Causal Effects of Immigration on Crime: Quasi-Experimental Evidence from a Large Inflow of Asylum Seekers.*

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Immigrants' expected duration of residence in host countries may influence not only efforts to integrate into the labor market but also criminal activity. We make use of the quasi-experimental regional allocation of asylum seekers in Germany in order to estimate the effect of their recent inflow on changes in crime rates. We establish three main findings: First, crime rates increase only slightly in response to the exceptional inflow of asylum seekers. Second, the increase in crimes is driven by the newcomers. Third, only the inflow of asylum seekers from countries with low protection rates causes the increase in crime rates. Our results suggest that the underlying channel is worse labor market access due to the restricted perspective of living in Germany.

Keywords: Crime; immigration; natural experiment; regional assignment; distribution policy; asylum seekers
JEL classification: F22, J15, K42, R10

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1 Introduction

The classical economic theory of crime stresses the relative returns from legal vs. illegal activity (Becker, 1968; Ehrlich, 1973). For immigrants, the returns from legal employment may depend—among other things—on the temporary duration of staying in the host country (Cortes, 2004; Dustmann & Görlach, 2016a,b). Does that, in turn, result in a higher likelihood for temporary migrants to engage in criminal behavior?

Most studies analyzing the relationship between immigration and crime conclude that immigration, if at all, only marginally increases crime in host countries (Butcher & Piehl, 1998b,a, 2007; Moehling & Piehl, 2009; Spenkuch, 2013; Bianchi, Buonanno & Pinotti, 2012). These studies, however, focus on environments of long-term labor immigration. The most recent period of refugee immigration faced by many European countries is very distinct from this setting. Refugees are different from labor migrants (Cortes, 2004; Chin & Cortes, 2015) and seem to exhibit higher levels of criminal behavior compared to natives (Bell, Fasani & Machin, 2013; Damm & Dustmann, 2014; Couttenier, Preotu, Rohner & Thoenig, 2016). This effect may be a result of shorter durations of stay or worse labor market prospects for immigrants (Bell et al., 2013; Damm & Dustmann, 2014), of the "violent legacy" of exposure to conflict in the home countries (Couttenier et al., 2016), of higher reporting behavior for crimes committed by refugees as opposed to by natives (Pfeiffer, Baier & Kliem, 2018) or of a different selection of people.

In this paper, we present the first empirical analysis on how immigrants' expected duration of staying in the host country influences criminal activity. In the framework of the standard Becker/Ehrlich model on the economics of crime, labor market opportunities play a crucial role for determining the benefits from legal activities. Labor market opportunities differ substantially across asylum seekers, not least due to differing probabilities of staying in the host country. Not all applicants will receive asylum such that some will have to leave the host country eventually,

implying a short duration of their stay. To the extent that the temporariness of immigration varies, asylum seekers' efforts for integration appear to also vary (Cortes, 2004; Dustmann & Görlach, 2016a). This effort, in turn, influences labor market opportunities and thus the relative returns to crime. Hence, this argument predicts higher crime rates for asylum seekers with a low probability of staying in the host country relative to those with a high probability of staying. Related to the previous argument, a few papers have shown that granting legal status to illegal immigrants reduces their criminal behavior likely due to legal labor market access (Baker, 2015; Mastrobuoni & Pinotti, 2015; Freedman, Owens & Bohn, 2018). However, illegal immigration is not the focus of this study but, instead, the effect of different legal statuses that imply different perspectives for integration.

The setting of this study is the exceeptionally large recent influx of asylum seekers to Europe. Within Europe, Germany is by far the largest host country for people seeking asylum in recent years in absolute terms. In 2015 alone, 890,000 asylum seekers entered Germany making up more than 1% of the entire native population. They arrived mainly from the Middle East, South-Western Asia and Africa (Bundesministerium des Innern, 2016). Hence asylum seekers arrived from countries with various domestic political situations and as a result have different chances of receiving asylum. This very recent group of asylum seekers consists predominantly of young males of age 15 to 35, the demographic group which is considered at highest risk to commit crimes (Freeman, 1999).

In general, the main challenge for identifying a causal effect of immigration on crime is regional sorting of immigrants along their preferences for committing crime or based on labor market prospects (Spenkuch, 2013; Edin, Fredriksson & Åslund, 2003). The literature has addressed this self-selection issue either by making use of instrumental variables (IV) or of dispersal policies. A common IV approach uses the share of previous immigrants already present in a region as an instrument for contemporaneous immigration to that region (Altonji & Card, 1991; Card,

2001). Based on this approach, the literature finds only negligible effects of immigration on crime for the US (Spenkuch, 2013) and for Italy (Bianchi et al., 2012). As predicted by the economic theory of crime, this effect is larger for crimes with higher expected financial gains, such as theft and robbery, and is most pronounced for immigrants with poor labor market prospects (Spenkuch, 2013). The German case is analyzed by Dehos (2017) for the years 2010-2015, i.e. before the inflow of asylum seekers reached its peak. For asylum seekers he finds no effect on crime except for specific offenses such as against the asylum law. However, this approach has recently been heavily criticized by David A. Jaeger (2018) on the basis of conflating short- and long-run responses to immigration. An alternative approach to estimating a causal effect from immigration employs a dispersal policy. In doing so, Piopiunik & Ruhose (2017) find large effects of immigration on crime for the case of ethnic German immigrants from the former Soviet Union to Germany in the 1990s and early 2000s, mainly in densely populated regions with a large share of foreigners and high pre-existing crime levels. For the recent inflow of asylum seekers to Germany, Gehrsitz & Ungerer (2016) show that districts that host a large-scale reception center are more likely to experience an increase in drug offenses. Our study also relates to the literature investigating the relation between asylum recognition rates and the number of applications on a cross-country level (Görlach & Motz, 2017; Missirian & Schlenker, 2017). However, we are not aware of any other study on the relation between recognition rates and criminal behavior. This is our main contribution.

This study analyzes the causal effect of the exceptionally large influx of asylum seekers on crime in Germany. To this end, we employ an asylum seeker dispersal policy as a source of exogenous variation. This quasi-experimental allocation allows us to overcome the endogenous settlement patterns of immigrants and allows estimating causal effects of asylum immigration on crime outcomes.

Our empirical results indicate that the large influx of asylum seekers to Germany increased

crime overall and theft in particular by a small but statistically significant extent. We estimate that a one percent additional inflow of asylum seekers in 2015 increases overall crime rates as well as theft by 4.6 percent in 2016. This increase is entirely driven by the local influx of those asylum seekers who have a low probability of receiving protection. On the flipside, the inflow of asylum seekers with a high probability of staying does not affect crime rates at all. These results are robust to various checks. We analyze suspects by nationality to check whether the effect is driven by natives who victimize asylum seekers, e.g. by hate crime (see Entorf & Lange, 2017). We find no empirical support for this potential channel. In addition, we check whether police forces are more attentive about crime committed by foreign-looking individuals and again find no empirical support and thus no indication of police discrimination.

We contribute to the literature on the impact of immigration on crime by investigating how the inflow of asylum seekers from countries with high vs. low chances to receive a residence status affects crime rates in the host country. Moreover, we provide new evidence on the consequences of dispersal policies and labor market restrictions in times of mass immigration from persons with a high criminal risk, i.e. males in the age group of 15 to 30. Our setting is very recent which allows only for short-term outcomes. Notwithstanding, our results have major scope for policy actions.

This study is structured as follows. The next section very briefly sets out the theoretical framework and develops a clear testable hypothesis. Section 3 explains the institutional background on the asylum system in Germany and how asylum seekers are distributed across German regions. Data and descriptive statistics are explained in section 4. The estimation models are described in detail in section 5, and results presented in 6. We conclude in section 7.

2 Conceptual Framework

According to the economic theory of crime developed by Becker (1968) and Ehrlich (1973), a crime is committed when expected benefits exceed expected costs. Expected costs are composed of the risk of being detected and the corresponding punishment of conviction. In addition, there are opportunity costs from forgone earnings if an offender is convicted and in prison. The theory was developed with a focus on property crimes such as theft and burglary as, for these types of crime, benefits arguably lie mainly in the economic value of an illegitimately acquired good. Costs and benefits of committing a crime may differ for asylum seekers as compared to natives or to other immigrants. We will focus on the different crime risks among the group of asylum seekers.

Incentives for committing crimes in the host country may differ by the country of origin due to different integration prospects induced by differing probabilities of stay. For example, for asylum seekers from countries currently enduring violent conflicts the chances for receiving asylum are higher than for asylum applicants from countries with other, harder to prove, reasons to emigrate. Cortes (2004) and Dustmann & Görlach (2016a) highlight the fact that expected temporariness of migration also influences economic behavior of immigrants with respect to efforts for integration. In addition, it has been shown that granting a legal status and thus labor market access to illegal immigrants reduces their criminal activity (Baker, 2015; Mastrobuoni & Pinotti, 2015; Freedman et al., 2018). We argue that the likelihood of receiving a protection status shapes individual expectations of being able to stay and work in the host country and thus influences not only the effort for integration and but also criminal activity.

