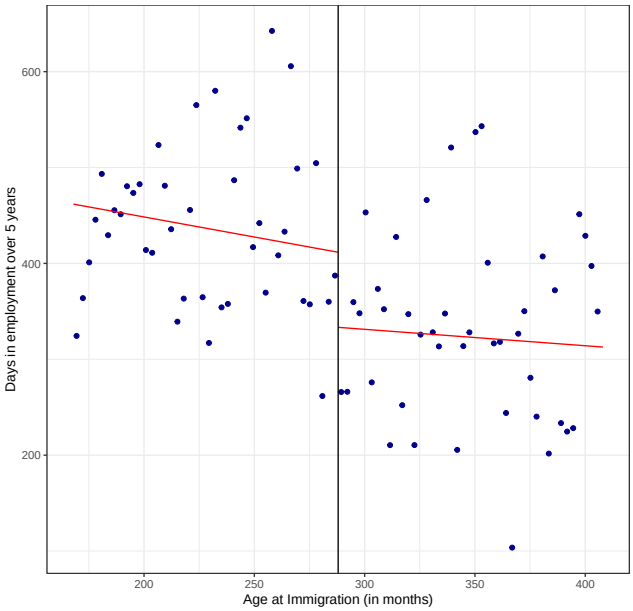
Outcome	Days employed	5-yr earnings	Months benefit	Months BSS
LATE	1059.632	67.437	-29.879	-31.094
SE	(491.599)	(35.043)	(18.295)	(19.842)
95% CI	[96.1, 2023.1]	[-1.2, 136.1]	[-65.7, 6.0]	[-70.0, 7.8]
Bandwidth	120	120	120	120
Sample	1795 / 737	1795 / 737	1795 / 737	1795 / 737
Kernel	triangular	triangular	triangular	triangular
Poly. order	1	1	1	1
Cutoff	288	288	288	288
Donut	No	No	No	No

Figure A.2: Discontinuity in the probability of participating in an understaffed apprenticeship without donut.

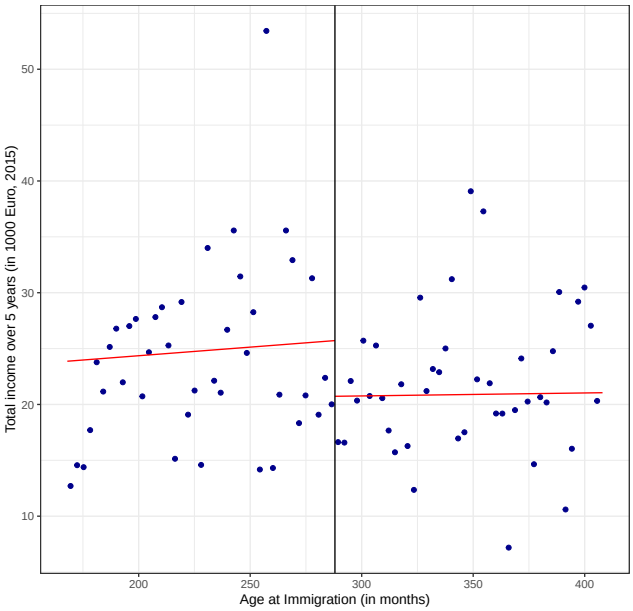


Notes: The x-axis shows the age at immigration with the cutoff at 288 months. The y-axis displays the share of asylum-seekers who started an apprenticeship before receiving asylum.