Consider the case of two different countries j from which asylum seekers are displaced, *Highlandia* (h) and *Lowlandia* (l).[1] Both countries differ only by the expected chances for their

[1] The actual distribution of protection rates in our empirical setting supports the existence of two groups of countries rather than three or more groups, see section 4.

emigrants of receiving asylum or similar legal protection with $E(asyl = 1|j = h) > E(asyl = 1|j = l)$. Thus, *Lowlandians*' expected duration of stay in the host country is shorter than *Highlandians*' as the former face a higher risk of being deported. Moreover, asylum seekers whose claim is denied may be prohibited from working. In consequence, incentives and possibilities for integration or assimilation into the host country are considerably lower for *Lowlandians* compared to *Highlandians*, resulting in lower costs for *Lowlandians* in committing crime. Assuming at the same time similar benefits of crime for *Lowlandians* and *Highlandians*, we hypothesize:

H: Asylum seekers from countries with a low probability of being able to stay commit more crimes than asylum seekers from countries with a high probability.

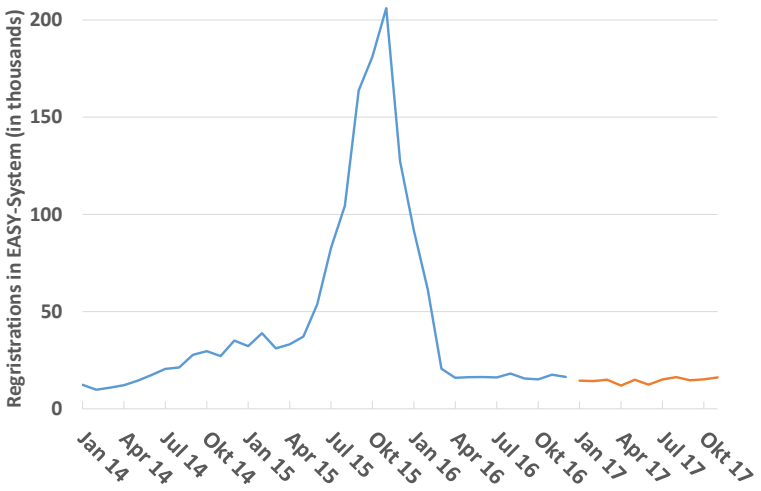
3 Institutional Details on Asylum Seekers in Germany

In the recent period of large migration flows from people seeking refuge in Europe, Germany received by far the largest absolute number of asylum seekers of any European country.[2] The number of newly registered persons seeking protection reached a historical maximum in November 2015 (see figure 1).[3] In addition to the enormous magnitude, the inflow came rather unexpectedly and official forecasts for the number of incoming asylum seekers had to be corrected upwards several times over the course of 2015. This inflow came to an abrupt halt in early 2016 due to an agreement between the European Union and the Turkish government as well as the closing of several borders along the so-called Balkan migration route. Therefore the large inflow of asylum seekers over the course of 2015 resembles a one-time shock. For this reason, we will later use the

[2]We use the term "asylum seekers" throughout this study in order to refer to the large influx of immigrants around 2015 arriving from Near and Middle East, Asia and Africa, who presumably had the intention to claim asylum in Germany. Even though an asylum seeker might be acknowledged as a refugee at some point in time or some persons may deliberately refrain from filing an asylum application, we keep using the term asylum seekers for consistency reasons.

[3]The absolute levels of these registration numbers should not be over-interpreted as they have been criticized for containing duplicates. In addition, some immigrants may have moved on to abroad such that these flows should not be taken as stocks (Brücker, Hauptmann, Sirries & Vallizadeh, 2017).

Figure 1: Development of number of persons seeking protection in Germany



Source: Own figure, data on registrations in the EASY system from Bundeszentrale für politische Bildung, 11.12.2017. Structural time series break since 2017 due to alterations in registration procedure.

inflow of asylum seekers as the main explanatory variable.

The demographic characteristics of the newly arriving asylum seekers are clearly set: the majority of these immigrants are young and male. For instance, the share of males among all first time applicants for asylum in Germany in 2016 was 65.7 percent and the share of applicants below the age of 30 was 73.8 percent (BAMF, 2017, p. 21). As is well documented in the literature, young males have the highest probability of becoming criminally active, especially for violent crimes (Piopiunik & Ruhose, 2017; Pfeiffer et al., 2018).

3.1 Asylum Applications and Labor Market Access

The Federal Office for Migration and Refugees (BAMF) is responsible for processing asylum applications. It can grant several different protection statuses for persons seeking refuge due to persecution from state or non-state players or due to a high risk of serious harm in the home country. A person holding one of these statuses is allowed to stay in Germany for at least one

Table 1: Outcomes of the asylum application

Outcome	Length of Temporary Residence Permit	Permanent Residence Permit	Labor Market Access
Refugee Protection under Geneva Refugee Convention	3 years	after $3-5$ years	unrestricted
Asylum under German constitution	3 years	after $3-5$ years	unrestricted
Subsidiary Protection	1 year	after 5 years	unrestricted
Ban on Deportation	1 year	after 5 years	restricted
Ordinance on Deportation	$7-30$ days	no entitlement	restricted

Source: BAMF, own representation

year with the possibility of several extensions. After five years, an unrestricted residence permit can be obtained. Table 1 summarizes the differences in these protection statuses in terms of the duration of the temporary residence permit, the time to acquire a permanent residence permit and the possibility to take up work.[4]

Immigrants whose application for asylum got rejected are obliged to leave the country within one week or a month. If this does not happen, another institution—the local foreigner office—is responsible for the return of the rejected asylum seekers. According to information provided by the German Parliament, 25 percent of all asylum application where rejected in 2016 and therefore these applicants were bound to leave the country (Deutscher Bundestag, 2017b). However, the foreigner offices have struggled with this task severely in the aftermath of the large influx of asylum seekers. In May 2017, 214,549 persons who are bound to leave the country were still living in Germany (ibid). Thus, return migration of rejected asylum applicants remains rather sluggish and is accompanied by a high degree of uncertainty, potentially leading to increased incentives for criminal activity.[5]

[4] In addition, there may be illegal immigrants who are precluded from working and thus have low opportunity costs of committing crimes (Mastrobuoni & Pinotti, 2015).

[5] According to BAMF (2017), there are several reasons for delayed returning of rejected asylum applicants: (i) rejected applicants have health issue which do not allow for deportation, (ii) rejected applicants delay the

Persons holding a protection status are generally free to pick up any kind of employment. One exception is constituted by persons with a ban on deportation. They have to obtain the agreement from their local foreigners office as well as from the local employment agency. The second agreement is especially problematic since the employment agencies are instructed to verify that there is no other candidate available from an EU country who could do the job ("proof of precedence"). Only after 15 months of residence in Germany, this restriction is removed.

While asylum applications are pending, the same severe restrictions to labor market access apply. The process to reach a decision on the asylum application took on average 8.7 months in 2016 (BAMF, 2017, p. 55).[6] In addition, newly-arrived asylum seekers had to wait on average for 4.5 months before being able to hand in their application (Deutscher Bundestag, 2017a). As a consequence, most of the asylum seekers arriving in the fourth quarter of 2015 were only able to apply for asylum in 2016 and many had to wait for the decision for over half a year.

Note that there is generally no consequence of criminal delinquency on the outcome of the asylum process. Only asylum seekers who are sentenced for one year or more of imprisonment forfeit their right of an asylum claim.

3.2 Regional Assignment of Asylum Seekers

Newly-arrived asylum seekers are distributed across all German districts according to a dispersal policy. Asylum seekers are distributed in two steps, first across federal states and then, within federal states, across districts and communities. At the first stage, asylum seekers are assigned by a quota which relies on state's tax revenues and population size ("Königsteiner Schlüssel"). The second stage of this regional assignment is usually based solely on population size, with the details of the process varying across federal states (Geis & Orth, 2016). More precisely, eight

deportation by going to hide, (iii) the sending countries deny the return of the emigrant, (iv) organisational or diplomatic complications as no official travel documents are available or obtainable.

[6]The median was 6 months for proceedings decided in Germany in 2016 (BAMF, 2017, p. 55). While the majority of proceedings was closed in below six months' time (55,7 percent), a substantial fraction took longer than this and 21.2 percent took longer than one year (BAMF, 2017, p. 55).

out of the 13 non-city-states apply population size as the only criterion while the other five add one or more further criteria.[7] Since we know the quotas and the criteria on which these quotas hinge, we can control for the underlying factors driving the assignment of asylum seekers across Germany.

It is important to stress that the assignment process within the federal state is exogeneous for the individual asylum seekers and for the communities. Still, communities may sometimes mention desires beforehand, which the authorities try to consider. According to Schammann & Kühn (2016, p. 11): "In the assignment of refugees *[to the communities]* neither themselves nor the communities have a say. *[...]* However, the authorities of the federal state partly ask beforehand for the capacities and desires of the communities and arrange the assignments accordingly (e.g. with respect to family size or moving date)." (own translation). However, as the inflow of asylum seekers grew to be exceptionally large in 2015, the room for these adjustments shrunk substantially and subsequently challenged the entire allocation system in Germany. In the words of the Federal Minister of the Interior (Thomas de Maizière on 20. September 2016): "In the last year in the refugee crisis we were all all pushed to the limit. There was tremendous pressure put on our systems. We converted gymnasiums, built tents, and made a lot of provisional measures."[8] (own translation). "In practice, often disused public facilities (e.g. barracks, schools), panel flats or vacated high rises were and are being used *[as community housing]*." (own translation from Aumüller, Daphi & Biesenkamp, 2015, p. 35). As a result, there have been deviations from the official quotas—mainly due to restrictions in available housing.[9] We argue that this collapse of

[7] For instance, the state of North Rine-Westphalia which includes the Ruhr area—the most densely populated region in Europe—assigns asylum seekers to communities based on population size (weight 90 percent) and on the area of the community (weight 10 percent). The state of Brandenburg follows the same procedure but additionally weights the quota with the relative employment share of the districts within Brandenburg (Geis & Orth, 2016).

[8] Source: https://www.bmi.bund.de/SharedDocs/reden/DE/2016/09/2-zukunftskongress-migration-integration.html, last retrieved 14. Jan. 2018

[9] A similar argument is made by Braun & Dwenger (2017) who argue that right after WWII the abruptness of the inflow of expellees created quasi-random variation in the regional assignment because there was no time to plan a sensible distribution of those refugees across Germany. They further argue that housing availability was a crucial determinant back then.

the distribution system and the size of the influx of asylum seekers generated a quasi-experiment which will be at the heart of our identification strategy.

In sum, the allocation of asylum seekers to districts was based on federal and state quotas as well as on the sheer availability of (provisional) housing. The latter fact generates quasi-experimental variation in the allocation of asylum seekers which we will use for identification.[10] We argue that the variation in the allocation of asylum seekers can only be considered as quasi-random since 2015 when the inflow grew too large to be handled by regulated procedures alone.

For the empirical identification it is important that the regional assignment—based on quotas and deviations from the quotas—was not influenced by differential crime trends of the districts. We provide empirical evidence on this claim in table 2. It presents the results from regressing the inflow of asylum seekers to districts in 2015 (normalized by population size) on districts' trends in crime rates prior to the influx of asylum seekers. All regressions include state and year fixed effects. Standard errors are clustered at the district level. If there were significant correlations between past trends in crime rates and the current assignment of asylum seekers, this would be an indication that asylum seekers are indeed disproportionately assigned to districts with differing trends in crime. In this case trends in crime were correlated with asylum seekers' regional assignment and thus problematic for identification. Column (1) to (3) of table 2 present the estimates for specific crime rates with a two year lag. Additionally, column (4) shows the results of a regression taking into account all main types of crime as well as other changes in potentially important district characteristics. An F-test of joint significance of all crime rates cannot be rejected (at the 57 percent level). Since there is no statistically significant relationship between contemporaneous asylum seeker inflows and lagged changes in crimes, it seems that the

[10] Figure 5 in the appendix visualizes how this inflow rate is distributed across Germany. The map exemplifies that the distribution of asylum seekers within federal states was not only based on the administrative quotas but also on other factors. If state-to-district assignment had been based only on the population size of the districts, we should observe no variation between districts within a state because the maps are normalized by population.

assignment of asylum seekers in 2015 was not influenced by differential pre-trends in crimes at the district level. Based on this result as well as on the institutional framework for the assignment of asylum seekers, we assume in the following that the allocation of asylum seekers was quasi-random and not driven by factors related to crime.

The model presented in column (4) also shows that no other covariates correlate significantly with the regional assignment of the asylum seekers. In total, the independent variables in the model in column (4) are only able to explain 17 percent of the variation of the local asylum seeker inflows—hinting at a high randomness in the deviation of assigned asylum seekers within states. Tables 10 and 11 in the appendix display the same test separately for inflows from countries with high vs. low protection rates, respectively, again showing no indication of differential pre-trends in crime.

Next, we want to show further descriptive evidence suggesting that the regional assignment of asylum seekers contained a random element. In order to do so, we order districts by their percentage deviation of the actual intake of asylum seekers from their theoretical quotas. We then scatter the ranks of two consecutive years. We add simple linear fits. If we see strong positive correlations over time, this would imply a high regional persistence of deviations from the quota. Figure 2 shows that the correlations are decreasing from 2012 to 2016, meaning that regional persistence decreased as the inflow of asylum seekers grew larger. The break in the trend is clearly visible since 2015.[11] This suggests that there was indeed an unusual element in the regional allocation of asylum seekers in that exceptional phase which may contain some quasi-random variation.

[11] The bi-yearly correlations of rank also clearly decrease, from 0.76 in 2012/13 to 0.46 in 2015/16, again reflecting the break in 2015.

Table 2: Trends in crimes in 2013 and asylum seeker inflow in 2015

Dependent variable:	Δ log asylum seekers per population in t			
	(1)	(2)	(3)	(4)
Δ Total crimes per 100k residents $_{t-2}$	-0.145			0.031
	(0.174)			(0.205)
Δ Theft per 100k residents $_{t-2}$		-0.158		-0.124
		(0.146)		(0.178)
Δ Violent crimes per 100k residents $_{t-2}$			-0.100	-0.087
			(0.073)	(0.075)
Δ Vacant private housing $_{t-1}$ (%)				0.065
				(0.045)
Δ Unemployment rate $_{t}$ (%)				0.005
				(0.026)
Δ Unemployment rate of foreigners $_{t}$ (%)				-0.001
				(0.007)
Δ GDP per capita in EUR 1000 $_{t-1}$				0.002
				(0.005)
Δ Share of males under 35 $_{t-1}$ (%)				5.077
				(12.776)
Δ Share of school dropouts $_{t-1}$ (%)				-0.005
				(0.006)
N	788	788	788	788
adj. R^2	0.163	0.163	0.163	0.169

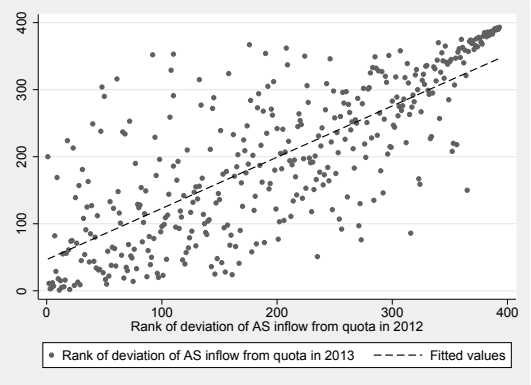
Notes: District-clustered standard errors in parentheses. All regressions include state and year dummy variables. T=2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Local GDP per capita, the share of males under 35 years, the share of school dropouts and the percentage of vacant housing is only available until 2015.

3.3 Residence obligations for asylum seekers and refugees

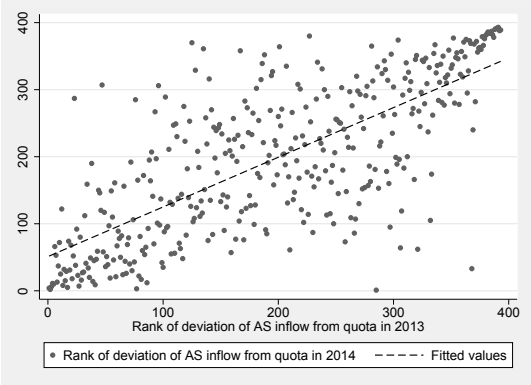
Asylum seekers are restricted from moving freely within Germany by law. Currently, Germany is the only country within the European Union with mandatory residence obligations for applicants for refugee status. According to this ordinance, applicants for asylum must not physically leave their place of residence (usually the federal state) for a maximum of the first three months of their stay in Germany. After this initial period, they need to continue *dwelling* in the place of residence as long as there is no decision on the asylum application or their living is not assured. Recall that decisions on the asylum application took on average 8.7 months in 2016 (after an

Figure 2: Scatter plot of ranks of deviations of asylum seeker intakes from the quota on the level of districts

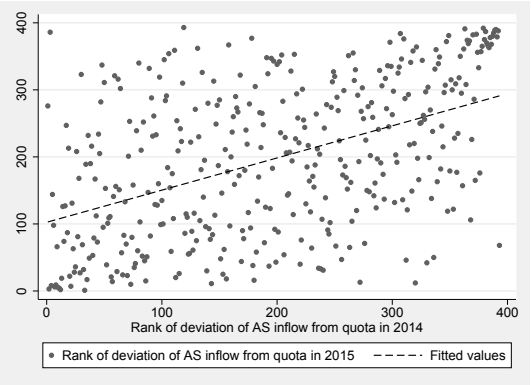
Ranks of 2012 (bottom) vs. 2013 (left)



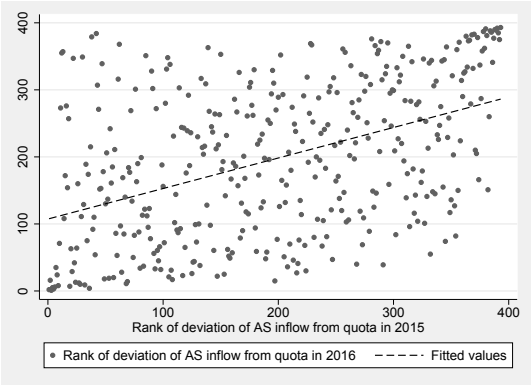
Ranks of 2013 (bottom) vs. 2014 (left)



Ranks of 2014 (bottom) vs. 2015 (left)



Ranks of 2015 (bottom) vs. 2016 (left)



Source: Own figures, data from AZR

average waiting time of 4.5 months until submission of the application) and therefore the majority of asylum seekers having arrived in late 2015 or early 2016 will not have moved by the end of 2016. Once the asylum claim is accepted, refugees used to be free to move. However, in mid 2016 a new "integration law" came into effect which requires even protected asylum seekers to continue dwelling in their place of residence for up to three years unless they take up a job, apprenticeship or university studies somewhere else and pay for their living. However, as finding an occupation elsewhere is a rare event and affordable housing is very scarce, most refugees

cannot afford moving somewhere else. Severe economic penalties incentivize asylum seekers to comply with the policy. In consequence, we consider the initial quasi-experimental allocation of asylum seekers as stable for a considerable period of time.