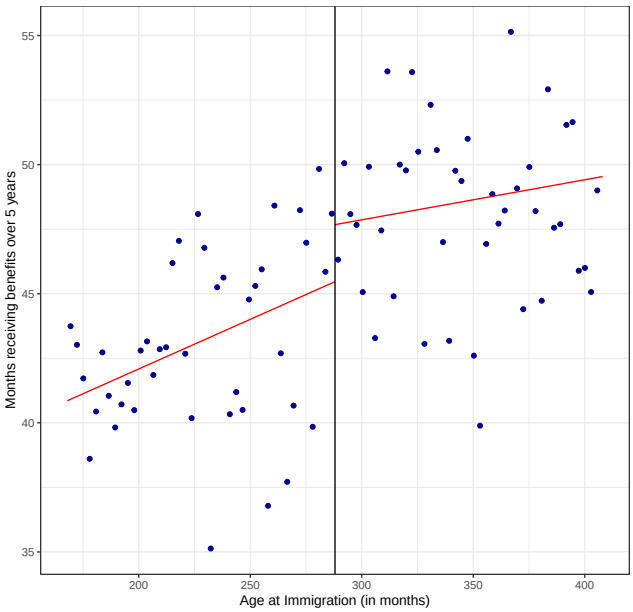
Figure A.3: Discontinuity in the main outcomes at the cutoff after 5 years without donut.



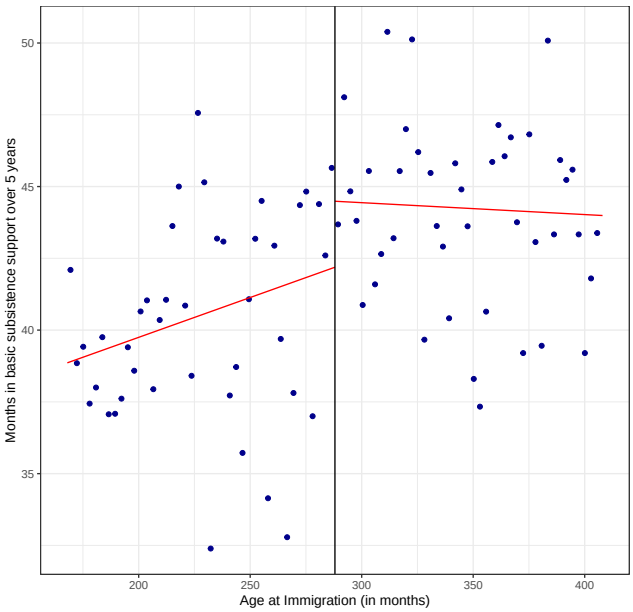
(a) Days employed



(b) Total Earnings (in 1000€)



(c) Months receiving welfare benefits



(d) Months in basic subsistence support

Table A.3: Apprenticeships during the asylum process: Fuzzy RDD estimates, Syrian asylum-seekers.

Outcome	Days employed	5-yr earnings	Months benefit	Months BSS
LATE	-7223.951	-548.943	27.284	7.207
SE	(8580.672)	(646.101)	(140.376)	(77.418)
95% CI	[-24041.8, 9593.9]	[-1815.3, 717.4]	[-247.8, 302.4]	[-144.5, 158.9]
Bandwidth	120	120	120	120
Sample	973 / 1153	973 / 1153	973 / 1153	973 / 1153
Kernel	triangular	triangular	triangular	triangular
Poly. order	1	1	1	1
Cutoff	288	288	288	288
Donut	Yes	Yes	Yes	Yes

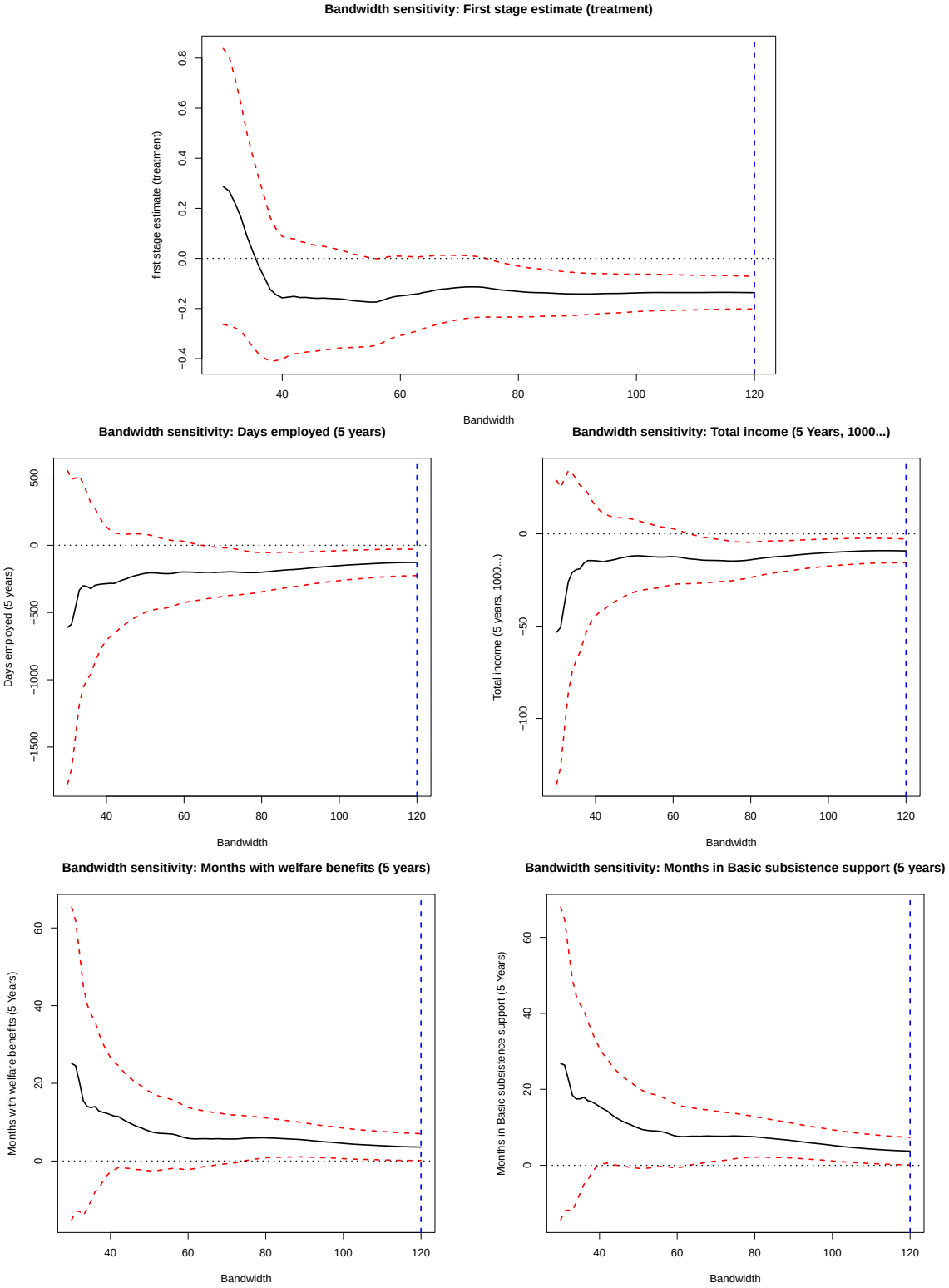
Table A.4: Apprenticeships during the asylum process: Fuzzy RDD estimates, 2.5 years in Austria

Outcome	Employed	Earnings	Benefits	BSS
LATE	1.335	16.585	-1.144	-1.121
SE	(0.374)	(7.279)	(0.402)	(0.437)
95% CI	[0.6, 2.1]	[2.3, 30.9]	[-1.9, -0.4]	[-2.0, -0.3]
Bandwidth	120	120	120	120
Sample	1648 / 727	1648 / 727	1648 / 727	1648 / 727
Kernel	triangular	triangular	triangular	triangular
Poly. order	1	1	1	1
Cutoff	288	288	288	288
Donut	Yes	Yes	Yes	Yes

Table A.5: Apprenticeships during the asylum process: Fuzzy RDD estimates, 5 years in Austria