4 Data and Descriptive Statistics

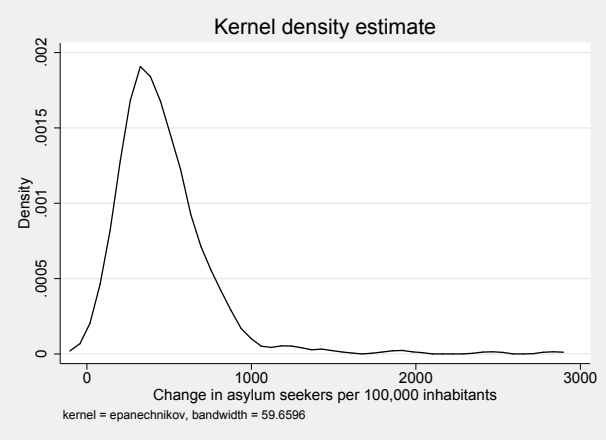
Our analysis combines several different data sets on the district level which corresponds to the NUTS–3 level. German districts are comparable in size to US counties with on average 200,000 inhabitants. So far, data data are only available up to the year 2016.

Asylum Seekers

Data on the number of asylum seekers stem from the Central Register of Foreign Nationals (AZR) which reports information about all foreign nationals living in Germany—about 10 million individuals. This data set is administered by the Federal Office for Migration and Refugees (BAMF). It is used by over 7,000 authorities and organizations, including police and customs authorities. We use an aggregated version of the data set provided by the Federal Statistical Office. Aggregation is on the district level and to 15 different residence permit statuses, each separated by nationality. For a few small districts no disaggregated data is available. From the different residence permit statuses we identify asylum seekers in the database as the sum of those who have submitted an application for asylum (mit Aufenthaltsgestattung) and those without any residence permit (ohne Aufenthaltstitel) where the latter is only taken for individuals from top refuge countries. We define our inflow variable of asylum seekers in this way, since immigrants under these categories are most likely recently arrived individuals either having applied for asylum already or want to apply but did not have the chance yet (recall the discussion on waiting time to apply for asylum in section 3.1).

The *stock* of asylum seekers has increased by almost a factor of seven from about 122,400 in 2012 to 830,600 in 2016. Taking the first difference from this stock of asylum-seekers gives

Figure 3: Distribution of changes in asylum seekers per 100,000 inhabitants over 2015



Source: Own figure, data from Central Registry of Foreign Nationals

the net flows, which are almost always positive in 2015 (>99%). For the year 2015, we refer to the net flow as the *in*flow due to the massive influx of asylum seekers. We use the net inflow of asylum seekers in 2015 as our main explanatory variable since the maximum of the inflow was reached between summer 2015 and early spring 2016 (recall figure 1). As data on the residence location of foreigners is reported annually on Dec 31st, the difference of the stock of asylum seekers on Dec 31st of 2014 to Dec 31st of 2015 is the best measure for the unexpected inflow.

The inflow of asylum seekers per 100,000 inhabitants in 2015 was on average 485 additional asylum seekers up from 329 in 2014 to 804 in 2015. The corresponding median rate of asylum seekers was 410, with a minimum of −1103 (in Würzburg) and a maximum of 7184 (in Schweinfurth). Figure 3 shows the density of this inflow across districts after exclusion of the minimum and the maximum value.

Total Protection Rates

The outcomes of asylum applications are summarized and reported by the BAMF for each country of origin. The "total protection rate" (TPR) summarizes the share of applicants which are admitted a protection status which allows the asylum applicant to stay in Germany for

Table 3: Total protection rates (TPR) for 2016

Country	High TPR	Country	Low TPR
Afghanistan	55.8	Albania	0.4
Eritrea	92.2	Algeria	2.7
Iran	50.7	Bosnia & Herzeg.	0.2
Iraq	70.2	Gambia	6.5
Syria	98.0	Kosovo	0.4
Somalia	71.2	Morocco	3.6
Unknown	84.4	Macedonia	0.5
		Nigeria	9.9
		Pakistan	3.3
		Russia	5.2
		Serbia	0.3
		Tunisia	0.8
		Turkey	8.2

Source: BAMF Asylgeschäftsbericht 2016.

some time. Protection statuses include: recognition as a refugee under the Geneva convention, recognition as a refugee under the German constitution, subsidiary protection, and a deportation ban (see also table 1). As presented in table 3, the total protection rate in the year 2016 varied between 98 percent for Syria and less than 1 percent for countries from the former Yugoslavia. Note that we define two groups of asylum seeker sending countries: those with protection rates of above 50 percent and those with protection rates of about 10 percent or lower (also see figure 4).[12]

For asylum seeker countries with a total protection rate higher than 50 percent in 2016, we categorize these countries as countries from which asylum seekers have a high chance of staying in Germany—as defined by the Federal Office for Migration and Refugees. These countries include Afghanistan, Eritrea, Iran, Iraq, Somalia, Syria as well as asylum seekers from unknown sending countries. Asylum seekers from sending countries with total protection rates under ten percent are classified as having a low expected chance of staying in Germany. To this group belong

[12]Our categorization into high vs. low protection countries does not change when using TPRs for 2015 instead.

Macedonia, Bosnia and Herzegovina, Turkey, Russia, Albania, Serbia, Kosovo, Pakistan, Nigeria, Gambia, Morocco, Algeria and Tunisia. As the BAMF does not report the protection rates for all sending countries, we have to discard about five percent of the inflow when disaggregating it. Of the remaining inflow of asylum seekers in 2015, 53 percent stem from countries with high protection rates and 47 percent from countries with low protection rates.

Crime Rates

The crime data are obtained from the Federal Criminal Police Office of Germany (BKA). They report all crimes by crime category on a yearly basis. We use an aggregation to the district level, based on the full sample of all crimes reported to the police. Reported crimes, naturally, are a sub-category of all committed crimes. Crimes are counted case-wise and do not require the identification of a suspect or offender in order to enter the database. We will analyze crime rates for total crimes (without offenses to asylum laws)[13] as well as for burglary, theft and violent crimes. These categories are chosen based on the economic theory of crime which has been developed with a particular focus on property crime (Becker, 1968). Furthermore, theft may be particularly easy to commit for people who are potentially in need and are new to the country.

Crime rates, our main outcome variables, are defined as crimes committed per 100,000 inhabitants in 2013. We keep population size constant to 2013 levels in order to avoid the estimation of spurious effects which may result from variations in the denominator only (see the discussion in Clemens & Hunt, 2017). At the same time, this procedure excludes a mechanical reduction in crime rates as the number of asylum seekers adds to the population.

The sum of all crimes has slightly increased from less than 6 million in 2013 to below 6.3 million in 2016, an increase of 6.4 percent. Average crime rates per district increased from a low of 6.401 in 2013 to 6.978 in 2016, an increase of nearly 9 percent over the course of three years.

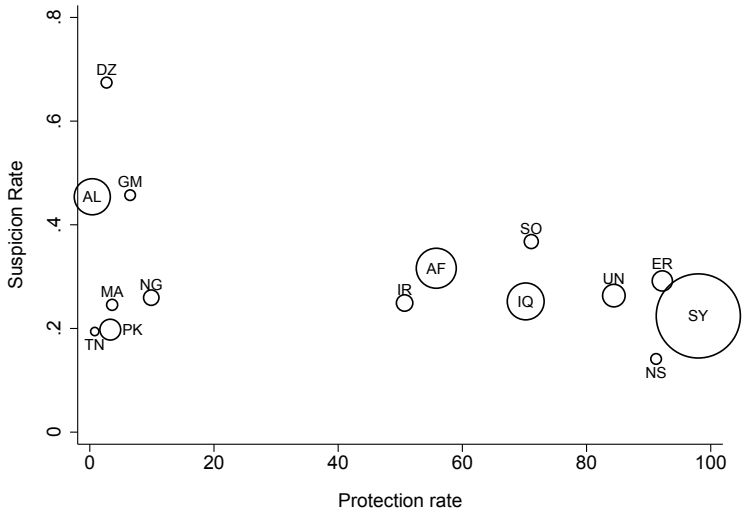
[13] We discard offenses against asylum law because these are predominantly unauthorized border crossings, which are in turn necessary to apply for asylum. We follow here the official representation from the BKA. See Gehrsitz & Ungerer (2016) for a discussion.

Up to this period there was a slight negative trend in crime rates. Figure 6 in the appendix shows the change in the total crime rate from 2015 to 2016 displaying no clear regional pattern. Theft is the largest crime category, accounting for about 2,400 crimes per 100,000 inhabitants per year.