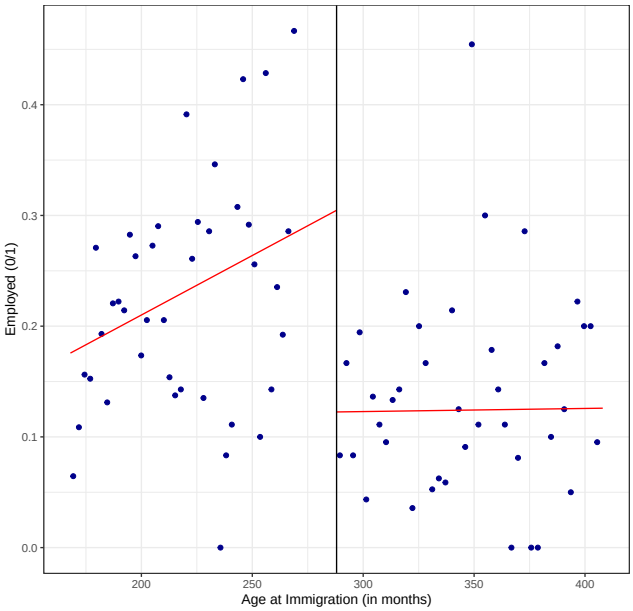
Outcome	Employed	Earnings	Benefits	BSS
LATE	0.355	27.628	-0.396	-0.571
SE	(0.454)	(13.792)	(0.416)	(0.388)
95% CI	[-0.5, 1.2]	[0.6, 54.7]	[-1.2, 0.4]	[-1.3, 0.2]
Bandwidth	120	120	120	120
Sample	1648 / 727	1648 / 727	1648 / 727	1648 / 727
Kernel	triangular	triangular	triangular	triangular
Poly. order	1	1	1	1
Cutoff	288	288	288	288
Donut	Yes	Yes	Yes	Yes

Figure A.4: Bandwidth sensitivity tests for RDD estimates

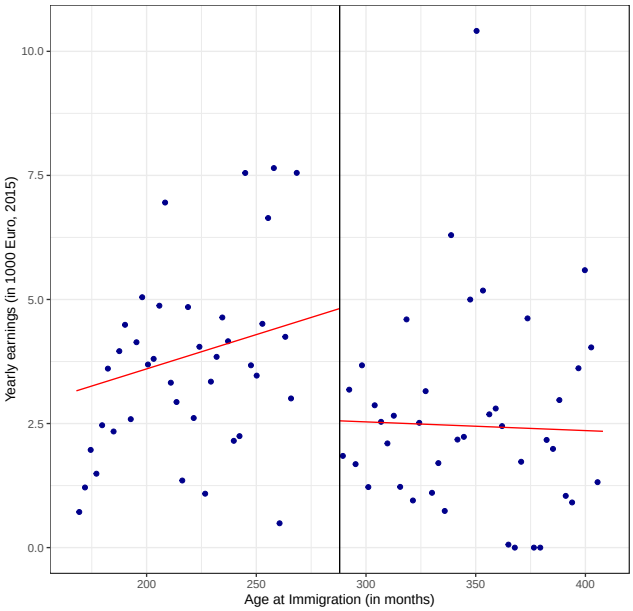


Notes: The top plot shows the sensitivity of the first stage (treatment assignment) estimate to different bandwidths around the cutoff point. The 2x2 grid below displays the sensitivity of the ITT estimates for each of the main outcome variables: days employed (5 years), total income (5 years, 1000€), months with welfare benefits (5 years), and months in basic subsistence support (5 years). Each plot shows how the ITT estimate and its 95% confidence interval vary as the bandwidth changes, providing insight into the robustness of the RDD results. A vertical line is included at the selected reference bandwidth of 120 months. The signs of the coefficients are flipped and a negative coefficient in this figure corresponds to a positive sign of the same magnitude in the results table and vice versa.