Foreign Suspects

For several robustness analysis, we will use suspect data by nationality which are also provided by the BKA. Note that these data require the identification of a suspect and therefore refer only to a subset of reported crimes. In contrast to the information on reported crimes, these data are not counted case-wise but by persons who are suspected to have committed a crime.[14] From the available data we define "suspicion rates" as the share of suspects from a certain country in a year over the corresponding population from that country living in Germany.

Figure 4: Scatter plot of protection rate against suspicion rate on the level of nations



Country abbreviations: AL Albania, AF Afghanistan, IQ Iraq, SY Syria, DZ Algeria, IR Iran, GM Gambia, MA Morocco, NG Nigeria, SO Somalia, TN Tunisia, NS Stateless, PK Pakistan, ER Eritrea, UN Unknown

Source: Own figure, data from BKA and BAMF

[14] For example, a crime committed by two suspects would be counted once for the number of crimes (above) and twice for the number of suspects.

Further regional data

Additional regional data on the district level are provided by the Federal Statistical Office. These data will be used as covariates in the regressions and include the following: Share of foreigners, GDP per capita, unemployment rate, unemployment rate among foreigners, share of population below 35 years of age, and the share of vacant private housing. Descriptive statistics on these variables can be found in table 4. Furthermore, we would ideally control for changed police spending. Unfortunately, this information is not available on the district level. Instead we use clearance rates on the district level as a proxy for the costs of crime to the offender (following Ehrlich, 1973).

Table 4: Descriptive Statistics

	2014		2015		2016	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Asylum seekers per 100,000 residents						
Asylum seekers	329.23	(152.00)	804.05	(496.44)	948.65	(721.72)
Δ Asylum seekers	0.53	(0.25)	0.87	(0.38)	0.11	(0.43)
Crime rates (i.e. crimes per 100,000 residents)						
Total crimes	6285.59	(2642.12)	6239.66	(2697.60)	6219.92	(2615.81)
Theft	2399.37	(1342.50)	2412.52	(1396.19)	2293.12	(1321.49)
Violent crimes	190.09	(99.83)	190.03	(99.59)	207.22	(103.00)
Suspect rates (i.e. suspects per 100,000 residents of that nationality)						
German suspects total crime	2235.88	(744.61)	2135.58	(709.06)	2082.78	(684.51)
German suspects theft	442.70	(197.12)	408.61	(187.16)	382.68	(177.02)
German suspects violent crimes	157.84	(73.45)	147.38	(69.34)	150.18	(72.23)
Turkish suspects total crime	8431.64	(6889.64)	7694.58	(5782.75)	7572.88	(6684.09)
Turkish suspects thef	1078.12	(1084.90)	918.63	(902.37)	878.21	(933.80)
Turkish suspects violent crimes	976.80	(1275.32)	868.14	(948.85)	792.12	(831.36)
Further regional variables						
Vacant housing in 2012	5.78	(2.82)	5.37	(3.05)	0.00	(0.00)
Share of males below age 35 in %	18.34	(1.74)	18.66	(1.80)	0.00	(0.00)
School dropout rate	5.63	(2.32)	5.77	(2.22)	0.00	(0.00)
Number of foreigners per 100,000 residents	7632.19	(4774.77)	8865.12	(4889.48)	.	.
Unemployment rate	6.26	(2.89)	5.99	(2.77)	5.68	(2.65)
Unemployment rate of foreigners	13.81	(5.86)	14.62	(6.57)	16.91	(8.79)
Clear up rate of total crimes	60.14	(6.97)	61.38	(8.60)	61.81	(8.10)
GDP per capita in EUR 1,000	33.34	(15.06)	34.45	(14.82)	0.00	(0.00)
N	394		394		394	

5 Empirical Strategy

We are interested in the causal effect of the immigration of asylum seekers in 2015 on regional crime rates. Assuming a linear dependency between immigration and crime, we formalize the following relationship:

$$\ln(crime_{dst}/\overline{pop}) = \delta \ln(AS_{d,2015}/\overline{pop}) + X_{dst}\beta + c_d + (c_s \times c_t) + c_t + u_{dst}\,, \tag{1}$$

where $\ln(crime_{dst}/\overline{pop})$ refers to the log of a specific crime rate in district d in state s in year t and $\ln(AS_{d,2015}/\overline{pop})$ to the log-transformed number of asylum seekers per resident population in the respective district in 2015. We normalize the number of asylum seekers by population size in order to measure the *intensity* of the increase in the number of asylum seekers and to obtain a measure which is comparable across districts of all sizes. We set $\overline{pop}$ to the district's population size of the year 2013, i.e. prior to the large immigration of asylum seekers. X_{dst} captures the time-variant characteristics of the districts. By including c_d and c_t we control for the time-invariant characteristics of the districts and year effects, respectively. Furthermore, since the organization of the police as well as the allocation of asylum seekers are responsibilities of the state, we also control for time-varying state trends by interacting c_s with year dummies. Controlling for diverging state trends is important in case federal states adopt different strategies over time to cope with the assignment of asylum seekers and with crime.

Our parameter of interest is δ. Since we are not able to measure c_d entirely and want to avoid any time-invariant confounding variable at the district level, we take the first difference of equation (1). Moreover, we want to separate immediate immigration effects from lagged effects on crime. Arguably as Piopiunik & Ruhose (2017) point out, for criminal activity to start some time has to pass. That leads to the following estimation equation:

$$\begin{aligned}\Delta \ln(crime_{dst}/\overline{pop}) = \sum_{t=2015}^{2016} [\delta_t \Delta \ln(AS_{d,\Delta 2015-2014}/\overline{pop}) \times year_t] \\ + \Delta X_{dst}\beta + c_s + c_t + \Delta u_{dst}\,.\end{aligned} \tag{2}$$

In the first-difference equation (2) $\Delta \ln(AS_{d,\Delta 2015-2014}/\overline{pop})$ can be interpreted as the inflow of asylum seekers to the districts in 2015, since in that year all districts received an outstanding number of new-incoming asylum seekers.[15] Our outcomes are measured in changes for two time periods such that our estimation model comprises the changes from 2014 to 2015 and from 2015 to 2016.[16] Hence, we are interacting the inflow of asylum seekers with year dummies $year_t$ equal to unity for the corresponding $t = 2015, 2016$, thereby obtaining estimates by year for our parameter of interest (see Moser, Voena & Waldinger, 2014). The estimates of the parameter δ_t reflect the percentage change in district crimes rates following a one percent increase in the number of asylum seekers per population in 2015. It answers the question: 'By what percent do crime rates change in districts that host an extra 1% of asylum seekers?', i.e. the elasticity of crime rates with respect to the inflow of asylum seekers.

In order to allow for a causal interpretation of δ, two assumptions on the estimation have to be made. First, there must be no omitted variable which influences changes in the regional crime rates as well as the inflow of asylum seekers. We are not too concerned about omitted variables since we dwell on a quasi-experimental distribution of asylum seekers as argued in section 3. Notwithstanding, we control for various district characteristics in the estimation. Second, pre-influx trends in crime rates should not systematically differ between districts with different inflows of asylum seekers in later years. We investigated this issue by regressing the asylum seeker inflow in 2015 on pre-trends in crime rates in section 3.2. The (placebo) regressions suggest that there is no statistically significant relationship between the asylum seeker inflow of 2015 and lagged changes in crimes, implying that the asylum seeker assignment in 2015 does not correlate with differential pre-trends in crimes at the district level.

Next, we want to differentiate the effect of the inflow of asylum seekers by their probability

[15] As this immigration shock is precisely visible in the data for 2015 (see figure 1), we focus on the inflow of asylum seekers in that year as our main explanatory variable.

[16] Outcomes from the year 2017 will be added as soon as the data are available, presumably in mid 2018.

of staying in the host country. In order to do so, we separate the inflow into two categories corresponding to *Lowlandians* and *Highlandians*. Analogous to the specification in equation (2) we obtain the following model:

$$\begin{aligned}\Delta \ln(crime_{dst}/\overline{pop}) = \sum_{t=2015}^{2016} \big[\delta_t^{low} \Delta \ln(AS\_low_{d,\Delta 2015-2014}/\overline{pop}) \times year_t \\ + \delta_t^{high} \Delta \ln(AS\_high_{d,\Delta 2015-2014}/\overline{pop}) \times year_t\big] \\ + \Delta X_{dst}\beta + c_s + c_t + \Delta u_{dst}\,,\end{aligned} \tag{3}$$

where $AS\_low/high$ refers to asylum seekers from countries with a low or high probability of receiving a protection status, respectively.

Again, we want to interpret δ^{high} and δ^{low} as causal parameters. In the appendix in table 10 and 11, we report the same (placebo) tests for the disaggregate inflows of asylum seekers as for the aggregate. These, too, confirm that there is no correlation with pre-trends in crime rates.

6 Estimation results

6.1 Effects of Immigration on Different Types of Crime

Table 5 presents the estimated coefficients for our main parameter of interest δ from equation (2), the causal impact of a one percent change of the number of asylum seekers in 2015 per 100,000 residents on the percentage change in different crime rates. The coefficients in all these models can be interpreted as elasticities. All models include fixed effects on the federal state level and control variables for the first-differences of the local unemployment rate in general and for foreigners in particular, the share of foreigners living in the district, the share of school dropouts and males under 35 as measures of the size of the population with high criminal potential, as well as the percentage of vacant private housing facilities. The table is divided into two panels, each column with a different type of crime rate as dependent variable. For each dependent variable we estimate two different models. Panel A displays estimation results for a single-year model only for the changes in crime rates from 2015 to 2016, i.e. for the year following the large influx of

asylum seekers. Panel B shows results for the model from equation (2) described in the estimation section which pools changes in crime for the years 2015 and 2016.

The first column of table 5 presents the effect of the inflow of asylum seekers on changes in the *total* crime rate without crimes against the asylum laws. In the first model in panel A, we estimate an elasticity of the total crime rate of 0.022 percent. The second model in panel B, in which we interact the inflow of asylum seekers with year dummies for 2015 and 2016, shows a slightly greater elasticity for the year 2016 of 0.029 percent. The estimated elasticity for 2015 is negative and significant. We argue that this is due to the fact that the inflow of asylum seekers was largest in the last months of 2015. This way newly arriving asylum seekers count towards the inflow variable while not having the time to influence crime rates in 2015 substantially. Recall that we exclude any mechanical effect by which the incoming population of asylum seekers reduces crime *rates* mechanically because we keep the denominator constant over time.

For the crime category *theft* in column (2), we find no statistically significant effect in the single-year model. However, there is a marginally significantly positive estimate for the effect of the asylum seeker inflow on changes in theft in 2016 in the pooled model. The estimated elasticity for theft of 0.032 percent has approximately the same size as the one for total crimes.

The estimated coefficients for *violent crimes* in column (3) are statistically insignificant. We conclude that these crimes are largely unaffected by the total inflow of asylum seekers. This seems reasonable in light of the economic theory of crime.

6.2 Causal Effect on Crime Rates Separated by Protection Rates and Channels

We now turn to the main results separating the asylum seekers' inflow by protection probabilities, denoted by *high* and *low*, see table 6.

A remarkable insight of splitting the inflow into two different groups is the result that increases in total crime rates and in theft are solely driven by the inflow of asylum seekers with

Table 5: Effect of asylum seeker inflow on changes in crime rates (i.e. crimes per 100k residents)

Panel A: $\Delta_{2016-2015}$	Δ Total crimes	Δ Theft	Δ Violent crimes
AS_{2015}	0.022**	0.025	0.025
	(0.011)	(0.017)	(0.018)
adj. R^2	0.108	0.201	0.371
N	394	394	394
Covariates	Yes	Yes	Yes
Fixed Effects	State	State	State

Panel B: Pooled	Δ Total crimes	Δ Theft	Δ Violent crimes
$AS_{2015} \times year_{2015}$	-0.019**	-0.001	-0.021
	(0.008)	(0.011)	(0.019)
$AS_{2015} \times year_{2016}$	0.029***	0.032*	0.013
	(0.011)	(0.017)	(0.017)
adj. R^2	0.051	0.142	0.199
N	788	788	788
Covariates	Yes	Yes	Yes
Fixed Effects	State	State	State

Notes: District-clustered standard errors in parentheses. T=2 for panel B. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Covariates include Share of foreigners, GDP per capita, unemployment rate, unemployment rate among foreigners, share of population below 35 years of age, and the share of vacant private housing.

low protection rates, i.e. with a low probability of staying in Germany. For this group's inflow the elasticity of crime rates lies between 0.035 percent for total crimes and 0.052 percent for theft (see panel B of 6). At the same time, the inflow of asylum seekers from countries with high protection rates does not affect crime rates, i.e. that elasticity is indistinguishable from zero. This result holds for each of the different types of crimes.

This key result confirms the necessity to consider protection rates in the estimation of the impact of an inflow of immigrants on crime. It improves the understanding of how immigration translates into criminal activity: the different staying probabilities translate directly into divergent criminal activity. There are different channels which may explain this finding. First and foremost

it is possible that the temporariness of immigration not only affects efforts for integration into the labor market as shown by Cortes (2004) and Dustmann & Görlach (2016a) but translates into criminal activity as well. However, differences in criminal behavior across various expected durations of stay may also be due to other channels. Therefore, in a next step, we empirically check different alternative channels.

6.2.1 First Channel: German Suspects

So far we have found that there is an important impact of immigration on crime. However, this effect might be driven by offenders other than the newly-arrived asylum seekers themselves. For instance, natives might engage more often in unlawful expression of hatred against foreigners (Entorf & Lange, 2017). We test this hypothesis by regressing the change in the suspicion rate of natives on the inflow of asylum seekers. Therefore, we now use additional data on suspects by nationality as the dependent variable. These data are only available for three different types of crime: total crimes, theft and violent crimes. Specifically, we perform the following regression:

$$\Delta \ln suspicion\ rate^{j}_{dst} = \sum_{t=2015}^{2016} [\delta_t \Delta \ln(AS_{d,\Delta 2015-2014}/\overline{pop}) \times year_t] + \Delta X_{dst}\beta + c_s + c_t + \Delta u_{dst} \tag{4}$$

The dependent variable in the following estimations is defined as the ratio of German suspects in a district to all Germans living in that district. We report the estimated elasticities of German suspects in response to the inflow of asylum seekers in tables 7 and 8. It shows no significant effects for any type of crime for the year 2016 in panel A nor in panel B. Apart from being statistically insignificant the order of magnitude of these elasticities for natives is much smaller than in the main effect. Taken together, natives suspicion rates do not react to the inflow of asylum seekers, also not by violent hate crimes. From this we conclude that the newcomers themselves are largely responsible for the increase.

The negative effect for total crimes in 2015 could be either due to crowding-out of natives

from certain crimes or by reallocated police forces, who might now pay more attention to asylum seekers. This is what we will check in the next subsection.

6.2.2 Second Channel: Reporting Behavior or Police Attention

Second, reporting behavior or police attention might differ across offenders (Pfeiffer et al., 2018). There could be reallocated police forces, who might now pay more attention to foreign-looking individuals. For that reason, asylum seekers might not be more likely to commit crimes but to be detected. (At the same time, native suspects could be detected less frequently.) Note that the high probability group includes countries like Pakistan, Eritrea, and Somalia while the low probability countries include Syria, Nigeria, and Gambia. Hence, visual markers can be very similar between potential offenders from high vs. low probability countries. In turn, this would require the reporter to know the nationality of the offender which is very unlikely. From this we argue that different reporting behavior is very unlikely to drive our results. Nonetheless, we check this potential channel empirically.

In order to test different reporting behavior or police attention, we consider suspicion rates of Turks. They constitute one of the largest minority of foreigners living in Germany. If the increased number in crimes is driven by selective investigations of the police forces, this group might also experience an increase in the suspicion rate. This might be the case due to a presumably great overlap of visible ethnical markers such as hair and skin color between many asylum seekers from Middle Eastern countries and Turks. Therefore, we now use suspect data again and perform the corresponding regression as in the previous section just for Turks instead of Germans.

Table 9 summarizes the regression results with the suspicion rate of Turks as dependent variable. We find no evidence that this group is suspected more often of crimes due to the inflow of asylum seekers. If anything, there may be a slight negative effect in 2016. This suggests that either reporting behavior and the police are both unbiased, or crowding-out in the market for

crimes is affecting Turks in Germany.

6.2.3 Third Channel: Past Exposure to Violent Conflict

Third, the underlying reason for finding different crime reactions to an inflow of asylum seekers with high vs. low protection rates may be different exposure to violent conflict in the past. We estimate a marginally statistically significant positive elasticity of violent crimes for asylum seekers with low protection rates. This result may partly reflect violent crimes among asylum seekers, e.g. based on conflicts between ethnicities (also recall Couttenier et al., 2016 and Pfeiffer et al., 2018). However, although we cannot exactly address the question of who was exposed to violent conflicts in the past, our results do not confirm the findings from Couttenier et al. (2016) according to which "violence breeds violence". This is because countries with high protection rates are usually more exposed to violent conflict than countries with low protection rates. In fact, this is why protection rates are high in the first place. Hence asylum seekers with high protection rates would be predicted to having been exposed to violent conflicts with a higher probability and thus would be more prone to commit violent crimes themselves as compared to asylum seekers with low protection rates (Couttenier et al., 2016). However, we find no effect on violent crimes as a result of the inflow from high protection countries. Instead, our results show the opposite, i.e. violent crimes increase only as a result to the inflow from low protection countries. Therefore the "violent legacy" of asylum seekers (Couttenier et al., 2016) cannot explain our main finding but, instead, speaks in favor of other channels.

6.2.4 Fourth Channel: Selection

Fourth, the selection of individuals leaving their home country to enter Germany as an asylum seeker could be different in high vs. low probability countries. In order to check this channel we separate the inflow of asylum seekers *within* the group with a low probability of stay into those who have received protection vs. those who have not.