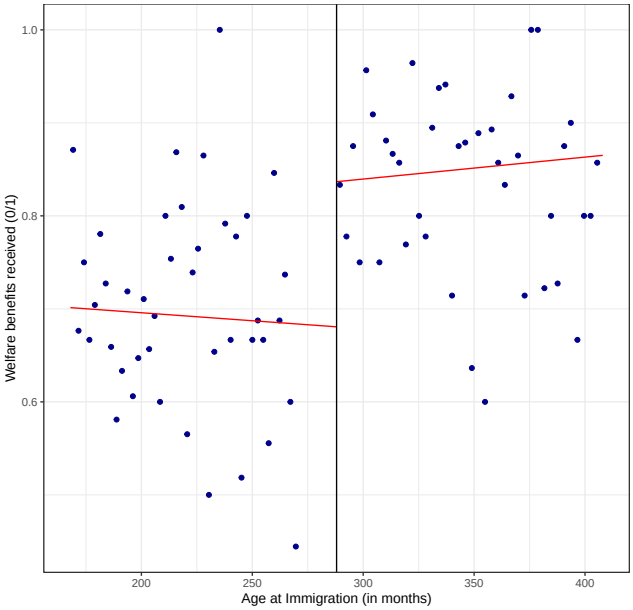
Figure A.5: Discontinuity in outcomes after 2.5 years in Austria



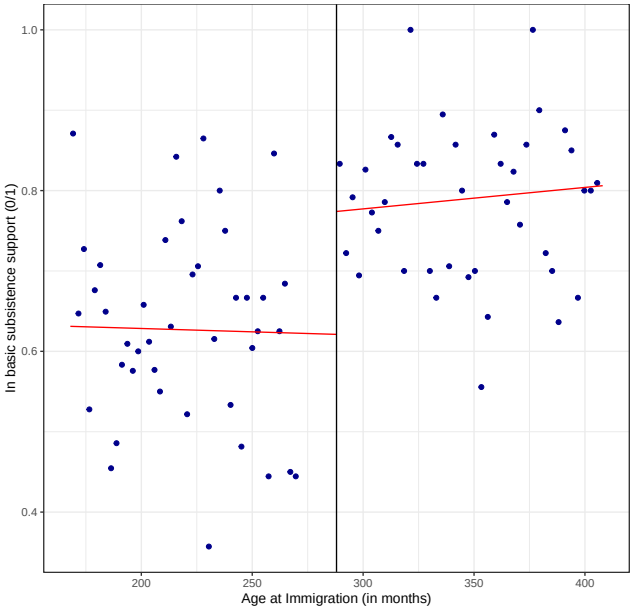
(a) Employment



(b) Yearly Earnings (in 1000€)