Table 6: Effect of asylum seeker inflow by protection rates on changes in crime rates

Panel A: $\Delta_{2016-2015}$	Δ Total crimes	Δ Theft	Δ Violent crimes
AS^{high}_{2015}	-0.003	-0.007	-0.006
	(0.007)	(0.011)	(0.013)
AS^{low}_{2015}	0.040***	0.057***	0.048***
	(0.010)	(0.016)	(0.018)
adj. R^2	0.138	0.232	0.378
N	394	394	394
Covariates	Yes	Yes	Yes
Fixed Effects	State	State	State

Panel B: Pooled	Δ Total crimes	Δ Theft	Δ Violent crimes
$AS^{high}_{2015} \times year_{2015}$	-0.011	0.002	0.002
	(0.007)	(0.008)	(0.016)
$AS^{low}_{2015} \times year_{2015}$	-0.005	-0.004	-0.035
	(0.009)	(0.012)	(0.022)
$AS^{high}_{2015} \times year_{2016}$	0.002	-0.001	-0.011
	(0.007)	(0.010)	(0.011)
$AS^{low}_{2015} \times year_{2016}$	0.035***	0.052***	0.045**
	(0.011)	(0.017)	(0.019)
adj. R^2	0.053	0.153	0.205
N	788	788	788
Covariates			
Fixed Effects	State	State	State

Notes: District-clustered standard errors in parentheses. T=2 for panel B. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Covariates include share of foreigners, GDP per capita, unemployment rate, unemployment rate among foreigners, share of population below 35 years of age, and the share of vacant private housing.

Table 7: Effect of asylum seeker inflow on changes in suspicion rates for natives

Panel A: $\Delta_{2016-2015}$	Δ Total crimes	Δ Theft	Δ Violent crimes
AS_{2015}	-0.005	0.006	-0.006
	(0.007)	(0.017)	(0.019)
adj. R^2	0.287	0.259	-0.002
N	394	394	394
Covariates	Yes	Yes	Yes
Fixed Effects	State	State	State

Panel B: Pooled	Δ Total crimes	Δ Theft	Δ Violent crimes
$AS_{2015} \times year_{2015}$	-0.020***	-0.005	-0.055***
	(0.006)	(0.012)	(0.020)
$AS_{2015} \times year_{2016}$	0.005	0.022	-0.008
	(0.008)	(0.016)	(0.017)
adj. R^2	0.311	0.330	0.079
N	788	788	788
Covariates	Yes	Yes	Yes
Fixed Effects	State	State	State

Notes: District-clustered standard errors in parentheses. T=2 for panel B. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Covariates include share of foreigners, GDP per capita, unemployment rate, unemployment rate among foreigners, share of population below 35 years of age, and the share of vacant private housing.

Table 8: Effect of asylum seeker inflow by protection rates on changes in suspicion rates for natives

Panel A: $\Delta_{2016-2015}$	Δ Total crimes	Δ Theft	Δ Violent crimes
AS_{2015}^{high}	-0.000	0.003	-0.006
	(0.006)	(0.013)	(0.018)
AS_{2015}^{low}	-0.001	0.018	0.003
	(0.008)	(0.021)	(0.022)
adj. R^2	0.284	0.261	-0.005
N	394	394	394
Covariates	Yes	Yes	Yes
Fixed Effects	State	State	State

Panel B: Pooled	Δ Total crimes	Δ Theft	Δ Violent crimes
$AS_{2015}^{high} \times year_{2015}$	-0.011**	0.001	-0.014
	(0.005)	(0.009)	(0.017)
$AS_{2015}^{low} \times year_{2015}$	-0.002	-0.009	-0.052**
	(0.006)	(0.015)	(0.023)
$AS_{2015}^{high} \times year_{2016}$	0.005	0.013	-0.006
	(0.005)	(0.011)	(0.015)
$AS_{2015}^{low} \times year_{2016}$	-0.002	0.014	0.003
	(0.009)	(0.021)	(0.021)
adj. R^2	0.307	0.330	0.079
N	788	788	788
Covariates	Yes	Yes	Yes
Fixed Effects	State	State	State

Notes: District-clustered standard errors in parentheses. T=2 for panel B. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Covariates include share of foreigners, GDP per capita, unemployment rate, unemployment rate among foreigners, share of population below 35 years of age, and the share of vacant private housing.

Table 9: Effect of asylum seeker inflow on changes in suspicion rates for Turks

Panel A: $\Delta_{2016-2015}$	Δ Total crimes	Δ Theft	Δ Violent crimes
AS_{2015}	-0.079**	-0.199*	0.004
	(0.038)	(0.111)	(0.070)
adj. R^2	0.032	0.024	0.020
N	394	351	335
Covariates	Yes	Yes	Yes
Fixed Effects	State	State	State

Panel B: Pooled	Δ Total crimes	Δ Theft	Δ Violent crimes
$AS_{2015} \times year_{2015}$	-0.050	-0.010	0.082
	(0.032)	(0.066)	(0.070)
$AS_{2015} \times year_{2016}$	-0.054	-0.180	-0.051
	(0.038)	(0.110)	(0.072)
adj. R^2	0.038	0.024	-0.004
N	787	705	679
Covariates	Yes	Yes	Yes
Fixed Effects	State	State	State

District level clustered standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

7 Concluding Remarks

In this study, we analyze the impact of an exceptional inflow of asylum seekers on crime rates. By separating asylum seekers by the likelihood to receive a protection status we are able to shed some light on the channels that drive crime rates after immigration.

The setting is the large and unexpected inflow of asylum seekers around 2015 to Europe and to Germany, by far the largest host country registering about 890,000 people in 2015 alone. The inflow consisted mainly of young men—a group particularly at risk of becoming criminally active.

It has been shown before that temporariness of migration plays a role for efforts for integration with respect to the labor market (Cortes, 2004; Dustmann & Görlach, 2016a). Based on the standard economic theory of crime developed by Becker (1968) and Ehrlich (1973) we expect that there could be a similar effect on crime. More precisely, we hypothesize that the probability of staying in the host country affects asylum seekers' criminal activity. We are not aware of any literature having studied this aspect before.

In order to address the potential endogeneity problem of regional sorting of immigrants, we make use of a quasi-experimental assignment of asylum seekers across districts. The inflow of asylum seekers pushed housing capacities to the limits—resulting in a random component in the distribution of asylum seekers due to sheer capacity constraints in housing. We use this quasi-random regional variation for identification.

Our estimation results on the overall inflow of asylum seekers to Germany indicate significant positive effects on crime rates. For total crimes and for theft, a one percent increase in the inflow of asylum seekers in 2015 leads to an increase in crime rates in 2016 of about 0.03 percent. Given that the number of asylum seekers in a district increased over the course of 2015 on average by about 160 percent, a simple back-of-the-envelope calculation would suggest that total crime rates and theft have increased by 4.8 percent in response. The fact that we observe reductions

in overall crime rates instead implies that crime rates would have decreased by much more in the absence of the inflow of asylum seekers. For violent crimes we find no statistically significant effect.

The key result comes from differentiating the asylum seeker inflow from high vs. low protection countries. It shows that the increase in crime rates is completely driven by newly-arrived asylum seekers from low protection countries while the inflow of asylum seekers from high protection countries displays a zero effect on crime. Starting from this result, we try to shed light on the channels of how immigration translates into criminal activity. First, we show that suspicion rates of natives show no reaction which is causally due to the inflow of asylum seekers. This result suggests that it is asylum seekers themselves who commit the additional crimes. Second we show that suspicion rates for Turks do not increase in response to the inflow of asylum seekers. This suggests that crime reporting to the police seems to be unbiased. Third, exposure to violent conflicts in the past does not appear to be the driving factor for crime rates to increase. If anything, the opposite may be true for this particular group of immigrants. Finally, regional characteristics seem not to be able to explain our results. Our main results hold for several robustness checks.

By excluding the importance of alternative channels one by one, we argue that it is indeed the perspective of being able to stay in the host country and to access its labor market which is a key determinant of criminal activity. It should therefore be considered in future analyses. This result allows predictions about which groups of immigrants are most prone to commit crimes in the host country. It also allows policy makers to target police efforts as well as integration measures and changes in the law for asylum towards the different groups.

The topicality of the exceptional inflow of asylum seekers allows us to observe only short-term effects, so far. We plan to add analyses for the year 2017 as soon as the data are available. In any case, it is possible that increases in crime rates are only short-term and fade out quickly.