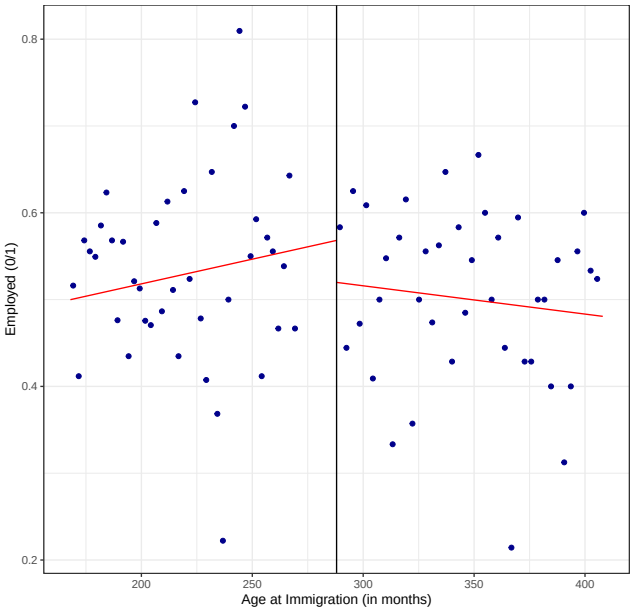


(c) Welfare benefits receipt

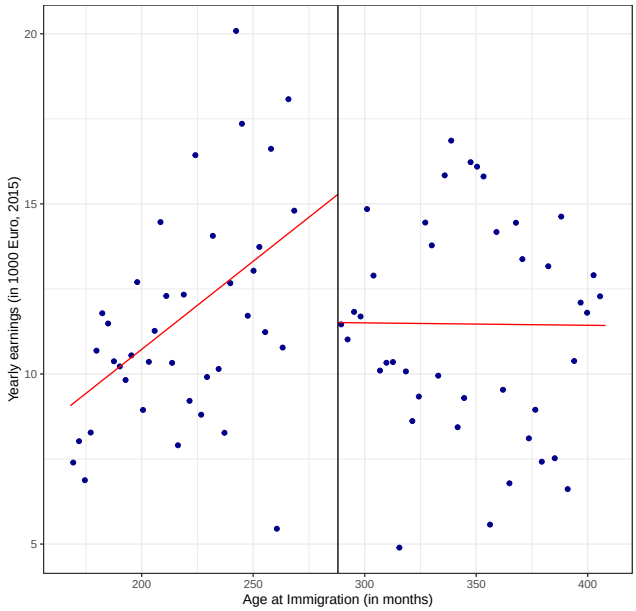


(d) Basic subsistence support

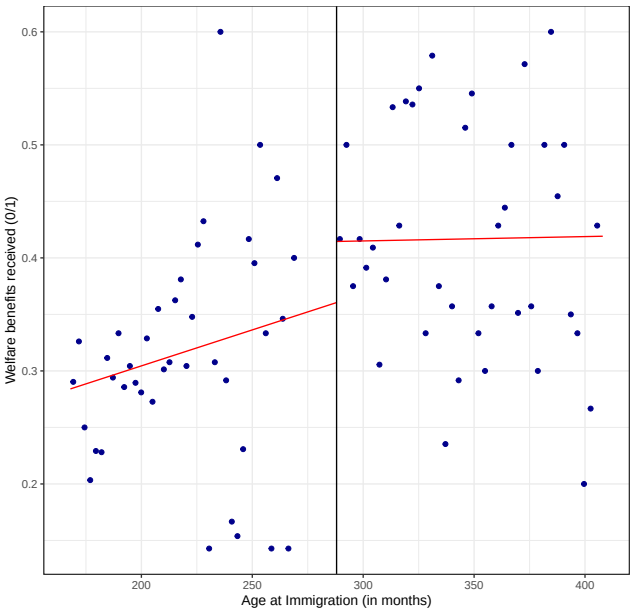
Figure A.6: (Smaller) Discontinuity in outcomes after 5 years in Austria



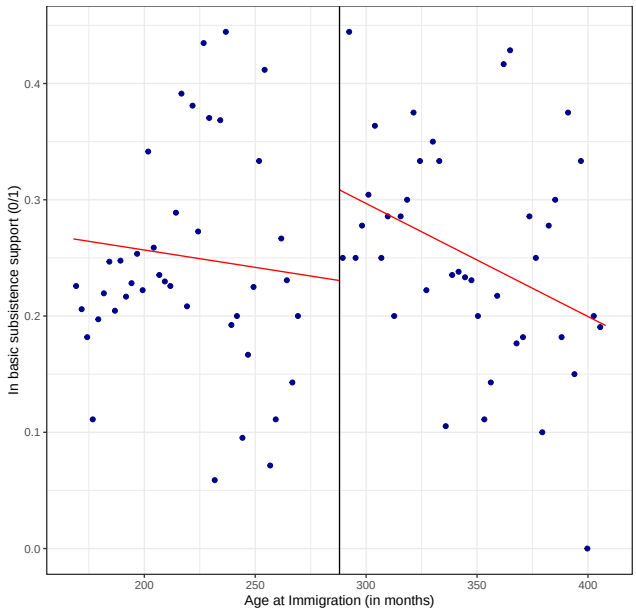
(a) Employment



(b) Yearly Earnings (in 1000€)



(c) Welfare benefits receipt



(d) Basic subsistence support