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8 Appendix

Table 10: Trends in crimes and asylum seeker inflow with high staying probability

Dependent variable:	Δ log asylum seekers per population in t			
	(1)	(2)	(3)	(4)
Δ Total crimes per 100k residents $_{t-2}$	-0.042			0.299
	(0.240)			(0.294)
Δ Theft per 100k residents $_{t-2}$		-0.203		-0.253
		(0.188)		(0.232)
Δ Violent crimes per 100k residents $_{t-2}$			-0.161*	-0.165
			(0.096)	(0.101)
Δ Vacant private housing $_{t-1}$ (%)				0.139**
				(0.064)
Δ Unemployment rate $_{t}$ (%)				0.012
				(0.036)
Δ Unemployment rate of foreigners $_{t}$ (%)				-0.007
				(0.010)
Δ GDP per capita in EUR 1000 $_{t-1}$				0.001
				(0.008)
Δ Share of males under 35 $_{t-1}$ (%)				10.475
				(17.265)
Δ Share of school dropouts $_{t-1}$ (%)				-0.003
				(0.008)
N	788	788	788	788
adj. R^2	0.230	0.231	0.232	0.245

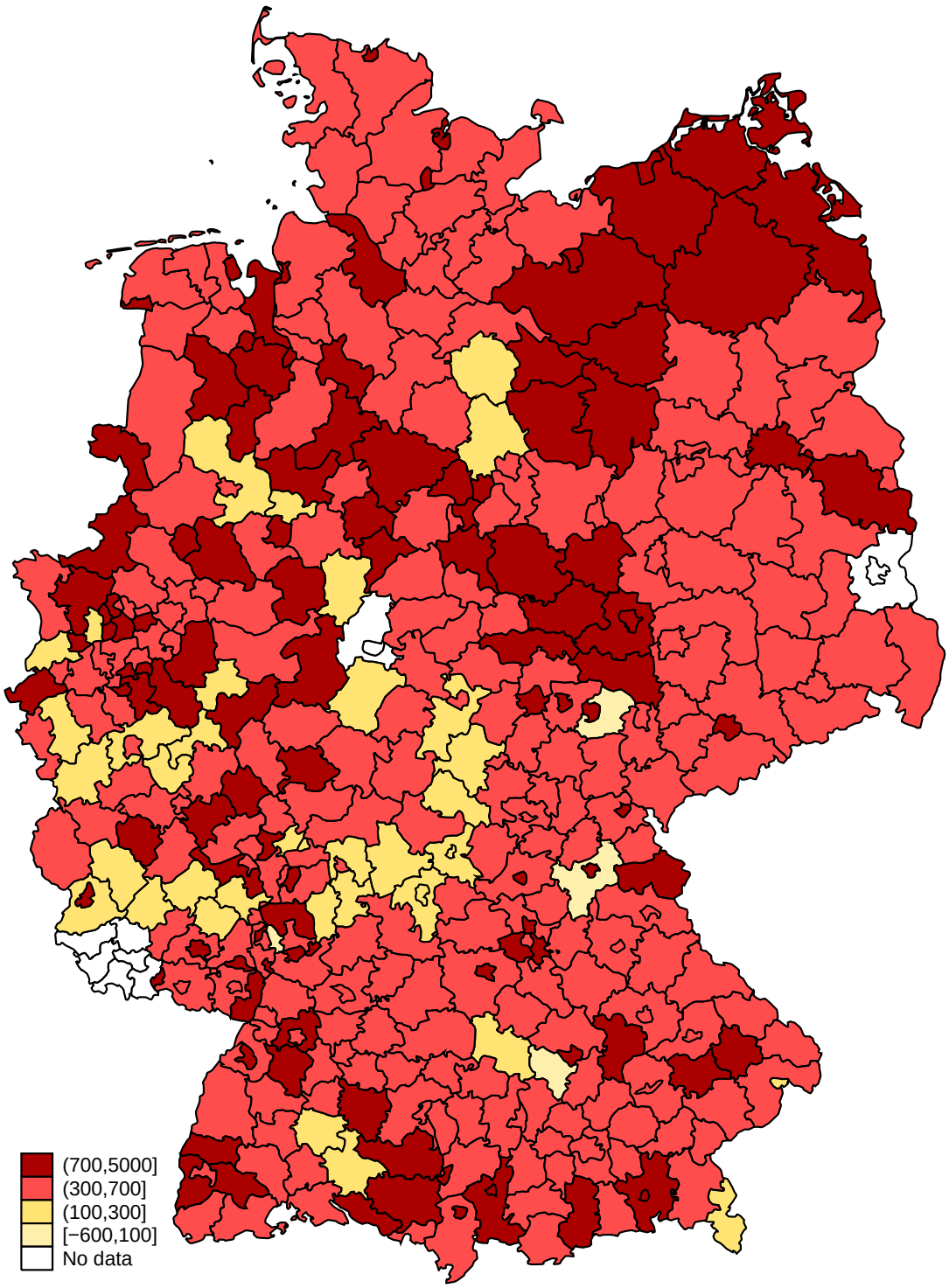
Notes: District-clustered standard errors in parentheses. All regressions include state and year dummy variables. T=2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Local GDP per capita, the share of males under 35 years, the share of school dropouts and the percentage of vacant housing is only available until 2015.

Table 11: Trends in crimes and asylum seeker inflow with low staying probability

Dependent variable:	Δ log asylum seekers per population in t			
	(1)	(2)	(3)	(4)
Δ Total crimes per 100k residents $_{t-2}$	-0.235			-0.146
	(0.197)			(0.243)
Δ Theft per 100k residents $_{t-2}$		-0.200		-0.109
		(0.170)		(0.210)
Δ Violent crimes per 100k residents $_{t-2}$			0.024	0.064
			(0.079)	(0.077)
Δ Vacant private housing $_{t-1}$ (%)				0.041
				(0.043)
Δ Unemployment rate $_{t}$ (%)				0.022
				(0.021)
Δ Unemployment rate of foreigners $_{t}$ (%)				-0.002
				(0.005)
Δ GDP per capita in EUR 1000 $_{t-1}$				0.007
				(0.008)
Δ Share of males under 35 $_{t-1}$ (%)				-7.425
				(13.960)
Δ Share of school dropouts $_{t-1}$ (%)				-0.001
				(0.007)
N	788	788	788	788
adj. R^2	0.102	0.103	0.101	0.111

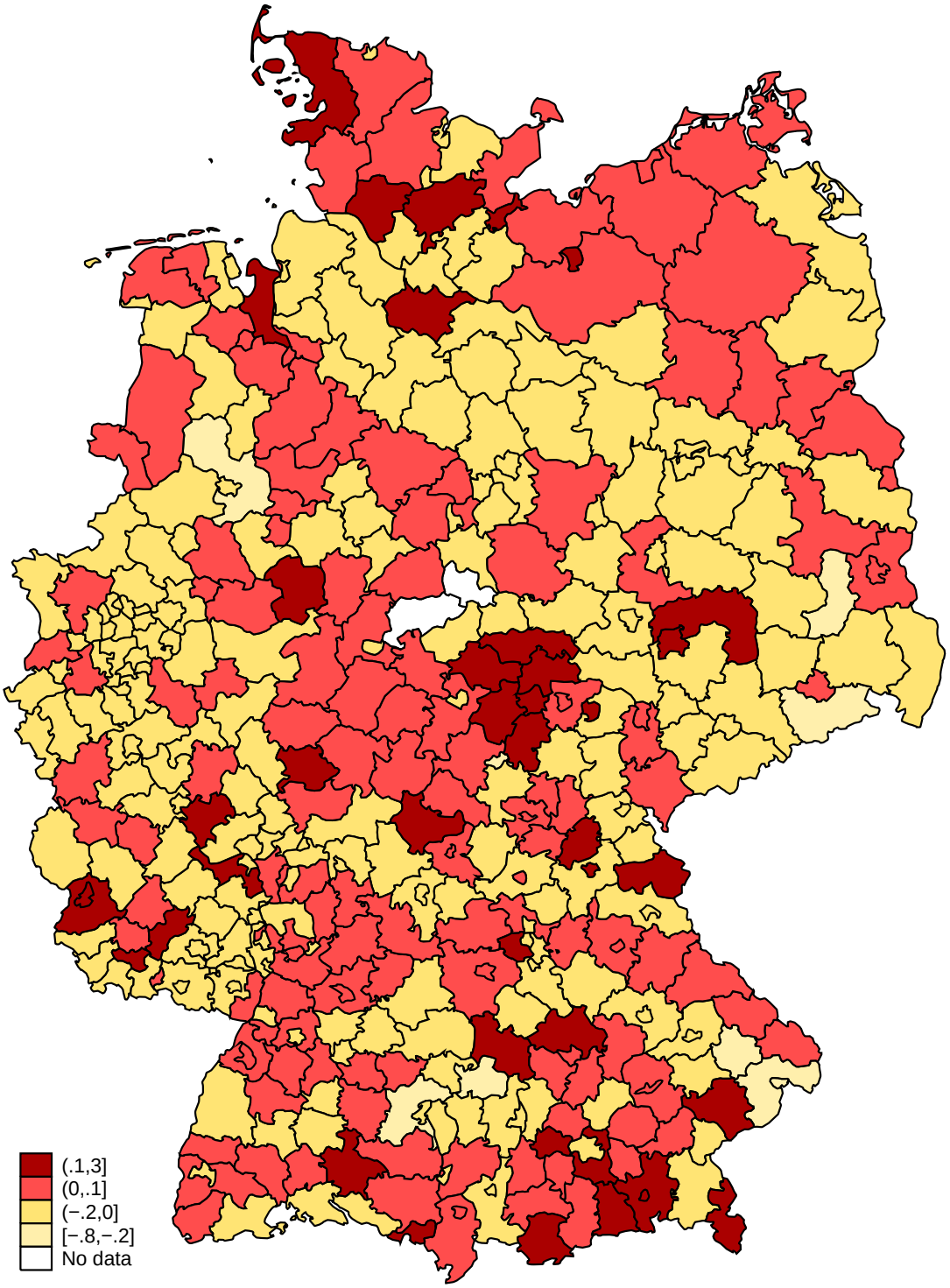
Notes: District-clustered standard errors in parentheses. All regressions include state and year dummy variables. T=2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Local GDP per capita, the share of males under 35 years, the share of school dropouts and the percentage of vacant housing is only available until 2015.

Figure 5: Change in stock of asylum seekers per population in 2015



Source: Own figure, data from AZR

Figure 6: Change in crime rate in percent for TOTAL CRIMES, except crimes against asylum laws, in 2016



Source: Own figure, data from BKA